

Analysis of the local context related to Aromatic and Medicinal Plants used in Food industry in Portugal, Romania, Spain and Slovakia



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INTRODUCTION

1.1 AROMATIC HERBS AND SPICES IN PORTUGAL

Aromatic herbs and spices are plants or plant parts, widely known and used for millions of years by the human being, in fresh, dried or frozen forms. When used in culinary, these products are flavour enhancers (seasoning) also helping preserving foods due to their antimicrobial properties. Aromatic herbs are very utilized in celebrations and rituals, in infusions and incense, for instance, as aphrodisiac products.

Nowadays, due to the increasing use of natural products and to the possible positive effect of aromatic herbs and spices on health, the knowledge on their role in culinary uses and their pharmaceutical applications is of paramount importance.

In the last years, the production of aromatic herbs and spices in Portugal has markedly grown, thus winning new producers for this activity.

The aromatic, medicinal and culinary herbs cover a large number of species that can be applied in food, pharmaceutical, chemical and cosmetic industries through the extraction of the active ingredients or essential oils, also being used for infusion. In either case there may or may not be processing involved, depending on the purpose for which they are intended.

According to figures provided by the Ministry of Agriculture and Sea these farms increased considerably from 2009 to 2012, with an increase from 80 to 180 hectares in farms area. Also, it was possible to observe an increase in the number of producers from 93 to 147 producers. This strong growth is due to the entry of young farmers in the sector, with a high level of education, who settled under ProDer program. As it might be observed on Figure 1, the producers of aromatic and medicinal herbs are distributed by the whole country.



Fig. 1 Map of Portuguese distribution of producers of aromatic and medicinal herbs

The producers of aromatic and medicinal herbs differ in the production destination: the ones that specialize for fresh consumption and the ones engaged in the production to dry. These last ones choose for organic production for the majority of the production, while in the green consumption typology, the two modes of production coexist, with the conventional mode dominating.

A third of producers sell the production in fresh and two-thirds sell the dried leaves, 10% is dedicated to the extraction of essential oils and a quarter of respondents are nurseries. In the segment of fresh production, conventional production method is crucial, with the organic method dominating in the dry production segment.

The fresh aromatic and medicinal herbs, produced outdoor, temporary or permanent, in conventional production, represent about 78% of the total area for fresh, including nurseries. The five major cultures by area are coriander (71%), celery (5%), parsley (4%), basil (3%) and mint (2%).

The area of fresh aromatic and medicinal herbs, produced organically is reduced when compared with conventional production, with only 14.5% of the area. The five major crops occupy an area corresponding to 10% of total: chard (3%), coriander, chives (2%), basil (2%) and parsley (1%).

The rest and most of the area (90%) is occupied by multiple species, with areas less than 5 hectares per farm, i.e., grown in areas of very small size and with low productions, normally flowing to niche markets.

The area of the dried aromatic and medicinal herbs, produced outdoor, screened, temporary or permanent, in conventional and organic production, is 44.52 hectares, much higher value (60%) for the fresh aromatic and medicinal herbs.

As in this group strongly dominates the organic production method, dried aromatic and medicinal herbs in conventional production were not considered.

Dried aromatic and medicinal herbs from organic production methods, are grouped by gender. It is noted that only two species, Lucia-lima, with 27%, and thyme, with 18%, occupy almost half of the total area of the group. Following are mint, lemon grass and the savory, which show values of 12%, 8% and 7%, respectively. The first five species account for 72% of the total area, a concentration of production of a limited set of option species.

This is a high growth potential sector, due to the either established and/or in installation phase companies, which focus on dried herbs and biological medicines segment. There are, however, limiting factors namely: the technical requirements, the use of hand labor, the financial costs for farm management, flow difficulties and the small size of holdings. Due to the growth of this market at both Community and global level, higher dimension holdings are required to individually place the product on the market.



1.2 HERBAL FOOD SUPPLEMENTS IN ROMANIA

From the huge variety of food supplements existing on the Romanian market the herbal food supplements are the main important sector and has several characteristics:

- The food chain is shorter than other processed food;
- It needs less production costs with smaller production areas, less equipment's, etc. than other highly processed food;
- Represent an important part of local manufacturers of food supplements in Romania; the majority of local food companies belongs to SMEs, even micro-enterprises, that focus on traditional manufacture of medicinal plants (old recipes and products formula), distribution of herbal products in trade fairs of rural area; these products have to be more very carefully monitored and manufacturers have to be well trained;
- The products being dried in a protective way (minimal processing), are more susceptible of altering the nutritional and safety quality during the storage time.

Medicinal plants, a valuable local resource

The variety of soil, climate and relief resulted in a rich and diverse vegetation in Romania. Almost 30-40% of the European flora and fauna could be found here. Out of the near 3700 species of registered higher plants, around 700 are traditionally used as medicinal (Parvu, 1991), 324 species scientifically proved to have therapeutic properties and 180 species can be used at industrial scale for plant extraction and different natural product obtaining.

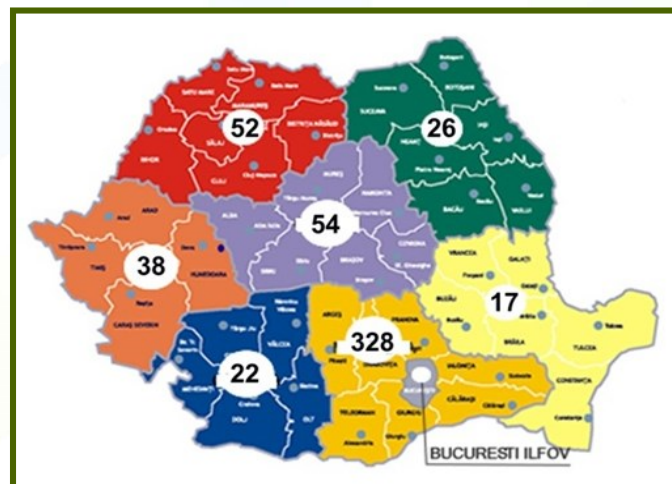


Fig. 2. Herbal Food supplements business operators working on Romanian territory

Romanian flora has more than hundred species of tinctorial value, which contain very resistant and bio-degradable pigments, used in food industry as colouring agents ("digestive pigments"), cosmetic (hair care) or natural fibres dyeing (especially wool and cotton). There are also 40 interesting species for their content in tannins (accumulated in bark, wood, leaves or fruits) and resins (mainly extracted from stem or buds).

Other 80 species were identified as toxic, due to their high content in pharmacologic active principles, which could have damaging, even lethal effects on animals and human, if these plants are accidentally grazed or eaten, respectively. Strictly controlled, these species and their chemical compounds can be and are used in veterinary and human medicine.

Different criteria, such as botanic, chemical, geographical as well as industrial importance, could be used to classify the Romanian medicinal plants and to define the specificity of local bio-resources.

Taking into account the life cycle, 51% of the medicinal plants are annual species, 31% are perennial species and 18% are biannual species. As to the life forms, we find in Romania: 36.4% hemicryptophytes, 20.06% therophytes and 17.9 phanerophytes; the rest of $\frac{1}{4}$ is composed by geophytes (8.64%), hemitherophytes (7.01%), chamaephytaes (4.32%), hydro-helophytes (1.54%), hydrophytes (1.54%), chamaephytaes-hemicryptophytes (1.23%), hemicryptophytes - hemitherophytes (0.30%) and epiphytae (0.30%).

The medicinal species that could be found frequent in spontaneous flora belong to the *Asteraceae*, *Lamiaceae* and *Rosaceae* families (5-10%), less frequent are found the members of *Ranunculaceae*, *Fabaceae* and *Aristolochiaceae* families (2-5%), while not at all frequent are the members of the *Poaceae* and *Violaceae* families (less than 2%).

"To harvest" wild species of medicinal plants it meant for the people a 'God help' and a good opportunity to supply (especially the poor families) their food with different nutritional and healthy products. Moreover this practice could also become a source of income or tourist attraction for some geographic areas, especially mountain areas, where forests proved to be very rich in such wild berries, medicinal plants or culinary herbs that have in their composition important active ingredients.

Herbal food supplements

The popularity of herbal food supplements (HFS) rises from “all natural” promotion of the products and consumers’ trust in health benefits. On the other hand, the easy access to the products by internet and direct sales is also responsible. According to Cohen and Adams (2011), 74% of adults utilize the Internet; 61% have searched for health or medical information on line; 49% have reviewed a website for information about a particular medical issue. A simple search for the term “weight loss supplements”, for example, produced 28,400,000 hits (Google, 2011).

Joining the EU in 2007 and opening the local markets, the number of food supplements placed on the Romanian market reached, in 2014, near to 20,500 products (manufactured all over the world), out of which approximately 85% of the products have in their composition botanical or botanical preparations. 40% contain exclusively species of medicinal plants, while other 47% are mixtures of plants or plant extracts combined with vitamins and minerals, or any other substances with nutritional and physiological effect.

In the category of HFS might be placed plants as a whole, divided or crushed (simple or combined teas, sold as bulk or doses), liquid extracts (tinctures), juices, energizing drinks, syrups, oils (fat oils or essential oils), powders and granules (in small packages or encapsulated), tablets (filmed or non-filmed), capsules (soft or hard), drinkable ampoule, jelly, pasta, bonbons or bars, etc.

Aligned to the trends of the time being, the Romanian market is enriched also by such products locally manufactured or imported, sold through different ways (drugstores, stores selling natural products, supermarkets, sex-shops, direct sales, internet) and intensely promoted by mass-media.

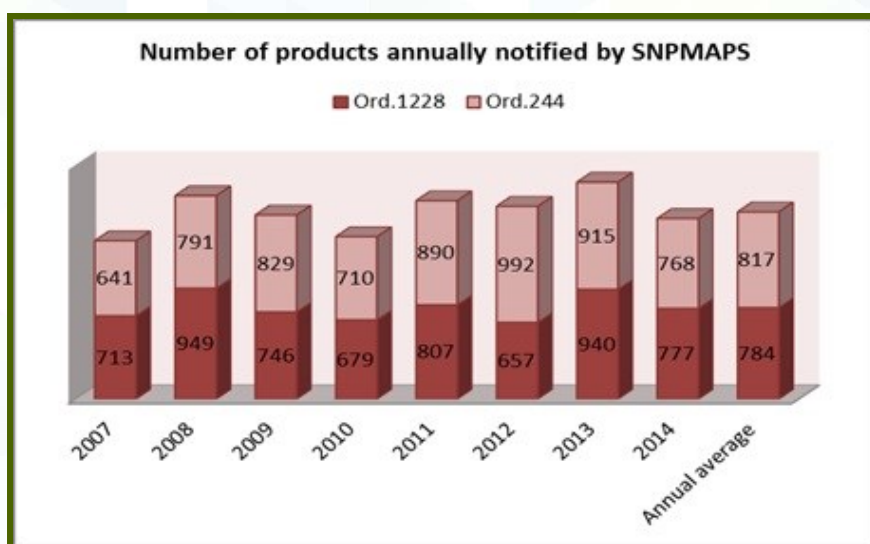


Fig. 3. Number of new herbs food supplements notified per year according with 2 Minister Orders 1228 and 244

The Romanian food supplements market (estimated to 300 – 500 mil. Euro/year) seems to be not yet saturated. Starting in 2006, the HFS monitoring showed that every year approximately 1,500 new products (Fig. 1) enter the market (nearly 50% of them are coming from China).

According to Stoia and Oancea (2013), a significant increasing of HFS sales was registered between 2008 (65 mil Euro) and 2010 (200 mil Euro). The fast development of the food supplement market was positively correlated with the improving of the HFS education level of consumers. People show flexibility in selecting and choosing the category of products which are suitable for their health problems. They seems to know the properties of the main bioactive substances, the difference of quality and efficiency between different products as well as the quality manufacturers/distributors.

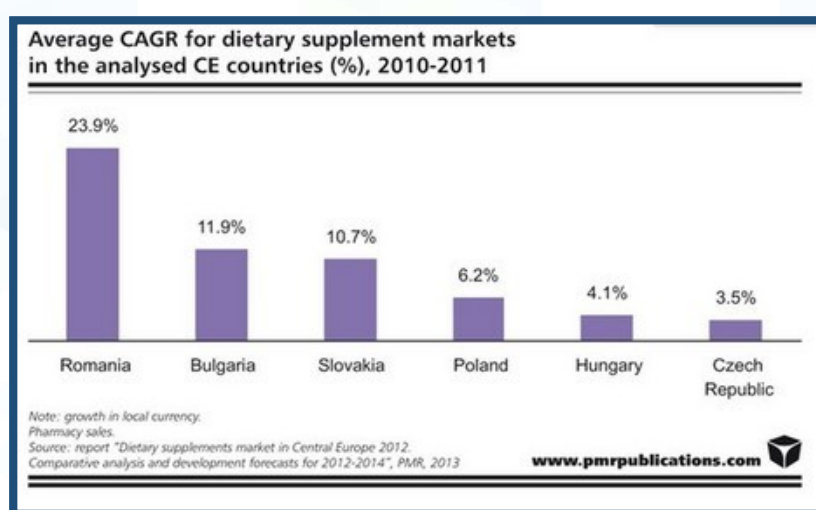
In this sense, in 2011, Romania was included on the list of the most important 17 pharmaceutical markets because it's a real potential of development in connection to rural space development and increasing of consumers awareness and level of information.

There are many other explanation for this situation that is similar in most of the European countries: people are looking to new sources of food, to functional ingredients and to diseases prevention by a holistic approach including diet, life style, green pharma and "bio" products.

As compared to other Central European countries, Romania had the fastest rate of development during last years being considered the most attractive market from the region, due to the continuous ascendant trend since 2008 up to 2014.

It is also noticed that HFS market development was also correlated to the increasing of the category of 55-64 years old in the population. This age group is more susceptible to chronic and degenerative diseases, so is positively correlated to food supplements needs and usage.

Fig.4 Growing rate of some food supplement markets of Central Europe (2010-2011)



As business opportunity, herbal food supplements trade and production has proved to be very attractive.

The Romanian herbs manufacturers (approximately 164 companies) are spread in 26 counties, covering approximately 62% of the Romanian territory and are relatively uniform distributed according to development regions (around 20 operators/each region and 3-4 operators/each county), concentrating, as expected, in Bucharest and neighbouring areas, namely Ilfov, Calarasi, Giurgiu.

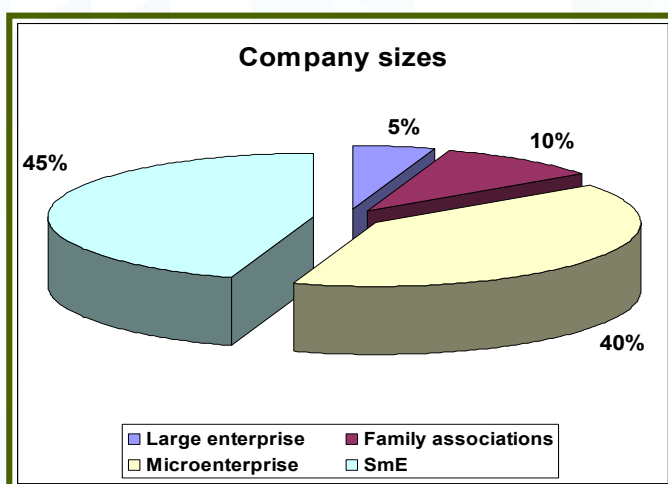
The network of distributor companies, which economic activity is to put on the market products coming from EU member states or imported products, is much higher; approximately 3 times (445 trade operators) than the number of Romanian manufacturers. In Bucharest and neighbouring areas are working more than half of the companies (234 companies), distributing a wide range of products manufactured in numerous countries of the world, EU member states as well as third countries such as: China, Thailand, India, Japan, USA, Canada, Switzerland, Norway, Australia.

Within the territory, the distributors of herbal food supplements produced in different other countries than Romania are present in 31 counties (75% of the country territory) and are relatively uniformly distributed according to the development areas (30 companies/each region or 5-6 companies/each county).

The range of turnover of food business operators working on Romanian HFS market is between at least 50,000 euros/year up to maximum 3 million euros/year.

Food business operators working in herbal food supplement sector are organized in micro-enterprises (40%), SMEs (45%), authorised dealers and familial associations (10%) and big companies, representing just 5% of the total operators.

Fig. 5 Type of food business operators working in herbal food supplement



An economic data study of some important Romanian manufacturers of herbal food supplements indicates a specific trend in the last 4-5 years:

- significant diversification of assortment through the increasing of imported raw materials and ingredients and packaging of some foreign products in Romania;
- increasing of sales volume;
- development of own medicinal plants production, by cultivation in new farms (from 5 ha up to 40 ha) the most important species that are used in their processing activities;
- organizing of networks of gatherers (local people specialized in harvesting medicinal plants from spontaneous flora);
- opening of outlets and creating specialized shop chains of natural products;
- developing partnership with the most important retailers (producing for them a range of products licensed as retailers own lines of products, manufactured under controlled condition of quality and safety);
- obtaining of raw materials and organic products (of real interest for export);
- producing in Romania some ingredients (especially plant extracts) mainly used by foreign companies from EU or USA (that are included in dietary supplements made in EU or USA).



1.3 QUALITY AND SAFETY OF SPICES IN SLOVAKIA

Safety and quality of foods has become a matter of increasing concern. As a result of greater awareness consumers prefer to buy foods that are made by larger manufacturers. The suppliers of spices (generally small and medium scale producers and food processors) are expected to pay heed to this change in customers attitudes.

Special attention should, therefore, be paid to small food manufacturers and the agencies that can assist and advise them. The basic principles behind spice's production and utilization are related to quality assurance with the aim to satisfy customer demands and safety. As a result, producers and processors should be advised to improve their production unit, keep up to date with a changing world and stay in business.

The basic principles and differences between quality control and quality assurance should be distinguished and the comparatively new management tool of Hazard Analysis and Critical Control Point systems (HACCP) is briefly described.

Quality improvement and control is not easy, particularly for very small manufacturers who may feel isolated. For this reason this publication ends with a series of appendices which list relevant publications, useful contacts and simple test methods.



1.4 AROMATIC AND MEDICINAL PLANTS IN SPAIN

Currently, according to the National Interprofessional Association of Aromatic and Medicinal Plants (ANIPAM) in Spain are grown, conventionally and organically, about 7000 hectares of Aromatic, Medicinal and Culinary Plants (hereinafter AMCP). To this production must be added plants from wild collection that still have a significant quantitative importance.

The most abundant crop is species of Lavender genus. Other well established crops are saffron, hops, paprika, mint, anise and sage. Regarding wild collection, the main species are rosemary, thyme, pine nuts, horsetail and chamomile from Mahon.

In 2010 according to the Spanish Ministry of Agriculture, Food and Environment MARM (2011), the AMCPs in Spain accounted for 2.28% of the area of organic farming, with 11020.54 ha, of which over 82% is located in the Region of Valencia. Following to great distance Regions of Murcia (4.5%), Aragón (3.3%) and La Rioja (2.72%). On the same date AMCPs processors (including spices) were 100 (3.65% of the total and 3.63% of the industry related to crop production). Interestingly, most AMCPs processors were concentrated in Andalucía (28), although the dedicated land is only 257.11 ha (2.33%). Just after Andalucía, the Region of Valencia with 22 processors and Region of Murcia with 17. There is no information about traders (importers, etc.), or generated volume of business.

AMCP is a broad, diverse and not delimited sector, covering many different plants, many processing and many marketing channels. In addition, due to their low weight in the overall agricultural production, it is difficult to find publications and studies on production, processing or marketing.



2. POLICY MAKERS INVOLVED IN HERBS PRODUCTION AND PROCESSING

2.1 AUTHORITIES

2.1.1 PORTUGAL

The International Regulatory Cooperation for Herbal Medicines (IRCH), a global network of regulatory authorities responsible for regulation of herbal medicines, was established in 2006, with the mission to protect and promote public health and safety through improved regulation for herbal medicines. The network's membership is open to any national regulatory authority and regional/sub-regional bodies, responsible for the regulation of herbal medicines.

The European Medicines Agency gives secretary support to the Committee for Herbal Medicinal Products (HMPC), which was created by the Regulation 726/2004 and, as result of Directive 2004/24/EC. HMPC is responsible for the organization and evaluation of scientific data on plant derived substances, preparations and associations, focusing safety and efficiency. The two main tasks of HMPC are: establish legislation at European Union level that regulates therapeutic uses and safety conditions for the use of substances and preparations of plants (established/traditional use); the elaboration of a list of EU plant derived substances, preparations and combinations for traditional medicines.

The central authorities involved in policies related to herbs food supplements are:

- the Government: Ministry of Agriculture and Sea, Ministry of Health,
- the Parliament;
- Inter-ministries advisory boards: Technical Committees or National Commissions for rural development or for health claims used in food product labelling which are working near the Ministry of Agriculture and Sea and Ministry of Health.
- ASAE: Food Safety Agency
- INFARMED: Authority for Medicines

2.1.2 ROMANIA

The central authorities involved in policies related to herbs food supplements are:

- the Government: Ministry of Agriculture and Rural Development, Ministry of Health, Ministry of Environment and Forestry;
- Romanian Academy of Science and the Parliament;
- Inter-ministries advisory boards: Technical Committee for medicinal plants and bee products or National Commission for health claims used in food product labelling which are working near the Ministry of Agriculture and Rural Development and Ministry of Health, respectively.
- The national and local authorities have different responsibilities that complement each other. Thus, in herbal food supplements' market monitoring and food business operators control in this economic sector are involved:
- SNPMAPS - herbal food supplements notification, market surveillance; production line and warehouses control;
- National Institute for Public Health - food supplements notification; hygiene; health risks alerts;

- National Sanitary Veterinary and Food Safety Authority - manufacturers activity authorisation; HACCP implementation on the production lines; safety control at the border of the imported products; EFSA national contact point for rapid alerts;
- National Agency for Consumers' Protection - correct information of the consumers by labelling;
- National Council of Audio-Visual - advertising of HFS in mass media;
- Environment Protection Agencies - licence for harvesting medicinal plants from the spontaneous flora; protection of endangered species;
- National Anti-Doping Agency - nutritive supplements for sportsmen;
- National Agency for Standards and Labels - copy rights, intellectual and industrial protection.

Ministry of Agriculture and Rural Development (MADR) is the National Authority for aromatic and medicinal plants field which elaborates policies and strategies and regulates the market and product chain, leads Technical Committee of medicinal and aromatic plants and bee products, update the lists of medicinal and aromatic plants allowed or forbidden in herbal food supplements and dialogues with owners' associations and professional organisations. Food Industry Division is responsible for herbal food supplements and traditional food monitoring. Policy and Strategy Division is involved in medicinal plant cultivation, registering the cultivated areas/each county, monitoring certain species (such as opium poppy/or hemp) as well as GMOs seeds and products. Inspection Division has the responsibility to control the medicinal plants production and warehouses where plant raw material is storage.

National Service for Medicinal, Aromatic Plants and Bee Products (SNPMAPS) is organized within the National Research and Development Institute for Food Bioresources - IBA Bucharest. It is coordinated by MADR and provides a range of services in connection with the market and herbal products, such as: notification, monitoring, quality and safety control of herbal food supplements as well as natural products for external use (skin treatment) obtained from medicinal plants, aromatic and hive products, except for cosmetics. The market surveillance of herbal food supplements and beehive products is applied to the production lines and warehouses of raw materials and finished products. SNPMAPS also holds the Unique Registry of Notification Certificates and manage operators' proposals of nutrition and health claims, aiming to be used for food supplements labelling, herbal product presentation and promotion.

Ministry of Health (MS) coordinates public health nutrition policies and strategies (including food reformulation programmes) and functions as the policy maker authority for pharmaceuticals, herbal traditional medicine products and food supplements which have exclusively in their composition vitamins and minerals. Ministry of Health is the authority that implements the EU Regulation no. 1924/2006 and provides the control on the market of the nutrition and health claims. MS also check how manufacturers comply with the EU Regulation no. 853/2004 requirements regarding hygiene good practices. The inspectors of the Direction of Public Health and Control in Public Health (which is subordinated to MS) act in all counties of the country to control the legal trade of food supplements and how the companies implement good manufacture practices.

Ministry of Environment and Forestry implements through the Environment Protection Agencies from each county the national policy of biodiversity conservation and endangered species protection. The Environment Protection Agencies implement also the procedure of sustainable harvesting of wild medicinal plants species, approving licence for those people/companies who want to gather plants, wild berries or mushroom from spontaneous flora.

National Authority for Consumer Protection (ANPC) acts in the field of consumer protection for prevention and control of practices that could harm life, health, security and interests of consumers.

According to the Government Decision no. 723/2011, this authority is involved together with Ministry of Health in the control of nutrition and health claims used in food products labelling.

The National Sanitary Veterinary and Food Safety Authority (ANSVSA) is the main governmental authority regulating food safety and coordinating food safety policies, ANSVSA authorizes the production units activities and control the food products safety (traceability on food chain). As responsible for the declaration at the border of the products of non-animal origin, ANSVSA controls, through the Custom offices the safety of imported products. ANSVSA cooperates with SNPMAPS, MS and National Anti-Doping Agency (ANAD) to verify the conformity to quality and safety standards of the products suspected of non-compliance. ANSVSA is also the National Focal Point EFSA and the first authority who alert the others on safety problems.

National Anti-Doping Agency (ANAD) is a public institution with legal personality, decision-making autonomy in anti-doping. One of its main tasks is to detect and identify banned substances in dietary supplements dedicated to sportsmen. ANAD also supervises the food supplements trade in fitness clubs and sports halls as well as the consumption of food supplements by professional athletes.

General Inspectorate of Romanian Police - Central Laboratory for Drug Analysis and Profiling identify prohibited substances (THC, amphetamines) in herbal food supplements, seeks illegal traffic, investigate economic frauds and apply sanctions to frauds and to criminal offences.

2.1.3 SLOVAKIA

Slovakia's economic situation has improved rapidly in the years after the separation of Czech Republic and Slovak Republic in 1993. In the following years the Slovak Republic has made good progress as far as macroeconomic stabilisation and economic growth are concerned. GDP growth was between 5% to nearly 7 %, inflation was curbed to 6.5% in 1997 and unemployment is around the EU-average. (CEC Reports, http://ec.europa.eu/agriculture/publi/peco/slovakia/summary/sum_en.htm)

Obviously, one of the most important precondition for these changes were based on a renewed agricultural policy. Parallel with the stabilisation of domestic demand, increasing market support policy and partly reflecting world market influences, producer prices have increased for most commodities since 1994.

Slovakia is traditionally a net importer of agricultural products. Remarkably, the Agro-food trade is scattered amongst all commodity groups. The majority of agro-food imports regards commodities that cannot be produced in Slovakia. Spice production is a similar type of produce.

A broad variety of policy instruments have been implemented, that supported agriculture in the restructuring process. Roughly 10% of the budget goes to market support measures, which consist of intervention purchases for selected products (in particular of grains and meat) at minimum guaranteed prices and of export subsidies (mainly for dairy products, beef and sugar). 20% of the budget transfer goes as production support and is given in the form of input subsidies, which are to mitigate the impact of increased input prices. Structural policy measures for agriculture target to keep farmers in less favoured areas in business. Direct payments to farmers operating in LFAs are the main form of agricultural support in Slovakia and account for a quarter of the budget outlay.

Macroeconomic performance of Slovakia and Forecast for 2007. (<http://www.slovakia.org/economy.htm>)

2001	2002	2003	2004	2005	2006	2007	
GDP growth (%)	3.4	4.8	4.8	5.2	6.6	8.5	8.7(f)
GDP (US\$ bn)	62.8	68.6	73.1	78.9	86.1		
Inflation (%)	7.2	3.5	8.4	7.5	2.8	4.3	
Unemployment (%)	19.3	18.7	17.6	18.2	16.3	13.4	
Fiscal balance (% of GDP)	-6.5	-7.7	-2.7	-2.4	-2.8	-3.7	
Foreign debt (% of GDP)	49.2	43.3	42.4	41.4	34.2	30.4	

Source: Eurostat

Rural development policy

Approximately 48% of population live in the rural regions of Slovakia, 40% in intermediate regions and 12% in urban regions. Rural development policy is in the early stages of its implementation and still acts in the wake of regional policy, which itself is still not very advanced. Nevertheless, the existing problems of rural areas in Slovakia and the lively international discussion of the rural development topics, in particular in the EU, has strengthened the awareness of the need for an appropriate policy framework of rural development.

The first steps of emancipation towards an integrated rural development policy were taken by the setting up of the Rural Development Agency in 1995. In 1998 the Slovak Ministry for Agriculture drafted a "conception of rural development in the Slovak Republic" which formulates in an advanced way the objectives and implementation principles of rural development in the future. As a long-term objective it targets on the establishment of a rural development policy in a shape to which the EU is heading. However, there are still a lot of technical, administrative and financial problems to solve. Significant limitation of rural development is imposed by a lack of financial resources, particularly at local levels.

The main authorities involved in herb production and processing issues in different aspects in Slovakia are: Ministry of Agriculture, Ministry of Construction and Regional Development, Ministry of Education, Ministry of Economy, Ministry of the Environment, Ministry of Finance, Ministry of Health, Ministry of the Interior -Information Section, Ministry of Labour, Social Affairs and Family, Ministry of Transport, Posts and Telecommunication.

2.1.4 SPAIN

Below are listed the Spanish Authorities with competences in the different aspects of the herbs sector: agriculture, industrial transformation, quality and safety, health issues, etc, as well as different Organisms whose contributions (guides, studies, articles, etc.) are of high interest for this sector:

Ministry of Agriculture, Food and Environment, <http://www.magrama.gob.es>

Its General Directorate for Biodiversity, with the participation of the National Committee for the Improvement and Conservation of Forest Genetic Resources, as a coordinating body between the central government and the autonomous communities, have developed the Spanish Strategy for the Conservation and Sustainable Use of Forest Genetic Resources

Ministry of Health, Social Services and Equality, <https://www.msssi.gob.es/>

AECOSAN. The Spanish Agency for Consumer Affairs, Food Safety and Nutrition is the result of the merge between the Spanish Agency for Food Safety and Nutrition and the National Consumers Institute.

AEMPS. Spanish Agency of Drugs and Sanitary Products

Ministry of Internal Affairs, SEPRONA,

http://www.guardiacivil.es/es/institucional/especialidades/Medio_ambiente/

Policemen specifically dedicated to the conservation of nature and environment, water resources, the wealth of species, fisheries and forestry .

Centre for Industrial Technological Development, CDTI, www.cdti.es

CDTI is a Public Business Entity, answering to the Ministry of Economy and Competitiveness, which fosters the technological development and innovation of Spanish companies. It is the entity that channels the funding and support applications for national and international R+D+i projects of Spanish companies.

Regional Ministries of Health, Agriculture and Industry of the 17 Spanish Autonomous Communities.

Laboratory of Aromatic and Medicinal Plants of the National Institute of Research and Agricultural and Food Technology (INIA), an agency of the Spanish Ministry of Education and Science

Spanish Federation for Food and Drinks Industries (FIAB) <http://www.fiab.es>

Institute of Agricultural and Food Research and Development of the Region of Murcia. IMIDA is a public and autonomous research organization belonging to the Ministry of Agriculture and Water of the Region of Murcia, which aims priority is the attention to the needs of research that requires the agricultural sector of the Region of Murcia. www.imida.es

Agrifood Technological Center of Extremadura CTAEX. Looking for alternatives to traditional agriculture , CTAEX researchers have cultivated many species of medicinal and aromatic plants, in order to advise its best agronomic conditions, optimal harvesting time for maximum yields and new products. www.ctaex.com

Forest Technological Centre from Catalonia.
<http://www.ctfc.cat/?lang=es>

Association of Industries of Dietetics and Food Supplements, AFEPADI. This is the first trade association of food supplements and dietary products in Spain.
<http://www.afepadi.org/>

National Interprofessional Association of Aromatic and Medicinal Plants ANIPAM www.anipam.es

FITOMON. Advice and Consultancy on Natural products, vegetables, Food, Medical , Cosmetics, Veterinary and Agricultural Products. www.fitomon.com

Official Associations of Pharmacists

Organic Farming Control Bodies



2.2 LEGISLATION AND OTHER OFFICIAL DOCUMENTS ISSUED BY AUTHORITIES (STRATEGIES, WHITE PAPERS, GUIDES, ETC.)

2.2.1 PORTUGAL

In Portugal there is no specific legislation for the production of aromatic herbs and spices. However, at international level, the Codex Alimentarius approved a Code of Practices for spices and dried aromatic herbs in 1995 (CAC/RCP 42-1995). This codex established the hygiene requirements in the field of production / harvest, design and facilities, for personal and processing hygiene, and the specifications on the final product.

Every food products in EU should respect the “General Food Law” (Regulation (CE) n.º 178/2002), which establishes the principles and general rules of food legislation, creates the European Authority for Food Safety and establishes the food safety proceedings. It also includes food provisions on traceability.

About the maximum limits for pesticides residues (LPR), the EU establishes the limits of pesticides residues allowed on products with animal and vegetal origin for human consumption. The LPR are relevant for many of the natural products, including aromatic herbs and spices.

Furthermore, the UE 1999/2 / CE directives (ionizing radiation patterns) and 1999 Requirements / 3 / CE (list of foods and ingredients that can be irradiated) regulate the use of irradiation for spices treatment. At the moment, and under EU regulation, the only food categories allowed to receive irradiation are: dried aromatic herbs and spices.

There are three regulations: Regulation (CE) 396/2005, Regulation (CE) 178/2006 and Regulation (CE) 149/2008.

Regulation (CE) 1881/2006 legislates foods contaminants, once that EU has established maximum levels for certain contaminants in specific products or products groups.

The EU has established rules for the materials and objects that get in touch with foods (including, for example, package), with the objective of avoiding any unacceptable alteration of foods composition and to protect human health.

The existing regulation is: Regulation (CE) 1935/2004, Directive 84/500 / CEE, Directive 2007/42 / CEE, Directive 2002/72 CE, Regulation (CE) 282/2008, Regulation (CE) 372/2007, Directive 78/142 / CEE, Directive 93/11 / CEE, Regulation (CE) 1895/2005 and Directive 2008/39 / CE.

The European Spices Association (ESA) has defined their minimum demands for spices, which complements EU legislation. The document with the minimum quality demand has the specific rules for spices quality: cinnamon, cloves, nutmeg and saffron (whole and ground).

In Portugal there is no specific legislation for the production of aromatic herbs and spices. However, at international level, the Codex Alimentarius approved a Code of Practices for spices and dried aromatic herbs in 1995 (CAC/RCP 42-1995). This codex established the hygiene requirements in the field of production / harvest, design and facilities, for personal and processing hygiene, and the specifications on the final product.

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2.2.2 ROMANIA

Starting to harmonize the Romanian legislation with the European one in the field of food supplements, the official control will be organized aiming to:

- check the safety of botanical species used as raw materials and to adopt a national list of permitted species as well as a national list of prohibited ones in the herbal food supplements;
- monitor the existing food supplements on the market (the herbal food supplements are subject of the notification procedure since 2005 year);
- organise the official survey of the herbal food supplement market (SNPMAPS), including the inspection of the production lines of herbs manufacturers and HFS warehouses;
- develop a reliable procedure to assure the product conformity with the quality and safety requirements for each category of HFS;
- manage the use of proposals for nutrition and health claims on herbal food supplements.

A general interest for consumer protection was observed during last years, when not only the state authority of consumers protection (ANPC), but also some NGOs that work in the field registered significant progress in their activity.

ANPC succeed to organize/develop the European Centre of Consumers from Romania, which has as objectives to:

- offer the consumers easy access to information;
- inform the consumers about the internal market opportunities;

- assist and advise the consumers to solve their problems created in the relationship with different traders from EU member states;
- increase the trust of consumers in specialized organization/institution;
- cooperate with other European networks, such as FIN-NET or SOLVIT.

ANPC also implemented a PHARE project (2006-2008) and got financial support and technical assistance to strengthen the consumers movement in Romania. Thus there were setting up several NGOs to increase the level of knowledge and protection of the consumers, such as National Association for Consumers Protection and Programs and Strategies Promotion (ANPCPPS).

ANPC implemented Reg. CE 2006/2004 using TESTA network to ensure the cooperation between national authorities involved in control activities and consumers protection. In the meantime, ANPC is National Contact Point for rapid alert system RAPEX, which refer to high level of health risks for consumers.

Following the requirements of European Commission for strategy (2007-2013), ANPC had as objectives to:

- know and understand better the consumers and the Romanian market;
- arrive to more informed and better educated consumers;
- increase the individual capacity of auto protection;
- optimise the activity of state institutions which are directly or indirectly linked to consumer protection;
- improve the national legal framework;
- support the development of consumers associations;
- identify fraud and falsified products on the market, prevent this phenomenon and ensure an appropriate system of security;
- organize promotion campaigns, elaborate a guide book of best practices for consumers' protection.

ANPCPPS Romania has already 10 years of activity trying quite successfully to influence consumers to have a new attitude. This NGO was actively involved in programs and strategies that brought together public authorities, owners organization and professional associations from industry, research institutes and universities. ANPCPPS tried to teach consumers how to detect a falsified or non-compliant product, how to look to the food stuff labels, which harmful ingredients could be found in soft drinks or candies, etc.

Association for Consumer Protection EURO PROTECT CONSUM succeeded to elaborate a useful guideline of Best practices for consumers. Allergens in food staff.

Romanian national legislative framework

EU member state since 2007, Romania is in the process of transposition in the national legislation of EU regulation, regarding the production, processing and market organization of medicinal and aromatic herbs, as well as herbal food supplements.

The first regulations on food supplements appeared in 2001 (Government Ordinance no. 97/2001 on the production, circulation and food trade). This was followed by a number of laws, ordinances or government decisions that shared the responsibilities between different authorities and have helped to ensure a proper trade, marketing and publicity of these products, in order to diminish the health risks in the best interest of public health. The most important general laws and specific regulation in the field of herbal food supplements are:

- Law no. 491/2003 of Medicinal and aromatic plants and beehive products (modified by Law 239/2010 and Gov. Ordinance no. 15/2011);
- Decree no. 244/2005 that regulate the processing, manufacture and trade of medicinal and aromatic plants used as such, partially processed or processed as herbal food supplements;
- Decree no. 1228/2005 laying down the technical standards for the production and trading of food supplements, which have in both animal and vegetal ingredients, alone or combined with vitamins, minerals and other nutrients;
- Decree no. 1946/2014 regarding the notification procedure of herbal food supplements and body care herbal products of external use;
- Decree no. 1069/2007 which transpose the Directive no. 2002/46/EC regarding food supplements;
- Government Decision no. 723/2011, which transpose the EU Regulation no. 1924/2006 regarding nutrition and health claims;
- Decree no. 1761/2006 which transposes the EU Regulation no. 258/1997 regarding novel food ingredients;
- Decree no. 111/2008 approving the sanitary veterinary and food safety procedure for registration of veterinary and food business activities of production, as well as the control of processing, storage, transportation and direct or retail sales of food of animal and non-animal origin;
- Law no. 150/2004 regarding food and animal feed safety, which transpose the EU regulation no. 178/2002 regarding food safety;
- Government Decision no. 106/2002 on food labelling.

European Regulations and Directives

Due to the common open market and free trading of foodstuffs in the European Union, to protect health and life of citizens, the safety assessment of herbal products before to be placed on the market is a key issue. By harmonizing the national legislation with Community one, food supplements as foodstuffs are regulated by specific legislation and also by the general food legislation applicable to all foodstuffs.

European legislation on food supplements includes the following directives and regulations:

- Directive 2002/46/EC of the European Parliament and of the Council on the approximation of the laws of the Member States relating to food supplements;
- Regulation (EC) No 178/2002 of the European Parliament and of the Council laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety;
- Regulation (EC) No 1924/2006 of the European Parliament and of the Council on nutrition and health claims made on foods;
- Regulation (EU) No 432/2012 establishing a list of permitted health claims made on foods, other than those referring to the reduction of disease risk and to children's development and health;
- Regulation (EC) No 1925/2006 of the European Parliament and of the Council on the addition of vitamins and minerals and of certain other substances to foods;
- Regulation (EC) No 258/97 of the European Parliament and of the Council concerning novel foods and novel food ingredients;
- Regulation (EC) No 1170/2009 amending Directive 2002/46/EC of the European Parliament and of Council and Regulation (EC) No 1925/2006 of the European Parliament and of the

Council as regards the lists of vitamin and minerals and their forms that can be added to foods, including food supplements;

- Regulation (EU) No 1169/2011 of the European Parliament and of the Council on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004;
- Regulation (EC) No [852/2004](#) of the European Parliament and of the Council on the hygiene of foodstuffs;
- Regulation (EC) No 882/2004 of the European Parliament and of the Council on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules;
- Regulation (EC) No 1935/2004 European Parliament and of the Council on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC;
- Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs;
- Regulation (EC) No 1881/2006 setting the maximum levels for certain contaminants in foodstuffs.

Regarding the field of biodiversity conservation (which include medicinal plants), a review of the law and regulations shows that Romania aimed to harmonize the own legislation with the international rules and directive. Thus it was:

- signed the Convention from Rio (1992) regarding the biodiversity;
- approved the Strategy for Plant Conservation from Haga (1992);
- implemented the TRAFFIC Program since 1998, as soon as CITES Convention (international trade agreement related to wild flora and fauna) was adopted.

European Community regulations and national legal framework regarding to herbal products have been developed for the safety of citizens and public health.

In order to not mislead consumers, by regulations on labelling, manufacturers of herbal food supplements and other final products from plants classified by law as a foodstuff must not attribute them the action to prevent, treat or cure a human disease or refer to such properties.

By compliance with those regulations is intended to avoid selling doubtful products, invalidated scientifically, which may endanger the consumers' life.

2.2.3 SLOVAKIA

Having become an EU member in 2004, vast majority of Slovak legislation has been harmonized, which is reflected by The EU Food and Agricultural Import Regulations and Standards, a comprehensive report for European Union (EU-27 FAIRS report), prepared by the US Mission to the EU in Brussels.

The framework regulation laying down the general principles and requirements of EU food law is Regulation 178/2002. A framework for harmonized food controls is set by Regulation 882/2004.

The Slovak Republic (SR) food, nutrition and “food health harmlessness” legislation consists of the Food Act (Act no. 152/1995 Coll. amended by Act no. 349/2011) and Act no. 355/2007 Coll., on Protection, Support and Development of Public Health and on Amendments and Supplements to Certain Acts and the Food Codex, including implementing regulations, ordinances, decrees to the Food Act, issued by the Government of the SR, the Ministry of Agriculture of the SR (MoA SR), the Ministry of Health of the SR (MH SR). Food Codex can be found on website of the Slovak State veterinary and Food Administration.

Imported food products have the same status as the domestically produced products with respect to the provisions of the Food Act and Food Codex.

In order to make Slovak legislation compatible, many amendments were made to existing veterinary, phytosanitary, feed, and food legislation within the past few years in Slovakia. Since May 1st 2004, many new regulations came into force. Therefore, importers have to verify import requirements according to the latest legal acts. Approved legal regulations can be found on the following web pages: The Ministry of Justice of the SR: <http://jaspi.justice.gov.sk> www.zbierka.sk The Ministry of Agriculture (Decrees and legislation under commentary judgment available): www.mpsr.sk; The Ministry of Environment: www.enviro.gov.sk ; The Slovak Veterinary and Food Administration: www.svssr.sk; The Industrial Property Office of the SR (English version): www.indprop.gov.sk.

Certification is obligatory for import of fresh fruits and vegetable, live animals and animal products, fish, milk products, plants, plant products.

In the case of harmonized products, the EU certification templates have to be used, for non-harmonized products--national certification templates were approved. The Certificate of Conformity for other imported food products is not obligatory.

Fortification of food products with vitamins and minerals is permitted (regulated by Decree no. 1519/02-100). Information about vitamins and minerals content must be indicated on the label if presence of vitamin is significant (more than 15% of daily recommended intake in 100 g or in 100 ml of food or in one package, or single portion of food) according to appendix 1 of above mentioned Decree). Information about fortification is indicated in relevant product chapter of the Food Codex. For instance enrichment of milk and milk product by vitamins, minerals, trace elements, essential substances and other components is subject of approval of the Ministry of Health of the SR on the basis of application of producer or importer of milk.

Novelty foods are labeled according to regulations ES 1829/2003 and 1830/2003 that are mentioned in the Food Codex in 2nd part, 3rd chapter. Requirements on dietetic and special use foods are specified in Food Codex, 2nd part, novelized chapter 7 (Decree of the MoA SR and the MH SR no. 16826/2007-OL about requirements on food products for special nutritional purposes and nutritional complements). According to the Act no 23/2002 amending Food Act, an importer can introduce only packed food products for special purposes on the market. The Office for Public Health Service, The Section of Hygiene of Nutrition is responsible for approval of special nutritional complement import. I

According to the Act no. 421/2004 Coll. about ecological agriculture and biofood (organic) products production, production, import and export of such product have to be registered to the Central Control and Testing Institute in Bratislava (www.uksup.sk). Labeling of biofood products is allowed only with certification issued in SR or the country of origin. Label has to show “bio” or “eko”, pictogram ordered by this act, words “vyprodukované v ekologickom poľnohospodárstve” - “produced in ecological agriculture” and numerical code of certification body.

Food Act. The Food Act no. 152/1995 Coll., amended by Act no. 349/2011, is intended to protect the health of consumers and to provide for good nutrition of the population. The 1995 Food Act with the wording of later regulations provides a framework for basic rules and determines the conditions under

which food and tobacco products are produced, manipulated, and introduced in accordance to the requirements on the support and protection of human health and consumer protection in the food products market. The Food Act also defines the organization and role of the food supervision bodies. According to the Food Act, all food products produced, imported and introduced into circulation in the Slovak Republic must be in compliance with the requirements determined by the Food Act, Food Codex, and other specific regulations. In accordance with the Food Act, it is forbidden to introduce food products inadequately packed or insufficiently labeled, not meeting requirements for quality and health harmlessness, falsified, spoiled, or products with deceptive labeling, or deceptive advertising for consumption, with unknown origin, or after the date of the last consumption or minimal preservation period. Food products identified as hazardous to human health, falsified, or wrongly identified, cannot be distributed. The Food Act constitutes the legal basis for the issuance of a number of ordinances and decrees that spell out the specific requirements.

(http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Food%20and%20Agricultural%20Import%20Regulations%20and%20Standards%20-%20Narrative_Warsaw_Slovakia_12-31-2012.pdf)

Food Codex. Food Codex represents decisive part of food legislation. Food Codex includes guidelines on definitions, composition, tests, evaluations, and directives on the distribution of products governed by the food law. Individual chapters of the Food Codex were approved separately, and in the case of many chapters several amendments were done afterwards and recently; therefore it is necessary to verify import information with its latest amended version, which can be found in decrees, published in Bulletins of the MoA SR (www.mpsr.sk). In accordance with the Food Act, the Food Codex in 3 parts and many chapters spells out the requirements on health harmlessness, hygiene, content and quality of food, ingredients, as well as technological processes used for their production, further requirements on packaging of food products, their groups or all food products, scope and way of their labeling, their storing, transportation, manipulation with them, their circulation, rules for sampling and sample investigation, hygiene. The Food Codex jurisdictional scope extends to a variety of non-food items. They include tobacco, cosmetics, food related raw materials, additives, and technological auxiliary matters.

2.2.4 SPAIN

The different applications of the plants, either aromatic or medicinal determine their legal framework. Currently are one of the main concerns of health authorities and other regulation bodies (including the SEPRONA) to monitor safety and health of final consumers, (Source: The legal regulation of aromatic and medicinal plants, Juan Ramón Hidalgo Moya 2005, Eroski Consumer)

In 2004, after ten years delay, the Spanish Ministry of Health decided to prohibit or restrict the sale of 197 plants or parts due to their toxicity, including mistletoe, wild rosemary, holly or yellow laurel. And at European level, a 2004 Directive requires Member States to adapt their legal framework related with traditional medicines made from plants.

Some public bodies have issued reports warning that certain plants, legally regarded as medicinal, are being marketed as foods, spices, flavourings, additives or other "legal formula" in order to escape the strict medical regulations

However, plants for food have a broad and complex legal framework, ranging from spices and condiments, plants for teas, spices, food additives, nutrients or food supplements, among others, to which they have applied different producers to market their products.

Below is listed the wide legislation affecting AMCPs. Included information is not exhaustive and may change. These changes are available on

<http://aesan.msssi.gob.es/AESAN/web/legislacion/legislacion.shtml>

- Royal Decree 1487/2009, 26th November, food supplements.
- Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers.
- Regulation (EU) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods
- Commission Regulation (EU) No 432/2012 of 16 May 2012 establishing a list of permitted health claims made on foods, other than those referring to the reduction of disease risk and to children's development and health
- Regulation (EU) No 1925/2006 of the European Parliament and of the Council of 20 December 2006 on the addition of vitamins and minerals and of certain other substances to foods
- Commission Regulation (EC) No 953/2009 of 13 October 2009, on substances that may be added for specific nutritional purposes in foods for particular nutritional uses
- Royal Decree 1808/1991, of 13 December, regulating the indications or marks identifying the lot to which a foodstuff belongs
- Regulation (EU) No 1935/2004 of the European Parliament and of the Council of 27 October 2004, on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC
- Royal Decree 1801/2008, of 3d November, laying down rules on nominal quantities for packaged products and the verification of their actual contents are set.
- Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002, laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety.
- Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs
- Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules
- Commission Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs
- Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives
- Commission Regulation (EU) No 1129/2011 of 11 November 2011 amending Annex II to Regulation (EC) No 1333/2008 of the European Parliament and of the Council by establishing a Union list of food additives
- Regulation (EC) No 1332/2008 of the European Parliament and of the Council of 16 December 2008 on food enzymes
- Regulation (EC) No 1334/2008 of the European Parliament and of the Council of 16 December 2008 on flavourings and certain food ingredients with flavouring properties for use in and on foods.
- Royal Decree 2483/1986, of 14 November, on technical health regulations on general conditions of regulated temperature inland transport of food and food products.
- Royal Decree 140/2003, of 7 February, establishing health criteria for the quality of water for human consumption.
- Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs
- Regulation (EC) No 258/97 of the European Parliament and of the Council of 27 January 1997 concerning novel foods and novel food ingredients
- Royal Decree 1101/2011 of 22 July, on the positive list of extraction solvents that can be used in the manufacture of food products and their ingredients.

- Royal Decree 348/2001, of 4 April, on the manufacture, marketing and importation of foods and food ingredients treated with ionizing radiation.
- Royal Decree 191/2011 of 18 February on General Sanitary Inspection of Food and Food Industries.
- Law 17/2011, of 5 July, on food safety and nutrition.

Irradiated foods are regulated by:

- Directive 1999/2/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning foods and food ingredients treated with ionizing radiation.
- Directive 1999/3/EC of the European Parliament and of the Council of 22 February 1999 on the establishment of a Community list of foods and food ingredients treated with ionizing radiation. So far, this positive list contains only a single food category: "dried aromatic herbs, spices and vegetable seasonings".

Specific legislation about some herb based products

- Royal Decree 2242/1984, of 26 September, on Technical and Health Regulations for the production, distribution and sale of condiments and spices.
- Royal Decree 3176/1983, of 16 November, on Technical and Health Regulations for the Preparation, Circulation and Trade of Plant Infusions for Food use.
- Royal Decree 1345/2007, of 11 October, regulating the method of authorization, registration and conditions of supply of medicinal products for human use that are industrially manufactured.
- Royal Decree 1487/2009, of 26 September on food supplements.
- DIRECTIVE 2004/24/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 March 2004, amending, as regards traditional herbal medicinal products, Directive 2001/83/EC on the Community code relating to medicinal products for human use.

Protected designations of origin (pdos) and other quality labels

Some Spanish DOPS are: Saffron from La Mancha (Region of Castilla La Mancha), Paprika from Murcia (Region of Murcia) and Paprika from La Vera (Region of Extremadura).

Some Regions have their own Quality Labels. For example in the Region of Valencia lavender, rosemary, lavender cotton and thymus are recognized under the Valencian Community Quality Label.

2.3 STANDARDS, CODES OF PRACTICE AND RECOMMENDATIONS OF PROFESSIONAL ASSOCIATIONS AND PUBLIC-INTEREST NON-GOVERNMENTAL ASSOCIATIONS

2.3.1 PORTUGAL

The Habitats Conservation – Conservation of Naturais and Semi-Natural Habitats at Serras de Aire e Candeeiros, has the ethic code for aromatic, medicinal and culinary herbs harvest practices, where it refers the rules for harvesters. The recent increasing interest in the harvest and use of these type of products led to the need of basic norms definition, that control the indiscriminated harvest of this precious and limited natural resource.

Within the National Strategy for Salt Consumption Reduction in Portugal, the Portuguese General Directorate of Health disclosed the report "National Strategy for Salt Consumption Reduction in Portugal" and the Briefing Document "Using Herbs & Similar in Food", which reinforces the importance the use of herbs and salt substitute.

The Direcção Geral de Saúde, in the framework of the National Program for the Healthy Diet (PNPAS) released a brochure on the subject "Aromatic Herbs – A strategy for salt reduction in Portuguese diet" where different aromatic herbs are described as well as their possible culinary uses. This brochure was elaborated with the objective of disseminating aromatic herbs information, once that, DGS has realized aromatic herbs richness, has realized that most of these Mediterranean traditional products are produced in Portugal and wants to incentives these Portuguese products consumption.

The European Medicines Agency gives secretary support to the Committee for Herbal Medicinal Products (HMPC), which was created by the Regulation 726/2004 and, as result of Directive 2004/24 / EC. HMPC is responsible for the organization and evaluation of scientific data on plant derived substances, preparations and associations, focusing safety and efficiency. The two main tasks of HMPC are: establish a legislation at European Union level that regulates therapeutic uses and safety conditions for the use of substances and preparations of plants (established/traditional use); the elaboration of a list of EU plant derived substances, preparations and combinations for traditional medicines.

The signature and ratification by Portugal of the Convention on Biological Diversity (CBD), respectively in 1992 and 1993, and its entry into force with binding effect, in 1994, determined the implementation of measures consistent with not only, the heritage conservation of plant genetic resources, as well as the recognition, collation and documentation of traditional knowledge associated with them.

In recent decades, to respond to international agreements undertaken by Portugal and to contribute for a sustainable use of these resources, several measures were implemented to promote training and support medicinal and aromatic plants sustainable production. Support measures for implementation and application of medicinal and aromatic plants sustainable development programme in Portugal, in recent years, has led to the implementation and application of sustainable development programmes in Portugal

A recent report published in 2011 by the Portuguese Ministry of Agriculture, considering the period of 2004 to 2009, shows an increase in production area and number of growers, which demonstrates that MAP programmes and policies, have contributed to the development of this sector in Portugal.

At present, there is a consensus among researchers, the industrial and environmental organizations, that the initiatives to reduce the pressure on the environment and the conservation of genetic resources, is closely related to the development of systems that enable the sustainable use of wild species and medicinal and aromatic plants production, that leads to better quantity and quality of raw material. It is important that all who wish to integrate the Portuguese market of aromatic and medicinal plants take into account three fundamental aspects: Legislation, Organization and Quality.

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Implementation and application of sustainable development programmes in Portugal:

- The contribution to the successful implementation of international agreements undertaken by the country in biodiversity conservation;
- Demonstrate the economic viability of aromatic and medicinal plants production;
- Enhance the production and utilization of medicinal and aromatic plants in the context of natural resource conservation and sustainable rural development;
- Contribute to the reduction of the negative impacts of over-harvesting of wild populations;
- Promote research in medicinal and aromatic plant species, particularly in the areas of Botany, Phytochemistry, Pharmacology and Plant Biotechnology;
- Increase the technical knowledge (TK) of plant propagation, sample drying, packaging and storage;
- Confirm the importance of collation and documentation of medicinal and aromatic plants TK;
- Encourage and promote medicinal and aromatic plants production in order to obtain higher quality of raw materials and products;

If there is the interest in starting an application to support the cultivation of aromatic herbs, you should consult and carefully study the applicable legislation, in particular with regard to the installation and investment young farmers PRODER Site - as well as the framing income support (available on the websites of MAP Office of Planning and IFAP).

Guides:

- Adelaide Santos, Idalina Leite, Curso de Plantas Medicinais, Aromáticas e condimentares, Associação de Agricultores do Concelho de Arouca (2006);
- Alan Buckingham, Cultivar Legumes – Hortas, Quintas, Terraços e Pátios, Editora Civilização (2007);
- Nogueira, M.T.D. 2007. Boas práticas agrícolas, de colheita e conservação de plantas medicinais.
- Luís Alves, Cursos de Jardinagem 1 - Plantas Aromáticas, Medicinais e Condimentares.
- MEDICINAL AND AROMATIC PLANTS – PORTUGAL; Ana Maria Barata, Filomena Rocha and Violeta Lopes; Eliseu Bettencourt and A. Cristina Figueiredo
- **Guia para a Produção de Plantas aromáticas e Medicinais**, written in Project “Formar para a produção de PAM em Portugal” framework.
- Gabinete de Planeamento e Políticas. 2013. As Plantas Aromáticas, Medicinais e Condimentares, Portugal Continental 2012. Ministério da Agricultura e do Mar, Governo de Portugal.

2.3.2 ROMANIA

Those food business operators who are responsible and have understood the importance of the EU quality and safety requirements have already implemented or certified different systems of quality control and use specific standards or guides or, such as:

- SR EN ISO 22000:2005/AC:2006 - System of food safety management; Implementing this standard the organization could show its capability to control and diminish all contamination risks and health threats during the manufacturing process and prove to be able to ensure a safety food recommended for human consumption;
- SR EN ISO 9001:2008/AC:2009 – System of quality management;
- IFS (International Featured Standard) – is an internal audit standard for those companies that process and pack different food products, especially when a potential contamination risk was detected during primarily packaging;

- HACCP - Hazard Analysis and Critical Control Point has to be implemented in all stages of the food production, processing and distribution; it has to be noticed that HACCP implementation was compulsory for all Romanian business food operators since 1 January 2007 (national Law no. 150/2004, which transposed EU Reg. no. 178/2002);
- GMP - Good Manufacturing Practices of medicinal plant processing is targeting not only the inspection of building, equipment's, technological flow and quality control of the products and documents, but also the human resources, consumers' complaints and products recall.
- The manufacturers who have developed their own production farms (medicinal plant cultivation) or have organized gathering groups (specialized in harvesting medicinal plants from the spontaneous flora) have also at their disposal some Romanian standards, as following:
- SR 13479:2003 – Medicinal and aromatic plants. GMP for plant cultivation;
- SR 13480:2003 - Medicinal and aromatic plants. GMP for plant harvesting.

Both of these standards were elaborated by EUROPAM (European Herb Growers Association) and were translated by ASRO (Romanian Standards Association) who was assisted by ROPAM (affiliated to EUROPAM, at that moment). They are targeting all raw material used in food industry, pharmacy or cosmetics.

Respecting the good practices, plant producer is sure that he is obtaining hygienic products, with a low microbial contamination. By standard implementing there are also limited all the potential risks that could affect plants during harvesting, processing or storage.

Another standard is SR 1631-1:2003 – Medicinal and aromatic plants. Sensory quality of raw material, recommended by ASRO both to the farmers and herbs traders. This standard underlines the need for quality determination of medicinal plants, due to the specific variation of raw material macroscopic characteristics (colour, size of plant fragments) and sensorial features (taste, smell).

According to Flora European and ISTA (International Association for Seed Testing), ASRO have published SR 1632-1:2003 Medicinal and Aromatic Plants. Botanical Nomenclature, standard which helps to correctly identify the medicinal species and to avoid mistakes that can induce health problems to the consumers.

Different documents and guides have been issued by different organizations:

- FoodDrinkEurope orientative document about the REGULATION (EC) No 1334/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on flavourings and certain food ingredients with flavouring properties for use in and on foods. Translated by FIAB*.
- European Spice Association. Document about the minimum quality requirements. Rev 4. Adopted in the Technical Commission Committee 1st December 2011*
- International Organization of Spice Trade Associations IOSTA. General guide for Good Agricultural Practices. Spices*.
- Guide for the sustainable production of aromatic and medicinal plants 2010*. INTRADER project. E. Moré; M. Fanlo; R. Melero; R. Cristóbal, Forest Technological Centre from Catalonia
- Organic production of aromatic and medicinal plants. Strengthening agrodiversity and rural employment. Agroecology Magazine Ae15. Spring 2014*.
- Commercial distribution of medicinal and aromatic plants in Catalonia, Forest Technological Centre from Catalonia (CTFC) and School of Agricultural Engineering (ETSEA) at the University of Lerida *.

3.1 RESEARCH ORGANIZATIONS INVOLVED IN HERBS PRODUCTION AND PROCESSING

3.1.1 PORTUGAL

The components that differentiate aromatic and medicinal herbs and spices from the others, giving it therapeutic value and aroma, are the active principles. Among these are: the alkaloids, toxic compounds that act on the central nervous system. They may have varied therapeutic activity as that of the opium that is used as a narcotic, the action of quinine on fever, the broom action as a heart regulator, the tea as a diuretic. The alkaloid content in plants increases until the flowering and declines rapidly after that; the glycosides, only in special cases are close to alkaloid medicinal properties; the essential oils, appear in many plants with a characteristic aroma, generally pleasant, which may be obtained by distillation; the tannins, with anti-diarrhoeal action, are easily oxidized; the bitter principles, from various sources, usually glycosidic, have a bitter taste, and by stimulating secretion of gastric juices create conditions for improving the appetite; the mucilage, hydrocarbons that increase in volume by hydration are used as laxatives, lubricants or antiinflammatory drugs.

Today's knowledge of aromatic herbs and spices in Portugal continues to be an important subject in the botanical and biochemical research, with a considerable number of scientific publications. In other domains as the genetic resources conservation, phytotechniques and biotechnology, the levels of knowledge vary from basic to advanced knowledge. The sustainable use of these plants in Portugal is integrated in wider strategies, such as the European Union (EU) and natural resources policies.

In a survey were recorded 7 producers, after harvest of vegetative material, that transform its production to essential oils. Some producers of PAM that produce oil also import raw materials and/or in the harvesting of wild plants are gatherers. The transformation is done on the farm, not being considered for the processing estimate, according to the stipulated methodological criteria, leaving only the level of the primary product. However, drying is not inserted in a process transformation, because only causes a decrease in moisture content. The species used are roughly the same as the dry PAM. Given the small number of farms with this activity and the diversity of individual oils, it is not possible to analyze in detail this segment, in compliance with the principle of the statistical secret and we commit ourselves before the data providers.

EPAM – Empreender na Fileira das Plantas Aromáticas e Medicinais (PAM) em Portugal: is the name of a project, led by Associação para o Desenvolvimento do Concelho de Moura which started in 2011 and was motivated by the Programa para a Rede Rural Nacional (FEADER), which objective is to support the aromatic and medicinal herbs sector development in Portugal. It works on net animation, research and information availability, training, promotion and lobby (in particular to the political enhancement of the sector). In February, 2014, in the framework of this program, a set of activities was approved under the title "Train for the production of medicinal and aromatic plants in Portugal", in order to design, develop and disseminate technical knowledge on the production of PAM in Portugal, enabling PAM producers and promoting contacts and exchanges between them and experts and researchers.

In the region watered by the the Alqueva Dam, in Portugal, an Academy of Medicinal and Aromatic Plants (MAP) has been formed. The project supports farmers, already implemented or start-ups, to produce, process and market. An initiative looking ahead: creating jobs and gain scale through a Farmer Group.

3.1.2 ROMANIA

Hundreds of research studies and development projects as well as the intense work aiming to identify, evaluate and manage this important natural resource of Romania, resulted in a valuable scientific support, which explain the successful economic and trade activity of the XX century.

All the responsible ministries created and enhanced their own networks of research and development activity (Table 2) in direct connection with the economic development of medicinal plant sector:

- Ministry of Education, Universities: Botany departments in all the Faculties of Biology and Ecology; Polytechnics: Departments of Chemical Analyses;
- Ministry of Health, Medicine and Pharmacy Universities: Pharmaceutical Botany, Pharmacology departments);
- Ministry of Agriculture and Rural Development: Agriculture Research and Production Centres, National Institutes;
- Academy of Agricultural and Forestry Sciences-that were involved in cultivation technologies, plant breeding and seed production, other forest products than wood (such as mushrooms and wild berries, respectively);
- National Authority for Scientific Research and Innovation: National Research and Development Institutes, Centres of Research and Excellence - that studied medicinal and aromatic plants from botanical, genetic, biochemical and ecologic point of view, different *in vitro* biotechnologies, plant protection;
- Romanian Academy of Science (Botanical Institute - that focused on endangered and protected species, natural reserves and protected areas);
- Each Botanical Garden: Iasi, Bucuresti, Craiova, Timisoara and Cluj, developed a medicinal plant sector, while in Targu Mures it was created an entire medicinal plants botanical garden, where approximately 1000 taxa could be seen. Collections of 70-200 species each are found in all the important cities, near the Universities of Agronomic/Agricultural Sciences and Veterinary Medicine used for demonstrative purpose and student practice;
- On the other hand, Natural Science Museums from the main cities of the country started to collect local medicinal flora and to create herbarium in many important cities of the countries.

The agronomist researchers have studied 52 species of cultivated medicinal and aromatic plants (Mocanu, 1999). The eco-physiological needs of the cultivated species were established (the most appropriate region for each species was designed) and the map of natural geographic distribution of medicinal plants was set up. The main cultivated species were (and still are): *Coriandrum sativum*, *Sinapis alba*, *Brassica nigra*, *Foeniculum vulgare*, *Cynara scolymus*, *Hyssopus officinalis*, *Silybum marianum*, *Papaver somniferum*, *Mentha piperita*, *Mentha crispa*, *Salvia officinalis*, *Calendula officinalis*, *Melissa officinalis*.

In Romania there were homologated 29 cultivars of 17 species *Coriandrum sativum* (Sandra/82, Omagiu/2000), *Datura innoxia* (Laura/82, Silvia/84), *Papaver somniferum* (Extaz/82, Safir/82), *Matricaria recutita* (Margaritar/82, Flora/89), *Valeriana officinalis* (Magurele/82), *Cynara scolymus* (Celesta/89, Unirea/93, Flavia/00), *Mentha piperita* (Cordial/89, Cristal/2000, Columna), *Mentha crispa* (Record/92, Mencris), *Lavandula angustifolia* (Corbeanca/92), *Thymus vulgaris* (Smarald/93), *Vinca minor* (Azur/96), *Digitalis lanata* (Tonic/00, Lanata-1), *Ocimum basilicum* (Basilica00, Geeal/00), *Tagetes patula* (Tages/96), *Trigonella foenum graecum* (Robusta/00), *Foeniculum vulgare* (Hestia/01), *Artemisia dracunculus* (Armonia/01, Artemis/01). Other 24 species were domesticated (*Achillea millefolium*,

Acorus calamus, Angelica archangelica, Atropa belladonna, Carum carvi, Chelidonium majus, Gentiana lutea, Hypericum perforatum, Plantago lanceolata, Valeriana officinalis, Vinca minor), 10 species were acclimatised (*Amsonia tabernaemontana, Digitalis lanata, Echinacea purpurea, Glaucium flavum, Grindelia robusta, Momordica charantia, Satureja montana, Securinega suffruticosa, Solanum laciniatum*) and 31 valuable local landraces were certified.

More than 20 technologies of cultivation (about 80 technological sequences) have been created, succeeding to establish: the preceding culture, soil preparation, fertilisation, methods of plant multiplication, sowing period, seed rate, sowing depth, raw intervals, maintenance requirements, disease prevention and cure, damaging insects control, harvesting methods, drying and storage conditions, processing techniques for fresh and dry raw material, etc.

The sustainable use of local resources (63 species mainly collected in 2000) asked the biodiversity conservation (today 297 species are *ex situ* persevered, 179 species are hold by Suceava Gene bank and 13 species, are on the National Red List (under the severe control of Romanian Academy of Science - Committee for the Nature Monument Protection). The National Catalogue of Plant Genetic Resources was published in 2000 year, with the support of the IPGRI. The medicinal and aromatic plants cover a whole fascicule (Murariu et al., 2002).

Interesting partnerships (public and private; scientific and economic; entrepreneurial and business development) were registered during the last years, focusing on the same subject, namely medicinal and aromatic plants.

Running projects together, the public institutions in concert with interested private companies and other organizations (such NGOs) started to do the first steps to recover the herbal product chain and to come near the previous success in the field.

A real support for agriculture (that continues to be a vulnerable sector) came from the Ministry of Agriculture and Rural Development, which introduced medicinal plants in rural development strategy, offering subsidies for the cultures. In the meantime, the Ministry of Education and Research implemented a new, modern information system, which contain a national database of large interest that could be easily accessed online.

In spite of the slow progress of the society and all difficulties of transition period (especially mentality changes of the people), it seems that the preparation for a new approach of medicinal plant have been done.

3.1.3 SLOVAKIA

National Agricultural and Food Centre (NPPC) provides comprehensive research and pooling of knowledge in the field of sustainable use and protection of natural, particularly land and water resources for crop production and animal production, quality assurance, safety, innovation and competitiveness of food and non-food agricultural origin, productive and non-productive impact of agriculture on the environment and rural development and knowledge transfer of agricultural research users.

Plant Production Research Institute in Piešťany (hereinafter PPRI Piešťany or Institute) was established on the 1st March 1951 under the title "Regional Departmental Research Institute of Plant Production" at Borovce near Piešťany. The Institute farm at Borovce about 410,41 hectares agricultural land area absorbed at the same time.

Research activity of PPRI Piešťany in the field of technological research is at present primarily aimed on: regulation of factors conditioning and influencing the quantity and the quality of yield at main field crops; sustainable improvement and optimisation of growing systems and technologies in plant production,

Output/Activity O2/A1. **Leader** IBA-Bucharest. **Partners involved** No Gravity, CTC, UCB-ESB and UCAM

including the integrated, alternative and ecological forms; sustainable production of biomass and ways of biomass utilisation for energy production and for non-food purposes; ecologisation and biologisation of the plant production and research of effects and impact of climate change on the course of production process at the plant production and possibilities for an adaptation of agriculture to the change.

In the field of genetically-breeding research is research of PPRI oriented on analyses of plant genotypes and phenotypes, relationship between them and creation of new biological materials with improved properties using the progressive methods; biotechnological procedures applicable in plant production and in agriculture, including the modifications of plant genomes; genetically conditioned tolerance and persistence of plants to negative factors of the environment; improving the quality, safety and functionality of food resources and testing of the genetically modified plants.

PPRI Piešťany insures and in conditions of Slovak Republic co-ordinates collecting, studying, conservation and utilisation of plant gene pool for agriculture and nutrition (Gene Bank for the needs of SR is located at the Institute in Piešťany) and at the same time non-production and landscape-forming functions of plant production and of agricultural production are examined.

At the same time the Institute insures: dissemination of knowledge and putting the research and development results into practice; advisory, evaluating and project-making activities; preparation of strategies, prognoses, outlooks, concepts, expertises, studies, proposals and syntheses in the fields of general and specialised plant production; acquisition and dissemination of scientific information; publishing and editing scientific, professional and popular literature and serials; national and international cooperation in science and technology; educational and additional activities.

Food Research Institute located in Bratislava is focused on the processing and proposals for science and technology projects in accordance with the concept of state scientific and technical policy and program priorities and departmental research; solution and coordination of scientific and technical projects awarded in the form of state orders, state and departmental grants; of research and development in food chemistry, analysis, microbiology, technology and related industries; research and technology validation, including proposals for technological application of detergents and disinfectants; ensuring the transfer of knowledge and the world of science and research in food legislation, policies and development programs and food directly to food production pilot plant testing new technologies and production unit operations for the area of biotechnology and food production; design-engineering in connection with the implementation of research results in practice; development of international scientific research cooperation and scientific research cooperation with other departmental research institutes, universities, research establishments, universities and SAS. It forms the basis of the Centre of Excellence food research - CEPV.

Research Institute of Agriculture and Food

Scientific research organization of the agriculture sector . Applied economic research in the field of cross- sectoral and economy of agriculture and food , the pooling of knowledge of basic research in these areas and the development of knowledge in related scientific disciplines issues, scientific and technical periodical press in the scope of activities of the Institute . The principal activities of the institute 's scientific research activity in the field of cross-sectoral and economy.

3.1.4 SPAIN

According to the results of the HERBAL-MEDNET project (Lifelong Learning Programme, www.herbalmednet.eu), in general there is little research on the cultivation of Aromatic and Medicinal Plants in Spain.

At national level the National Institute for Agricultural and Food Research and Technology INIA is an autonomous Public Research Organization of the State Secretariat of Research, Development and Innovation of the Ministry of Economy and Competitiveness. It's the only public research organization of the National State Administration exclusively dedicated to agrifood and forestry research. The Forest Research Centre FRC of INIA has the functions of scientific research, technological development and innovation, scientific-technical training, national and international cooperation and the provision of scientific-technical services related to the field of forestry. FRC's Department of Forest Products includes aromatic and medicinal plants.

Other Institutes, also at national level, have also investigated in this field, such as the Institute of Industrial Fermentations belonging to the Spanish National Research Council CSIC and many Universities as well as many Technological Centres spreaded all over Spain, being the most important one the Forest Technological Centre from Catalonia CTFC.

At regional level, the following institutions have research lines in aromatic and medicinal plants:

- Institute of Agricultural and Fisheries Research and Training IFAPA of Andalusia
- Research and Food Technology Centre CITA of Aragon
- Agricultural Research Centre Albaladejito of Castilla La Mancha.
- Agricultural Technological Institute of Castilla y Leon ITACyL
- Agricultural and Food Research and Development Murcian Institute IMIDA of Murcia
- Valencian Institute of Agrarian Research IVIA of Valencia.

3.2 SCIENTIFIC PAPERS (ARTICLE, BOOKS, PROJECTS)

3.2.1 PORTUGAL

Several studies have been conducted in the field of aromatic herbs and their relationship to health. These studies show that herbs are holders of beneficial properties that contribute to prevent some diseases and promote overall health. Some scientific works are:

Lopes A., et al. 2014. Ervas aromáticas – uma estratégia para a redução de sal na alimentação. Direção-Geral de Saúde. Lisboa. 18 páginas

Medical Association. 2006. Health benefits of herb and spices: the past, the presente, the future. Volume 185. Number4. 26 páginas

Bachmeier, B. et al. 2008. Curcumin downregulates the inflammatory cytokines CXCL1 and -2 in breast cancer cells via NFkB. Carcinogenesis 29(4):779-789.

Almeida D. Efeito da canela na glicemia pós-prandial, esvaziamento gástrico e saciedade em pessoas saudáveis Sociedade Brasileira de Diabetes.

Katiyar, S. K., Agarwal, R., Mukhtar, H. (1996). Inhibition of tumor promotion in SENCAR mouse skin by ethanol extract of Zingiber officinale rhizome Cancer Res, 56, pp. 1023-1030.

Baliga, M. S., et al. (2011). Update on the chemopreventive effects of ginger and its phytochemicals. *Crit Rev Food Sci Nutr*, 51, pp. 499-523.

Yoshikawa, M., et al. 1994. Stomachic principles in ginger. An anti-ulcer principle, 6-gingesulfonic acid, and three monoacyldigalactosyl glycerols, gingerglycolipids A, B, and C, from *Zingiber Rhizoma* originating in Taiwan. *Chem Pharmacol Bull*, 42, pp. 1226-1230.

Haniadka R., et al. 2013. A review of the gastroprotective effects of ginger (*Zingiber officinale* Roscoe). *Food Funct.*, 6, pp. 845-855.

Siddaraju, N. Dharmesh, M. 2007. Inhibition of gastric H⁺, K⁺ ATPase and *Helicobacter pylori* growth by phenolic antioxidants of *Zingiber officinale*. *Mol Nutr Food Res*, 51, pp. 324-332.

Mahady, G. B., et al. 2003. Ginger (*Zingiber officinale* Roscoe) and the gingerols inhibit the growth of Cag A+ strains of *Helicobacter pylori*. *Anticancer Res*, 23, pp. 3699-3702.

Portuguese authors publications

Figueiredo, A.C., Barroso, J.G. 2007. Plantas Aromáticas e Medicinais. Factores que afetam a produção. Pp. 1-18. In: Figueiredo, A.C., Barroso, J.G., Pedro, L.G. (Eds) *Potencialidades e Aplicações das Plantas Aromáticas. Curso Teórico-Prático*, 3ª Ed. Edição da Faculdade de Ciências da Universidade de Lisboa- Centro de Biotecnologia Vegetal, Lisboa, Portugal.

Figueiredo, A.C., Barroso, J.G., Pedro, L.G. & Scheffer, J.J.C. 2008. Factors affecting secondary metabolites production in plants: volatile components and essential oils. *Flavour and Fragrance Journal* 23: 213-226.

Figueiredo, A.C., Barroso, J.G., Pedro, L.G., Salgueiro, L., Miguel, M.G. & Faleiro, M.L. 2008b. Portuguese *Thymbra* and *Thymus* species volatiles: chemical composition and biological activities. *Current Pharmaceutical Design* 14: 3120-3140. Figueiredo, A.C., Pedro, L.G., Barroso, J.G., Trindade, H., Sanches, J., Oliveira, C. & Correia M. 2013. *Thymus capitellatus* Hoffmanns. & Link. *Agrotec* 9: 12-15.

Proença da Cunha, A., Roque, O.R. & Nogueira, M.T. 2012. Plantas aromáticas e óleos essenciais, composição e aplicações. Fundação Calouste Gulbenkian, Lisboa, Portugal.

Passarinho, J.A., Ferreira, M.E., 2010. Um horto de plantas alimentares e ervas aromáticas. In: M.M. Valagão (Org.), *Natureza, Gastronomia & Lazer. Plantas silvestres e ervas aromáticas condimentares*. Edição Colibri, Lisboa: 103-127 (ISBN: 978-972-772-926-5).

Ferreira, M.E., 2014. As plantas aromáticas e medicinais (PAM) na dieta mediterrânica: porquê, quando e como?. In: Romano, A. (Ed.), *A Dieta Mediterrânica em Portugal: cultura, alimentação e saúde*. Edição Universidade do Algarve: 203-214 (ISBN: 978-989-8472-51-9).

3.2.2 ROMANIA

The most important books and monographs on medicinal plants

Alexan M., 1976, *Ghidul micului culegător de plante medicinale*, Trustul Plafar, București

Alexan M., Bojor O., 1983, *Fructele și legumele – factori de terapie naturală*, Edit. Ceres, București

Andrei M., 1971, *Să cunoaștem plantele medicinale*, Edit. Didactică și Pedagogică, București

Anton N., 2003, *Tratamentul bolilor cu plante medicinale*, Edit. Alo, București

- Anton S., 2006, *Incursiune în medicina naturistă*, ediția a-IX-a, Edit. Polirom, Iași
- Ardelean A., Mohan Gh., 2008, *Flora medicinală a României*, Edit. All, București
- Bavaru A., Godeanu S., Butnaru G. & Bogdan A., 2007, *Biodiversitatea și ocrotirea naturii*, Edit. Academiei Române, București
- Beldie Al., Chiriță C.D., 1967, *Flora indicatoare din pădurile noastre*, Edit. Agro-Silvică, București
- Bodea C., 1965, *Tratat de Biochimie vegetală. Partea I-a. Fitochimie*, Edit. Academiei, R.S.R.
- Bodea C., Cucu V., Cioacă C., 1982, *Tratat de biochimie vegetală*, vol. IV, Edit. Academiei R.S.R., București
- Bojor O., 1959, *Contribuții la identificarea florei medicinale din raionul Sibiu*, Edit. Farmacia, București
- Bojor O., 1998, *Pledoarie pentru viață lungă*, Edit. Pacco, București
- Bojor O., Alexan M., 1981, *Plantele medicinale – izvor de sănătate*, Edit. Ceres, București
- Bojor O., Alexan M., 1984, *Plantele medicinale și aromatice de la A la Z*, Edit. Recoop, București
- Bojor O., Perianu C., 2005, *Sănătate prin semințe, legume și fructe*, Edit. Fiat Lux, București
- Bojor O., Popescu O., 1993, *Miracolele terapeutice ale plantelor*, Edit. Edimpex – Speranța, București
- Bojor O., Popescu O., 2001, *Fitoterapie tradițională și modernă*, Edit. Fiat Lux, București
- Borza Al., 1968, *Dicționar etnobotanic*. Edit. Academiei R.S.R.
- Buiculescu I., 1971, *Contribuții la cunoașterea florei medicinale din masivul Piatra Mare*, Comunic. Bot.
- Butură V., 1979, *Enciclopedie de Etnobotanică Românească*, Edit. Didactică și Pedagogică, București
- Calcandi V., Mitroiu-Rădulescu N., Bojor O., Calcandi J., Georgescu V., Gruia M.V., Lungeanu I., Mihăilescu-Firea S., Șerbănescu-Jitariu G., Tarpo E., Toma N., 1976, *Contributions à l'identification et à l'évaluation des plantes medicinales de la flore spontanée du département Dâmbovița-Acta Bot.Horti Bucurestiensis, 1975-1976*
- Ceașescu M.E, Doru G., Bereșiu I., 1989, *Plante aromatice și condimentare utilizate în preparatele culinare*, Edit. Ceres, București
- Chirilă P., 1987, *Medicina naturistă*, Edit. Medicală, București
- Ciulei I., Grigorescu E., Stănescu U., 1993, *Plante medicinale, fitochimie și fitoterapie*, Edit. Medicală, București
- Coiciu E., 1967, *Plante medicinale și aromatice de perspectivă*, Centrul de docum. Agric., București.
- Coiciu E., Racz G., 1962, *Plantele medicinale și aromatice*, Edit. Academiei R.P.R., București
- Constantinescu C., 1975, *Plantele medicinale în apărarea sănătății*, Edit. Recoop, București
- Constantinescu C., Agopian A., 1973, *Plante medicinale din flora spontană*. Edit. Recoop, București
- Constantinescu D., Hațieganu E. M., 1979, *Plante medicinale, proprietățile lor terapeutice și modul lor de folosire*, Edit. Medicală, București
- Constantinescu D., Hațieganu E. M. & Busuricu F., 2004, *Plantele medicinale utilizate în terapeutică*. Edit. Medicală, București
- Crăciun F., Bojor O., & Alexan M., 1976, *Farmacia naturii*, vol. I, II, Edit. Ceres, București
- Crețu L., Domeșenco L., 2005, *Plantele alimentare care ne apără sănătatea*, Edit. Arc, Chișinău

- Dihoru Gh., 1984, *Ghid pentru recunoașterea și folosirea plantelor medicinale*, Edit. Ceres, București
- Dobos A., 1993, *Farmacia endemica*, Editura Nirvana, Bucuresti
- Drăgulescu C., 1992, *Plante medicinale alimentare din flora spontană*, Edit. Ceres, București
- Duță V., 2005, *Farmacia naturii, miracolul vindecării cu ajutorul remediilor naturiste*, Edit. Ștefan, București.
- Enea D., 2004, *Prezentarea a două specii medicinale obținute în sectorul „Plante cultivate” ale Grădinii Botanice „Al. Buia” a Universității Craiova*, Analele Universității din Craiova, Fac. de Horticultură, vol VII
- Fătu A., 1880, *Tratat de Botanică, Partea I-a*. Universitatea din Iași
- Fischer E., 2000, *Dicționarul plantelor medicinale, Ghid practic pentru cultivarea și utilizarea plantelor medicinale și aromatice*. Edit. Gemma Press, București
- Geiculescu V.T., 1987, *Bioterapie*. Edit. Științifică și Enciclopedică, București
- Giurgiu E, Popa M., 2002, *Ghid de vindecare fitoterapeutică și de apiterapie*, Editura Studia, Cluj-Napoca
- Goina T., Constantinescu E., Ciulei I., Rocz G., & Grigorescu E., 2001, *Index fitoterapeutic*, Edit. Cantas, Iași.
- Gontea I., 1970, *Alimentația rațională a omului*, Edit. Didactica și Pedagogică, București
- Gradila M., 1998, *Cultura plantelor medicinale*, Editura M.A.S.T, Bucuresti
- Greceanu E., 1970, *Plante medicinale și aromatice*, Editura Ceres, Bucuresti
- Grigorescu E., 1987, *Din ierburi s-au născut medicamente*, Edit. Albatros, București
- Grigorescu E., & Silva F., 1997, *De la etnomedicină la fitoterapie*, Edit. Spiru Haret, Iași
- Halamgean, L., 2006, *Ecotehnologia plantelor medicinale*, Editura Universitatii “Aurel Vlaicu”, Arad
- Hăncianu M., Stănescu U., Aprotosoae C. *Bazele farmaceutice, farmacologice și clinice ale fitoterapiei* (vol. III), Ed. « Gr. T. Popa », Iași, 2008, ISBN Iași, 2008, ISBN 978-973-7682-68-0
- Ionescu-Stoian P., Savapol E., 1977, *Extrakte farmaceutice vegetale*, Edit. Medicală, București
- Istudor V., 1998/2001/2005, *Farmacognozie, Fitochimie, Fitoterapie*, vol. I, II, III, Edit. Medicală, București
- Laza A., 2000, *Îndreptar profilactic și terapeutic de medicină naturistă*, Edit. Păzitorul Adevărului, Făgăraș
- Laza A., Racz G., 1975, *Plante medicinale și aromatice*, Edit. Ceres, București
- Micuț I.C., 1985, *Plante în medicină*, vol. I. Edit. Litera, București
- Mindel E., 1991, *Biblia vitaminelor*, Edit. Elit, București
- Mitroiu-Rădulescu N., Bojor O., Georgescu V., Gruia M.V., Guja M., Pelea M., Șerbănescu- Jitariu G., Tarpo E. & Toma N., 1981, *The charting of the spontaneous medicinal flora the district of Mehedinți, in view of its utilization*, Acta Bot.Hortic. Bucurestiensis, 1979-1980, 205-211
- Mocanu Șt., Răducanu D., 1983, *Plantele medicinale și aromatice*, Edit. Ceres, București
- Mohan Gh., 2000, *Mica enciclopedie de plante medicinale și fitoterapie*, Edit. All, București
- Mohan Gh., 2003, *Atlasul plantelor medicinale din România*, Edit. Corint, București
- Mohan Gh., 2006, *Tratarea bolilor cu plante medicinale*, Edit. Corint, Bucuresti

- Mohan R., 2009, *Aromaterapia și sănătatea*, Natura, vol. 51, Edit. Universității de Vest „Vasile Goldiș”, Arad
- Muntean S.L., 1996, *Cultura plantelor medicinale aromatice*, Edit. Dacia, Cluj Napoca.
- Muntean S.L., 1990, *Plante medicinale și aromatice cultivate în România*, Edit. Dacia, Cluj-Napoca.
- Nădășan V., 2003, *Incursiune în fitoterapie*, Edit. Viață și sănătate, București.
- Neacșu P., Tiță M.G., Mogoșanu G.D. & Tiță I., 2006, *Remedii naturale în tratamentul bolilor*, Edit. Sitech, Craiova.
- Neamțu G., Câmpeanu G., & Socaciu C., 2005, *Biochimie vegetală*, Edit. Didactică și Pedagogică, București.
- Niță Ibrian E., 1999, *Hrana vie și leacuri naturale pentru o sănătate deplină*, Edit. Eikon, Cluj-Napoca.
- Nita Ibrian, E., 1997, *Plantele aliment si medicament*, Editura Solteris, Piatra Neamt
- Olah A., 1996, *Farmacia naturii*, Editura Mentor, Cluj-Napoca
- Oltean M., Negrean G., Popescu A., Roman N., Dihoru G., Sanda V., Mihăilescu S., 1994, *Lista roșie a plantelor superioare din România*, Studii,sinteze,documentații de ecologie, Acad.Română, Institutul de Biologie, nr.1:1-52.
- Opris M., 1990, *Milenarele intamplari ale plantelor medicinale*, Editura Cristal, Bucuresti.
- Oroian Silvia In: Anca SÂRBU (eds.) - *Arii speciale pentru protecția și conservarea plantelor în România/Important Plant Areas (IPAS-s) in Romania*. Ed. Victor B Victor, București, 2007
- Palade M., 1999, *Botanica farmaceutica*, editia a li-a revazuta siadaugita, Editura Tehnica, Bucuresti
- Pârvu C., 1997, *Universul plantelor – Mica enciclopedie*, Edit. Enciclopedică, București.
- Pădure I. M., 2002, *Distribution of Nepeta parviflora Bieb. (Lamiaceae) in Romania with ecological and phytocoenological consideration*, Rev. Roum. Biol. Biol. Veget., 47 (1-2)57-65.
- Pădure I. M., 2005, *Monographic researches of Nepeta L species in Romania*, PhD thesis, Univ. București, Facultatea de Biologie, 377 p.
- Pădure I. M., 2008, *Chemical constituents of the essential oils of eight species of Salvia L. (Lamiaceae) from Romania*, Acta Horti Bot. Bucurest. 35: 20-25.
- Păun E., Mihalea A., Dumitrescu A., Verzea M., Cojocariu O., 1986/1988, *Tratat de plante medicinale și aromatice cultivate*, vol. I, II, Edit. Academiei Române, București.
- Paun E., 1975, *Menta*, Editura Ceres, Bucuresti
- Peiulescu M. A., Popescu H., 1978, *Plante medicinale în terapia modernă*, Edit. Ceres, București.
- Pelikan W., 2000, *Omul si plantele medicinale*, vol I, Editura Triade, Cluj-Napoca
- Popescu H., 1984, *Resurse medicinale în flora Românie*, Edit. Dacia, Cluj–Napoca.
- Popovici I., Lupuleasa D., & Hrișcu A., 1997, *Dicționar farmaceutic*, Edit. Didactică și Pedagogică, București.
- Potlog A., Vințan A., 1985, *Plante aromatice*, Edit. Științifică și Enciclopedică, București.
- Prodan I. & Buia Al., 1966, *Flora mică ilustrată a României*, Edit.Agro-silvică, București.
- Racz G., Laza A., & Voiciu A., 1970, *Plante medicinale și aromatice*, Edit. Ceres, București.
- Radu A., Andronescu E., 1981, *Botanica farmaceutică*, Edit. Didactică și Pedagogică, București.

- Robu T, Milica, C., 2004, *Plante medicinale autohtone*, Institutul European, Colectia Utilis, Iasi
- Roventa I, Roventa D., 1987, *Saschiul mic-o valoroasa planta medicinala si ornamentala*, Editura Ceres, Bucuresti.
- Savin I., 1990, *Să ne tratăm fără medicamente*, Edit. Științifică și Enciclopedică, București.
- Sârbu A., 2001, *Diversitatea plantelor în contextul strategiei europene de conservare a biodiversității*, Edit. Alo, București.
- Scarlat M. A., Tohăneanu M., 2009, *Bazele fitoterapiei*, Edit. World Galaxy, Pitești.
- Schipor V., 2001, *Plante medicinale la îndemana tuturor*, Editura Polirom, Bucuresti
- Simionescu I., 1961, *Flora României*, Edit. Tineretului, București.
- Stănescu U., Miron A., Hăncianu M., Aprotosoia C., 2004, *Plante medicinale de la A la Z; monografii ale produselor de interes terapeutic* (vol. I), Ed. « Gr. T. Popa », Iași, ISBN 973-7906-71-3, ISBN 973-7906-73-X, 312 pp.
- Stănescu U., Hăncianu M., Miron A., Aprotosoia C., 2004, *Plante medicinale de la A la Z; monografii ale produselor de interes terapeutic* (vol. II), Ed. « Gr. T. Popa », Iași, ISBN 973-7906-71-3, ISBN 973-7906-74-8, 318 pp.
- Stănescu U., Miron A., Hăncianu M., Aprotosoia C., 2002, *Bazele farmaceutice, farmacologice și clinice ale fitoterapiei* (vol. I), Ed. « Gr. T. Popa », Iași, ISBN 973-85384-3-2, 348 pp.
- Stănescu U., Miron A., Hăncianu M., Aprotosoia C., 2002, *Bazele farmaceutice, farmacologice și clinice ale fitoterapiei* (vol. II), Ed. « Gr. T. Popa », Iași, ISBN 973-85384-3-2, ISBN 973-85384-4-0, 271 pp.
- Stoianov R., 2002-2005, *Farmacia din gradina*, vol I-V, Editura cartea de buzunar, Bucuresti, 96 pp.
- Toma C., Rugină R., 1998, *Atlas anatomia plantelor medicinale*, Edit. Academiei Române, București.
- Tamaș M., Oniga I., 2001, *Produse fitoterapeutice românești*, Edit. Medicală, Cluj-Napoca.
- Tohăneanu M., Scarlat M.A., 1999, *Ghid de terapie naturistă*, Edit. Romcartexim, București.
- Tită I., 2003, *Botanică farmaceutică*, Edit. Didactică și Pedagogică, București
- Tită I., 2005, *Botanica farmaceutică*, Edit. Didactică și Pedagogică, București.
- Tită I., Năstase A., 1997, *Flora medicinală din Oltenia*, Edit. Scrisul Românesc, Craiova.
- Todor I., 1968, *Mic atlas de plante din flora R. S. R.* Edit. Didactică și Pedagogică, București.
- Tudor I., Minoiu M., 2004, *Plante medicinale miraculoase din flora României*, Edit. Artmed, București.
- Vaczy C., 1980, *Dicționar botanic poliglot*, Edit. Științifică și Enciclopedică, București.
- Vasilica Mozăceni A., 2003, *Ghidul plantelor medicinale*, Edit. Polirom, Iași.
- Voinea-Ene F., 2001, *Sa ne tratam singuri (Ghid de terapie naturista)*, editia a II-a, Editura Bic All, Bucuresti
- Zitti R., Retezeanu M., 1958, *Flora medicinală spontană din raionul Caransebeș*, Lucrările Conferinței Naționale de Farmacie, București, 68-79.
- Zitti R., Retezeanu M., 1958, *Flora medicinală spontană din raionul Făget*, Lucrările Conferinței Naționale de Farmacie, București, 105-109.
- * * * (1952 -1980) – *Flora R.P.R.*, vol I-XIII, Edit. Academiei R.P.R.-R.S.R., București.

Relevant R&D projects financed by The Ministry of Education and Scientific Research

Project title	Period of implementation
Development and transfer of a technology aiming to obtain some original natural products, using plant bioactive compounds, BIOFITO	2008-2011
Medicinal plant processing technologies and biosynthesis to obtain natural products with lipolytic activity, LIPOSAN	2005-2008
Technological transfer and assistance for implementing the micro propagation technology to multiply some selected lavender bio forms (<i>Lavandula</i> ssp.), BIOLAV	2005-2008
Isolation of some functional ingredients with antioxidant activity to be used as food integrators, FITALOX	2005-2008
Biotechnology for obtaining plant metabolites used in the prophylaxis and Orthomolecular therapy, METAVEG	2008-2011
Uncontaminated plant extracts used in phytotherapy obtained by unconventional technologies, FITODEC	2005-2008
Agro-forestry strategy for the recovery and conservation of medicinal plant biodiversity in the context of sustainable rural development in the mountain valley of Bistrita, MED-AGROSILV	2007-2010
The Veronica genus – identification of interrelations between the biological and ecological diversity of the species identified in protected areas and at national level in order to characterize, preserve and durable use of the genetic resources, VEROBIO	2005-2008
Plant product with potentially anti-aging effect derived from biotechnology, BIOTECH ₂₁	2007-2010
Getting through biotechnology plant products acting on neuro-immuno-cutaneous system, BIOTECH ₇₇	2006-2008
Management of natural resources and ecological security of the border basin of the Prut, MARESEP	2005-2008
System for raw material standardization implemented to increase the medicinal plant extract quality used in pharmaceutical industry and cosmetics, PLAMEDCOMPET	2007-2010
Induction of somatic variability of different medicinal plants aiming to select useful lines for their therapeutic properties	2006-2008
Plant products active in remediation of some metabolic disorders	2007-2010
Some important functional ingredients derived from medicinal plants useful in cardiovascular diseases prevention	2007-2010
Obtaining and characterization of some extractive fractions with immunomodulatory and antioxidant properties	2006-2008
The anti-tumour activity mechanism of some medicinal plant extracts obtained from <i>in vitro</i> cultivated tissues and cells	2007-2010
Production and use of medicinal plants obtained in a “bio” farm specialized in ecological agriculture	2006-2008
Innovative bio-nano-technology approaches for obtaining therapeutically products associated to anti-diabetic activity	2008-2011
Natural polymer matrices which include biocide nano-materials and nutrients, useful	2007-2010

as fertilizers in ecologic agriculture of medicinal plants, ECONANOPLANT	
Biodiversity management and <i>in vitro</i> conservation of <i>Geranium robertianum</i> L valuable genotypes	2006-2008
Complex of galic acids used as ingredient in a new formula of plant product recommended for paradonthose treatment	2003-2005
Efficient method and associated laboratory procedure to detect the pesticides residue in medicinal plant products	2003-2005
New bioactive compounds of plant products used in oral cavity diseases treatment due to their antimicrobial and antiviral properties	2004-2006
Rapid gas chromatographic method to identify and quantify the essential oils in plant raw material	2004-2006
New bio active plant product used for peripheral circulation stimulation	2004-2006
Plant product rich in flavonoid compounds successfully used in osteoporosis treatment during the menopause period	2005-2007
Characterization of some plant bioactive compounds with imunomodulatory, metabolic and neurotropic activity that can be used in functional food	2005-2007
Imprinted polymeric structures used for molecular recognition of bioactive compounds from plant extracts	2006-2008
Sustainable exploitation of medicinal plants and hop aiming to obtain bio active products	2006-2008
Complex characterization of some extracts of <i>Claviceps purpurea</i> obtained by biotechnology (parasexual hybridizing) aiming to be used as cytostatic in the veterinary therapy	2008-2011
Integrated model of plant biomass exploitation for nutritional and therapeutic purposes	2007-2010
Efficient method for raw material decontamination and safe plant extracts obtaining	2007-2010
New technologies to obtain plant products with neuro-immunitary activity	2006-2008
Efficient biologic, biochemical and pharmaceutical methods to characterize some bioactive compounds with cytostatic activity	2006-2008
By products of wine industry able to be processed and used as ingredients in cosmetics, food supplements and functional food, OMEGANUTRIOSAN	2005-2008
Natural inhibitors of serin-protease isolated from plants, used for their anti-allergen and anti-inflammatory properties	2008-2011
Optimisation of the nutritional factors aiming to obtain enriched eggs in poly unsaturated fatty acids (new functional food)	2005-2008
Plant biomass used for isolation of some chemical substances efficient in central nervous system support, NEUROVEG	2005-2008
Higher valorisation of vegetal by-products and wasted to support sustainable use of natural resources	2014-2016

Relevant R&D projects financed by European Funds and co-financed by the Romanian Government

1. Methodologies for implementing International Standards for Saffron Purity and Quality (SAFFIC), 2006-2009; 6th EU Framework Program; ROPAM (NGO, Sacele, Brasov);
2. Biosensors and sensors for the industrial biosynthesis process of widely used commercial antioxidants: nutraceuticals as additives for food and agriculture promoting public health and safety (....) 2009-2012; 7th EU Framework Program; Bioanalysis Excellence Center, Bucharest
3. Plant food supplements: Levels of Intake, Benefit and Risk Assessment (PlantLIBRA), 2010-2014; 7th EU Framework Program; University Transilvania, Brasov;
4. Implementation of Natura 2000 Network in Romania, 2007-2008; International project, financed by Europe Aid, Phare; UMF Tg Mures;
5. Infrastructure for medicinal plants research, aiming to obtain innovative herbal food supplements and natural pharmaceutical products; period of implementation, financed by ERDF and Romanian Government (POS CCE); SME Planta Carpatica, Sighisoara
6. Basis of the integrated management Natura 2000 in Hartibaciu-Tarnava Mare-Olt area, 2011-2015; financed by Romanian Government, co-financed by ERDF; POS MEDIU; UMF Tg. Mures
7. Entrepreneurship in the field of medicinal and aromatic plants - an alternative for sustainable rural development, 2007-2013; financed by European Social Funds, co-financed by Romanian Government; POS DRU; Iasi Agricultural Chamber.

3.2.3 SLOVAKIA

The most important journals in the Slovak Republic in the field of food industry:

The Journal of Microbiology, Biotechnology and Food Sciences is an Open Access, peer-reviewed online scientific journal published by the Faculty of Biotechnology and Food Sciences (Slovak University of Agriculture in Nitra). The major focus of the journal is publishing regular (original) scientific articles, short communications and reviews from animal, plant and environmental microbiology (including bacteria, fungi, yeasts, algae, protozoa and viruses), microbial, animal and plant biotechnology and physiology, microbial, plant and animal genetics, molecular biology, agriculture and food chemistry and biochemistry, food control, evaluation and processing in food science and environmental sciences.

Journal of Microbiology, Biotechnology and Food Sciences is published **6 times per year** in electronic version.

Slovak Journal of Food Sciences is an international scientific journal for food industry. Articles published in the journal are peer reviewed and freely available online. Journal covers areas including: food hygiene, food safety and quality, food microbiology, food laws and regulations, ingredients and ingredient functionality, nutraceuticals, product formulation, sensory science and sensory statistical analysis, process control and its contribution to food processing operations, food chemistry, food toxicology, food engineering, food technology and biotechnology, nourishment, public health, primary production of food, food adulteration and food economics.

Some relevant references:

Cross, D. E., et al. "The effect of herbs and their associated essential oils on performance, dietary digestibility and gut microflora in chickens from 7 to 28 days of age." *British poultry science* 48.4 (2007): 496-506.

- Dotlacil, L., et al. "Research, conservation and utilisation of plant genetic resources and agrobiodiversity enhancement-contribution of the Research Institute of Crop Production Prague-Ruzyne." *Czech Journal of Genetics and Plant Breeding* 38.1 (2002): 3-15.
- Habán, Miroslav, and Pavol Otepka. "Organically cultivated medicinal plants and their quality analysis." *Proceeding of conference, Organic Farming*. 2007.
- Hoareau, Lucy, and Edgar J. DaSilva. "Medicinal plants: a re-emerging health aid." *Electronic Journal of biotechnology* 2.2 (1999): 3-4.
- Łuczaj, Łukasz. "Ethnobotanical review of wild edible plants of Slovakia." *Acta Societatis Botanicorum Poloniae* 81.4 (2012): 245-255.
- Masarovičová, Elena, and Katarína Kráľová. "Medicinal plants-past, nowadays, future." *I International Symposium on Chamomile Research, Development and Production* 749. 2006.
- Salamon, Ivan. "Aromatic and medicinal herbs of Slovakia." *Medicinal Plants-International Journal of Phytomedicines and Related Industries* 6.3 (2014): 155-160.
- Salamon, I. "RESEARCH AND DEVELOPMENT OF THE PLANT MEDICINE BLOSSOMS IN SLOVAKIA—NEW VARIETIES." *CMAPSEEC* 8(2014): 134.
- Salamon, I., and Ivana Sudimáková. "Quality of chamomile teas-essential oil content and its composition." *I International Symposium on Chamomile Research, Development and Production* 749. 2006.
- Stričík, Michal, and Ivan Šalamon. "FOREIGN MARKET OF MEDICINAL PLANTS IN SLOVAKIA."

3.2.4 SPAIN

Some projects:

INTRADER project: Guide for the sustainable production of aromatic and medicinal plants 2010*. E. Moré; M. Fanlo; R. Melero; R. Cristóbal, Forest Technological Centre from Catalonia

This guide has been generated within the INTRADER project (Innovation and Transfer for Rural Development). INTRADER is an initiative of the CTFC (Forest Technological Centre from Catalonia) that is included within the framework of Empleaverde (Greenjobs) programme 2007-2013 of the Biodiversity Foundation. This initiative includes 5 Spanish autonomous regions: Aragon, Catalonia, Madrid, Navarra and the Basque Country, and workers in SMEs / agricultural companies, freelancers and workers in the forestry, agriculture and environmental sectors.

MAP2ERA project: Strengthening EU cooperation capacity of the National Institute of Medicinal and Aromatic Plants of Morocco: Towards Morocco's integration into the ERA http://cordis.europa.eu/result/rcn/140839_en.html. University of Alicante UA is partner of this project.. UA is a young and extraordinary dynamic Spanish University with full spectrum of academic and research competencies. Several research departments of the University (e.g. the Chemical Processes Engineering and the Biodiversity Institutes) work on the topics relevant to the research interests of the National Institute of Medicinal and Aromatic Plants NIMAP from Morocco, also partner of the project).

PlantLIBRA project: PLANT food supplements: Levels of Intake, Benefit and Risk Assessment, <http://plantlibra.eu>. PlantLIBRA is a project co-financed in the context of the 7th EU Framework Program. PlantLIBRA aim is to foster the safe use of food supplements containing plants or botanical preparations, by increasing science-based decision-making by regulators and food chain operators. PlantLIBRA is structured to develop, validate and disseminate data and methodologies for risk and benefit assessment and implement sustainable international cooperation. International cooperation is

necessary to ensure the quality of the plants imported in the EU. The project has issued the Manual: Plant Food Supplements (PFS): information for a proper use. The Spanish Foundation for Nutrition Research FIN is partner of this project.

GreenFooDec project. <http://www.greenfoodec.eu/>. Framed within the Seventh Framework Programme in the European Union and with a duration of two and a half years, GreenFooDec is coordinated by ainia technology center in Spain and integrated by nine organizations from four countries. Its goal is to find new technological alternatives to replace traditional treatments and processes, thus solving one of the most demanded needs for the vast majority of companies in the European spice sector: to maintain the inherent organoleptic properties of the product. Technological alternatives to be analyzed are: infrared, microwave, plasma and cold high pressure carbon dioxide combined with ultrasound, to ensure the microbiological quality of herbs and spices and maintaining the organoleptic properties of the final product. The project has worked with oregano, basil, saffron, paprika, cinnamon, thyme, rosemary and pepper among others. The Spanish Association of Processors and Packers of Spices and Seasonings AEC is another Spanish project partner.

SAFFIC Project: Methodologies for implementing International Standards for Saffron Purity and Quality, Horizontal Research Activities involving SMEs, FP6 EU. 2006 / 2009. www.saffic.eu. Coordinated by the Spanish Association of Processors and Packers of Spices and Seasonings AEC and with 20 participants from Greece, Italy, Romania, Spain and Sweden. Saffic was originated from the necessity to control the fraudulent practices proliferating in saffron. Partners involved in the project aim to develop new methodologies to modify the current ISO norm introducing standards and reliable procedures to fight against the fraud. Results: many scientific and technical articles and reports and a proposal of modification of the norm ISO 3632.

PAMBIOTICA Project: New uses of essential oils from aromatic and medicinal plants. National project financed by the Spanish Centre for Industrial Technological Development CDTi. The overall objective of the project is to investigate the use of essential oils and extracts obtained from aromatic and medicinal plants grown in the lands of Spa Resort El Raposo, in the meat, wine, food and cosmetics industries. PAMBIOTICA has dealt with rosemary, lavender, thyme, oregano, marjoram, sage, lemon balm, fennel, mint, basil, etc. Three years project in collaboration with companies and the Technological Centre CTAEX from Extremadura. Due to this project the consortium won, in December 2011, the CTAEX Technological Innovation Award in New Agro Food Products modality.

Some books:

Illustrated Atlas of aromatic medicinal and seasoning plants and herbs, Madrid: Susaeta, [2008] 249 p. ISBN 978-84-305-5971-8

The tailor made ecological medicinal garden / Annie-Jeanne Bertrand-- 1st ed-- Estella (Navarra): The Fertility of the Earth, 2008 128 p (Guide to Fertility of the earth; 7) ISBN 978-84-932779- 7-0

The healing power of plants: plants and natural supplements to strengthen the defenses and improve health. Mulea Montserrat et al] - 1st ed-- [Barcelona]. Integral, 2010 286 p. D. L. B 37587-2010. ISBN 978-84-9298-126-

The secrets of herbs and their home remedies. Susana Astiaso. et al] - [Lisbon]. Eurobest, D. L. 2008 128 p. ISBN 978-989-8144-15-7

Medicinal Herbs: Herbal remedies that work: the most natural way to prevent disease and stay healthy. Hyla Cass-- Madrid: Nowtilus, 2008. 174 p. (Practical Guide about health, natural medicine and nutrpharmacy) ISBN 978-84-9763-432-8

The friendly face of weeds: food, medicinal and ornamental uses of weed plants. Alicia Cirujeda et al.- Zaragoza: CITA, D. L. 2010 232 p. ISBN 978-84-693-9660-5

Medicinal plants in Guadiana (Extremadura, Spain) culture against traditional medicines and official phytotherapy. José Ramón Vallejo Villalobos, Peral Diego Pacheco, Maria Consuelo Carrasco Ramos-- San Vicente (Alicante): Editorial Club Universitario, 2009. 140 p. D. L. A 468-2009. ISBN 978-84-8454-765-5

Medicinal plants. Frantisek Stary, Hana Storchová [Madrid]. Tikal, DL 2009. 219 p. D. L. M 2694-2009. ISBN 978-84-92678-08-2

Medicinal plants for insomnia-- 1st ed-- Madrid: Editorial Complutense, 2008. 112 p DL M 36880-2008. ISBN 978-84-7491-930-1

<http://www.fitoterapia.net/biblioteca/pdf/libro%20insomnio%20completo.pdf>

Medicinal plants for overweight. 1st ed-- Madrid: Editorial Complutense, 2009, 128 pp

<http://www.infito.com/images/stories/publicaciones/libro%20sobrepeso.pdf>

Medicinal herbs and dietary supplements for Breathing disorders and diseases. 1st ed-- Madrid: Editorial Complutense, 2005. 72 pp. I.S.B.N .: 84-609-3589-2

<http://www.infito.com/images/stories/publicaciones/libro%20resfriados.pdf>

Herbal remedies for rheumatic diseases. INFITO. 1st ed-- Madrid: Editorial Complutense

http://www.infito.com/PUBLICACIONES/plantas_para_enfermedades_reumaticas.pdf

Medicinal plants. Blas Lazaro and Ibiza-- Barcelona: Manuel Soler, DL 2008. 326 p. (Manuals Gallach; 41). D. L. VA 545-2008. ISBN 84-9761-435-6

Plants that heal, laboratory of life: an experience of Province of Segovia ethnobotany [Ana Isabel de Andrés Beautiful, Alberto Albarran del Pozo. Segovia: Social and Cultural Caja Segovia, 2007. 190 p. : Il. al. + 1 disc (CD-ROM). D. L. SG 47-2007. ISBN 978-84-96145-72-6

Home Remedies for medicinal plants infusions, decoctions, tinctures and solutions for common ailments. Jordi Cebrian. 1st ed-- Barcelona: Integral, 2011. 250 p. D. L. B 13495-2011. ISBN 978-84-9298-1526

Culinary herbs. M^a Angeles Mendiola Ubillos, José Martín Montalbán. Madrid: Oxford University Press, D. L. 2009. 91 p. ISBN 978-84-8476-374-1

Some articles:

- Saffron for the treatment of depression: systematic review of clinical studies
- Efficacy and safety of ginkgo extract in patients with vertigo
- Ginkgo in the treatment of cognitive impairment
- Valerian and lemon balm in hyperactivity
- Green tea in improving the lower urinary tract symptoms
- Mistletoe effects on breast cancer
- Green tea in the treatment of uterine fibroids
- Neuroprotective effect of ginseng
- Use of medicinal plants in the monasteries of Cyprus
- Medicinal plants used in dermatological conditions in Navarra

Doctoral Thesis

Noelia Tejedor Garcia. 2012. Chinese herbal medicine in the context of European public health. University of Alcalá.

Diana Maria Navarro Martinez. 2013. Effect of treatments of aloe gel, involved in pre- or post-harvest on the quality of stone fruit and table grapes. Miguel Hernandez University of Elche.

Maria Dolores Romero Soto. 2012. Pharmacotechnics studies and development of dehydrated vegetables dosage forms for use in paediatrics and elderly. University of Granada.

Yolanda Ruiz Navajas. 2014. Characterization of essential oils of Mediterranean herbs and their application to chitosan films for preservation of meat products. Miguel Hernandez University of Elche.

Antonio Jose Morales Hernandez. 2002. Biogeography and use of the Valencian native flora: the case of aromatic, medicinal and seasoning plants. University of Valencia.

Jaime Usano Alemany. 2012. Study of the effect of environmental and agronomic factors on the production of essential oils of sage *lavandulifolia* Vahl. Complutense University of Madrid.

Armando Moro Peña. 2013. Characterization of aromatic plant extracts: potential implications in dairy matrixes. University of Castilla La Mancha.

D. Khalid Boutoia. 2014. Effect of supplementation with aromatic herbs in milk and goat cheese from the Murcia-Granada breed. University of Murcia.



4. INDUSTRY AND CONSUMERS ORGANIZATIONS

4.1. OVERVIEW ABOUT INTEREST OF FOOD INDUSTRY AND PROFESSIONAL ASSOCIATIONS IN QUALITY AND SAFETY OF HERBS PRODUCTION AND PROCESSING

4.1.1 PORTUGAL

The origin of the medicinal and aromatic plants is as old as agriculture, as well as its essences and extracts. Its employment begins as an unselective wild-harvested of plants, moving into a selective collection of some other, to cultivate the most useful to its extension to crop. MAPs are employed in nutritional industry, in home, in medicine and in cosmetic. The following main industrial use medicinal plants: big supplier to herborist, extraction of essential oil and industry.

Essential oils are gaining importance in flavouring indoor environment in offices, where is used different essences depending on the emotional state.

Aromatherapy, increasingly accepted, is increasing the demand for essential oil. In addition, it is increasing its use as an antiseptic and it has illustrated its effect on some virus for which there is still not reliable medication.

Furthermore, the permanent replacement global synthetic for natural products has side effects, for instance citral aldehyde, which is toxic and has pure irritant effect on the skin, but it is very beneficial as lemon essential oil (or cedron).

The seasonings are used as preservative and natural antioxidants in the food manufacturing industry. For instance, oregano, rosemary and sage, which are used in meat and sausages. They avoid the rancidness of products without the need of adding antioxidants and synthetic preservatives and stabilizers chemicals, which are becoming more limited in use in developed countries. Instead natives are safe.

Classified as a food supplement and do not require special licenses are not required restrictions on its use. In addition consumers tend to remove salt foods, replacing them with spices. The preference for natural foods has sought to replace artificial colours and flavours, thus promoting the natural herbs. The boom in the kitchen microwave, frozen foods and fast foods with new tastes, needs more seasoning. The multinational candy and cosmetics have developed demand for all types of essences, essential oils and aromas.

In some regions of Portugal aromatic plants are used as a substitute for salt in handmade cheese production. An ongoing investigation is being performed to identify the active ingredients of thyme “bela-luz” for further application in the dairy industry. The aim of this project is to obtain a gourmet product of intense and unique flavor targeted for the entire population, that can be consumed by people with hypertension and cardiovascular problems without damaging their condition. (EPAM).

Also an investigation to develop bread formulations with a reduced salt content by replacing it by herbs has been carried out. The results of this investigation were good, since it has been found possible to develop bread without compromising the quality of the same, showing a good potential for the acceptance by the consumer. This study also selected as flavor enhancers with greater potential for acceptance the olive oil, lemon juice, garlic and thyme infusion.

4.1.2 ROMANIA

In the field of herbal food supplements operates a number of non-governmental organizations and professional associations which put together herb producers, processors, importers and distributors of medicinal and aromatic plants (raw material), culinary herbs and dietary supplements.

One of most important national organization is the owners' association named "Planta Romanica". "Planta Romanica" is an owners' association of some of the food business operators involved in medicinal and aromatic plants processing industry, who manufacture and sale food supplements, traditional herbal medicines and/or body care natural products (26 companies).

The aim of the associaton is to promote the interest of its members, namely: herbs profitable cultivation and organic wild harvest, processing of medicinal and aromatic plants, marketing and sale of natural products. The main activities are:

- Reprezentative member in the Technical Committee of medicinal and aromatic plants and bee products;
- Participation in symposiums, exhibitions, meetings, congresses, conferences, both at home and abroad;
- Organization of training courses on specialized fields;
- Economic missions at home and abroad;
- Contribution to the national strategy established by government in the field of medicinal plants;
- Self-regulating the field of medicinal plants production and food quality by establishing updated rules in accordance to EU.

Other important organization is "The Romanian Medicinal and Aromatic Plants Growers, Manufacturers and Users" (ROPAM). This organization is consisting in 55 founding members involved in producing, harvesting of spontaneous flora, acquisition, processing and use of herbal species: agronomists, biologists, biochemists, economists, pharmacists, herbalists, medical doctors, foresters, etc. The organization was affiliated to EUROPAM and has participated in many experience exchange, visiting farmers and processing companies from other countries (Spain, Bulgaria, France, Switzerland). ROPAM organized in Romania the General Assembly of EUROPAM in 2006 year and was involved in 2 international projects targeting medicinal plants, one of them being a FP6 project.

The main social dialogue partner of the Ministry of Agriculture and Rural Development is the "National Association of Medicinal and Aromatic Plants Organizations" (OIPMA). OIPMA operates at national level and has as members the following professional associations: "Association of plant raw material producers"; "Association for collection and acquisition of spontaneous medicinal and aromatic plants"; "Association of medicinal and aromatic plants processors"; "Association of herbal and aromatic teas producers"; "Association of medicinal and aromatic plants tinctures and syrups producers"; "Association of traders and distributors of medicinal and aromatic plants"; "Romanian Association of Medical Doctors who practice Phytotherapy".

Founded in 2000, Romanian Food Supplements Industry Owners Association (PRISA) is another NGO in the field of food supplements. Since 2011 it became a full-fledged Association. It is an active partner of the state's institutions and a member of international organizations: Food Supplements Europe (FSE), International Alliance of Dietary/Food Supplements Association (IADSA).

There are relatively few national standards and guidelines of good practices adopted and implemented at national level by all categories of operators involved in the field of medicinal and aromatic plants. However, there is a growing interest for relatively uniform and fair practices in the field of herbal food supplements, whether it is about the cultivation and processing of medicinal plants, about herbal food

supplements, traditional manufactured products, market surveillance and control or proper commercial communication.

There are presented below the existing guidelines and codes of good practices implemented in Romania:

- Guide of good practice for cultivation and harvesting of medicinal and aromatic plants, approved by the Technical Committee of medicinal and aromatic plants and bee products, in 2011; the purpose of developing a Good Practice Guide for the cultivation and harvesting of medicinal and aromatic plants was to create a basic structure to highlight specific technological key elements to supports farmers to achieve quality crops and to ensure profitability of their agriculture activities.
- General Guide of Dietary supplements - issued by the Ministry of Health and the National Institute of Public Health in 2013; this is intended as a guidance for both professionals and their activity in food supplements manufacture and legal trade, but also for the consumers, to be properly guided and informed about types, characteristics and role of dietary and nutritional supplements.
- Special procedures for verifying the implementation and monitoring of food safety system based on HACCP principles in the food processing unit, issued by ANSVSA in 2006; the main objective of this is to provide a higher standard of food safety by identifying and preventing food safety hazards in the production, processing and distribution of food, to protect public health and reduce different disease risks.
- Code of good practice in commercial communication, complete with Appendix "Code of Good Practice in labeling and advertising of food supplements" – issued by Romanian Food Supplements Industry Association (PRISA), in 2014; this code aimed to promote and educate the population in general, in a qualified manner, but also address to the medical personnel, focusing on the importance and benefits of the food supplements. As far as self-regulation, PRISA has drawn up and approved two codes, namely Code of Ethics and Food supplements advertisement and labeling Code, respectively. PRISA and National Council of Audio-Visual (CNA) cooperate actively with regard to the mutual exchange of information related to the identification of incorrect commercial practices used in commercial communications regarding food supplements.

Once Romania joined the EU in 2007, in addition to the harmonization of national legislation to the European regulation, food business operators had to implement GMP and to comply with European safety and quality requirements regarding their products and manufacturing process.

An overview of the 93 food business operators involved in HFS manufacturing (44%) and HFS trade (56%) who answered at the beginning of 2012 year to a questionnaire elaborated by SNPMAPS (Fig. 4), showed that:

- 70% of the HFS distributors didn't implement any system of quality and safety since 2007 until 2011;
- only 73% of the Romanian manufacturers of HFS have implemented at least one (ISO) or more systems of control (ISO, HACCP, GMP), even if this was a compulsory requirement for all business operators, including HFS producers;
- 5% of the Romanian manufacturers of HFS have organized their own laboratories to control both quality and safety of raw material and final products;
- the rest of 95% of the Romanian manufacturers test their products in different laboratories which provide professional service of laboratory analyses.

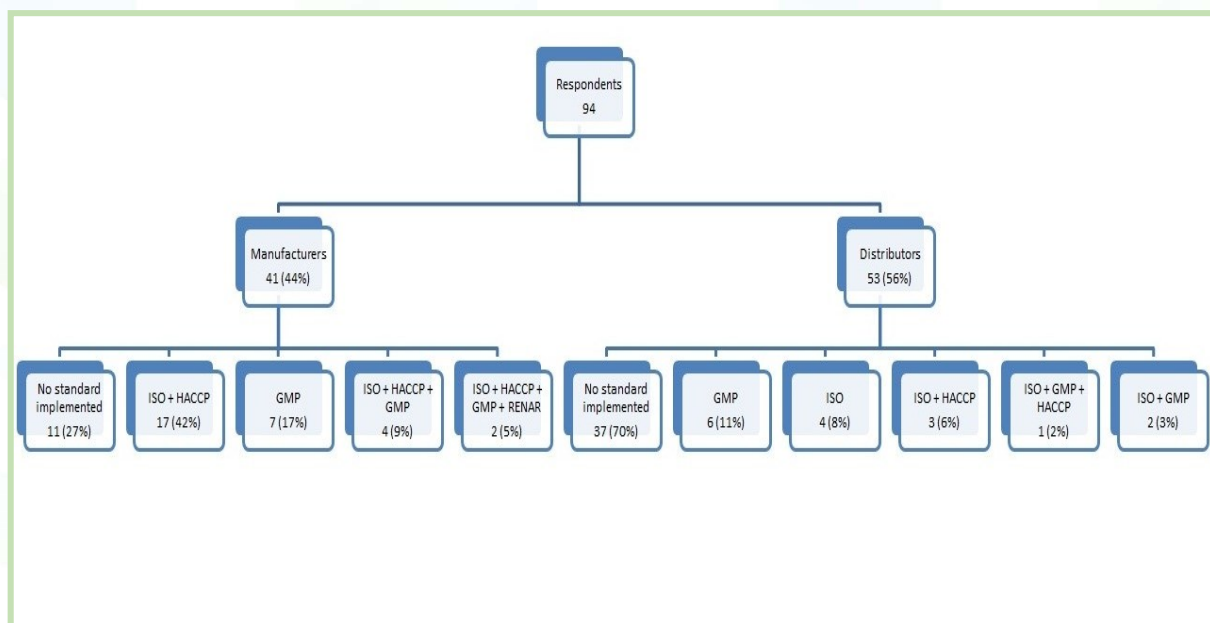


Fig. 4. Quality and safety control systems implemented by the food business operators working on the Romanian market

4.1.3 SLOVAKIA

The Slovak food processing industry is one of the most dynamically developing industries. The food processing industry in the Slovak Republic is at present entirely in the private sector after difficult transformation processes. A thorough restructuring of this industry took place in recent years, while its main objectives were as follows:

- to decrease excess capacities which had no perspectives for withstanding a competitive or international market,
- to modernise the production process, mainly in order to achieve higher productivity of labour and to improve hygiene of foodstuff production,
- to increase the competitiveness of the food processing industry.

Position of the food processing industry in the national economy of the Slovak Republic

According to the latest statistical data, there are 285 enterprises with 20 and more employees in the Slovak Republic whose type of business of is in the area of production of foodstuffs, beverages and tobacco processing. These enterprises presently employ around 41.1 thousand employees at present, i.e. is almost 10 % of employees in industries in the SR. Thus the food processing industry participates in the industrial production of the SR at a 13 % level. After the restructuring, the typical feature of the food processing industry in the SR is increase of production, and there are positive assumptions for its further growth.

Safe foodstuffs:

Priority of the food processing industry in the SR

Food safety is the priority of the agro-food processing complex in order to secure high protection of human health and consumer protection, protection of animal health and welfare and of health of plants.

An integrated and comprehensive approach is applied to the entire food chain in the system “from stall to table”, whereby all aspects of the food production chain, including agricultural inputs, are accessed, and attention is paid to the health harmlessness of all its elements in order to secure safety of the final foodstuff. Blanket long-term monitoring of extraneous substances in the food chain is performed, which includes agricultural farms as well as the retail chain. Contaminant, pesticide residue and veterinary drug residue monitoring are continuously implemented. Within its competence, the MoA of the SR performs state administration and professional supervision of control of quality and health harmlessness over agricultural products, foodstuff, tobacco products in the segment of plant cultivation, animal breeds, plant-medical and veterinary care, veterinary drugs, preparations for plant protection and extraneous substances in the food chain, as well as in the system of swift information exchange for foodstuffs and fodders. The control over legislation observance in this field is arranged by a control organisation of the resort - the Central Controlling and Testing Institute of Agriculture and State Veterinary and Food Administration of the SR. Development of laboratory capacities of the resort secures objectiveness and reliability of analyses for the purposes of control activities performance. An active policy of the resort is focused on securing consumer trust and the protection of consumers against health harmful foodstuffs and on protection of consumer interests. Operators of food and fodder enterprises, who are primarily responsible for the safety of foodstuffs and fodders, realise safety programmes focused on traceability and procedures of proper hygiene practice based on principles of hazard analysis and critical control point (HACCP).

Quality Policy

Activities of the resort are aimed not only at the production of safe foodstuffs, but also at the production of quality foodstuffs which will contribute to assortment enhancement and, due to their diversity, to maintenance of cultural heritage and traditional production. With the continuously increasing importance of foodstuff safety, in the SR is also constantly increasing the importance of application of legislation in the field of Quality Policy (indication of origin and geographical indication of agricultural products and foodstuffs) as an indicator representing quality of the product with certification of its origin, composition, features and observing of determined production methods.

Demand for quality products is an asset for producers, as well as for consumers. The Ministry of Agriculture of the SR has systematically informed the entrepreneurial public on the options provided by relevant legislation of the Community. Via their use, rural communities may be preserved since producers will be able to make their living in their own domestic regions. The use of the quality policies in practice contributes to a development of quality, as well as to a combination of the quality and geographical origin or of the traditional method of production of the relevant product. Products with protected indication of origin, with protected geographic indication or of a specific nature are a guarantee of the observance of the special conditions which provide the product with the specific features expected by the consumer. Typical Slovak products which comply with these criteria are e.g.: “Slovenská bryndza”, “Slovenský oštiepok” or “Skalický trdelník”.

Quality Mark

In August 2004 the Ministry of Agriculture of the SR put into practice the programme of a national quality mark for Slovak agricultural products and foodstuffs. Its objective is to focus the attention of the consumer public on the issue of safety and quality, as well as on the origin and tradition of agricultural products and foodstuffs. The “quality mark” on a product is a guarantee for the consumer that this product was produced in compliance with requirements of national legislation and legislation of the EU, while the determined technological process was followed during the production. Observance of the requirements regarding product marking is being controlled by foodstuff control bodies in all phases of its production, including the processing of raw materials, transportation and sale of the product. Quality agricultural products and foodstuffs are identified in this manner on the domestic market, with the specifics of the Slovak consumer taken into account.

4.1.4 SPAIN

From the earliest times aromatic, medicinal and culinary plants have an efficient application in food, perfumery, cosmetics and medicine. Today, marketing is done, fresh, frozen or dried, in the form of condiments and herbal products or processed, like essential oils, extracts or essences. Their main destination is the food, pharmaceutical or cosmetic industries. So, there are many industries or professional associations dealing with AMCPs:

Association of Dietary and Nutritional Supplements. AFEPADI. www.afepadi.org

AFEPADI, one of the first trade associations of food supplements and dietary products in Spain, actively works in topics like the future legal framework of Botanicals with the aim to push the industry needs and develop a consensus document which will help to facilitate an adequate legal framework for the use of botanicals in food supplements. Different working groups work in different blocks: Past, present and future use of plants in food supplements, List of ingredients positive vs. List of ingredients negative, Mandatory vs. Claims I volunteer Disclaimers and Guide to Good Practice in Europe.

In the seminar "Botanicals and Dietary Supplements: Building the Legal Framework" celebrated in late 2014 the final conclusion was that specific legislation for plants in food supplements is necessary and possible. Other conclusion was the need to use warnings and limitations for better use and safety of food supplements and properly reporting the nutritional and physiological purpose for which the product is intended as a fundamental consumer right. Participants expressed their needs both in the development and marketing of food supplements such as the consumer as to guarantee safety, quality and efficacy. The debate was dynamic and qualified "high income" by the present representatives of different areas. The conclusions of this meeting are being compiled and will be collected in a first consensus document to be published shortly, and which is to help facilitate an adequate legal framework for the use of plants in food supplements.

In 2015 AFEPADI will celebrate Complementary 2015, First International Symposium on Food Supplements and Bioactive Ingredients.

National Interprofessional Association of Aromatic and Medicinal Plants ANIPAM, <http://www.anipam.es/> . ANIPAM deals with the four major sectors of aromatic and medicinal plants, depending on the final product obtained from them:

- Herbs and spices (minimal processing). Food sector.
- Essential oils (distillation by steam or other physical means). Perfume and cosmetic industry. •Extracts (complex transformations to obtain active principles). Medical, pharmaceutical and food (additives) sector.
- Fresh plant materials. Agri-food sector.

Provincial Association of Spices, Condiments and Teas of Alicante. APRECOIN.

<http://www.aprecoin.com/> . APRECOIN was born in 1978 from the concerns of a group of entrepreneurs from Novelda (Alicante). This is small city is one of the motors of the Spanish industry involved in the processing, packaging and marketing of saffron, seasonings , spices and teas. APRECOIN edited the book "The story of the Spices". The purpose of this book is to offer a promotional tool for the spice companies in the Alicante province and reference for their clients, a book which includes vital data of the sector, in particular of the companies which deal in preparing and packaging colourings, spices and infusions.

Spanish Association of Tea and Infusions AETI <http://asociacionteinfusiones.es>. Founded in 1977 AETI is integrated by infusions of plant species packaging industries as well as individual business or companies using infusions of plant species as a basic raw material. AETI is member of the European Herbal Infusions Association EHIA. EHIA was born in 1980 in Hamburg with the aim of defending the interests of the tea sector and infusions at European level. EHIA is member of FoodDrinkEurope and has a close relationship with the European Tea Committee (ETC).

Federation of Associations for Territorial Development of Tajo – Tajuña, FADETA.

<http://www.fadeta.es>. FADETA has organized some technical meetings and workshops dedicated to Aromatic and Medicinal Plants. These meetings have been directed to students, researchers, companies, etc, trying to develop and promote the production and transformation of these kinds of plants.

National Association of the Aloe ASOCIALOE, www.asocialoe.com. Asocialoe is the first and only national association representing all sectors of aloe vera: Producers, processors and distributors. Asocialoe works with the direct support of scientists involved in the research on the properties of aloe vera and its health benefits

Other relevant associations:

- **Spanish Association of Processors and Packers of Spices and Seasonings. AEC.** <http://www.asociaciondeespecies.com/>
- **ASSOCIATION OF MANUFACTURERS AND EXPORTERS OF PAPRIKA AND OLEORESIN AFEXPO**
- **National Association of manufacturers of dietetic products for children, ANDI** andi@dieteticainfantil.es
- **Spanish Association of food flavours and fragrances. AEFAA.** www.aefaa.com

4.2. OVERVIEW ABOUT INTEREST OF CONSUMERS AND CONSUMER ASSOCIATION'S QUALITY AND SAFETY OF FOOD AND FOOD SUPPLEMENTS BASED ON HERBS

4.2.1 PORTUGAL

Consumer interest in medicinal and aromatic plants is continuing to change in the Portuguese marketplace, as segments of society become more aware of the possible relationships between good health and healthy living. The concept of Western medicine in which health is defined as absence of disease and all body systems functioning is moderating and becoming more adjusted to the idea of balance within the mind and body. As consumers become better informed about issues of food, health, and nutrition, they also become better informed about the controversies and concerns surrounding conventional medicine, genetically engineered products, pesticide contaminated food, and similar issues. Such consumers frequently choose or move towards a life-style likely to bring them into organic and natural food stores and to try alternative medical care. Increased use of medicinal and aromatic plants will most likely be part of this evolution.

4.2.2 ROMANIA

Attractive presentation, spectacular health claims, accessible price (between 5 to 30 euros/product) together with the new lifestyle of the people and high tech access resulted in an increased appetite for HFS consumption. Not only the specific categories of consumers (to whom food supplements are generally addressed and recommended) but also young people, children and teenagers are attracted by advertising, IT applications and business opportunities (multi-level distribution system).

In the meantime, as compared to the traditional HFS known by the Romanian population, the new categories of products found on the market are quite far, not only as matrix and presentation form, advertising and promotion but also as composition (many of HFS are obtained by processing of exotic species, that are coming from other continents, such as South America, North America, Asia or Australia).

The market success may be relatively easy to be explained if we consider the diversity of products, the nutrition and health claims, the possibility of administering them without the medical doctor's recommendation and the target categories of consumers to whom the products are addressed:

- relatively well educated persons (having quick access to information, using internet and ordering on-line the products);
- persons having a new lifestyle and fast rate of working, more stressful, that really need dietary supplements, especially vitamins and minerals or energy drinks;
- young people looking for improving their aspect (body building, slimming products), physical form or sexual activity;
- elderly with low income, who trust in medicinal plants and natural products benefits;
- pregnant women or women at menopause, having hormonal deficiencies and increased needs for certain minerals and vitamins;
- old people threatened by osteoporosis, whose absorption of minerals is problematic or the diet is poor in some necessary nutrients;
- children with low immunity, different allergies or metabolic deficiencies;
- consumers of media who wish to be trendy (buying everything that is trendy, including "bio" products and new formula of dietary supplements or food addressed to specific nutritional needs).

Regarding the average consumption of HFS per capita, different sources (Bio Integra 2011, PMR'S Report 2010) reported a value between 8-9.5 euros/year, less than the West European average (25 euros/capita/year).

Top 10 of most food supplements sold include digestive disorder herbal remedies (such as Liv 52 or Biotics) and products addressed to several common disorders (such as Artrostop).

A recent study published in the review PLOS ONE showed that HFS are the most popular food supplements in Europe, where most of the consumers use them to complement their diet and to maintain their health. But 22% of the Romanian respondents declared that they use HFS to treat the fever or other minor health problems, which means their perception about "natural products" is more linked to traditional herbal medicine products (THMP) than to dietary supplements. That's why as compared to other Central European countries, Romanian consumers prefer the solid matrices, such as tablets and capsules as dose forms.

The periodic usage of HFS was reported by 41.8% of the Romanian respondents, while the ingredients most frequently indicated as favourite were: *Ginkgo biloba*, followed by *Aloe vera* and *Panax ginseng* (Garcia-Alvarez et al, 2014).

Taking into account the general trend, 75% of the main companies became not only interested to sale their products, but also to educate people and to promote a healthy life style.

Unfortunately, beside the economic profit of the food business operators, global market brings to all countries the same health threats for the consumers. Not only FDA reports (FDA, 2009; FDA, 2012), but also the Scientific Committee of EFSA (EFSA, 2004) or Canadian Food Inspection Agency warned about a lot of concerns regarding the safety of HFS because of:

- occurring in herbs of toxic compounds or contaminants coming from the environment (heavy metals, pesticides, micro-organisms, mycotoxins); variability of secondary metabolites content of raw material (especially in plants harvested from spontaneous flora, where are registered concentrations above permitted limits until the quasi-total inexistence, which significantly influence the efficiency of final products); quality instability during the time;
- misidentification of the plants, confusion of valuable medicinal plants with similar looking like species, sold as raw material and proved to be dangerous surrogates for public health;
- combinations between plant species and other substances with nutritional and physiological effect (vitamins, minerals, animal extracts, bee products, probiotics, enzymes, fatty acids, etc.);
- interaction of safe plant species with diet and medical treatment which result in severe adverse/side effects. Some relevant examples are: *Ginseng* used for immunity stimulation could become dangerous for diabetic patients because it dramatically reduces the blood sugar level; *Ginkgo biloba*, recommended for improving memory and blood flow causes bleedings when associated to aspirin or anticoagulants; *St. John's Worth*, used in depression treatment, reduces the efficiency of contraceptive pills (Health Canada, 2010);
- adulteration of herbal food supplements by synthetic drugs/active pharmaceuticals compounds or their analogues substances; the most frequent adulteration has been observed to those categories of products for which the market demand is increasing: body-building, slimming, sexual enhancement, anti-diabetic or fatigue relief products (Health Canada, 2008). Products marketed as 'natural sexual enhancement' has been found to contain large amount of phosphodiesterase Type-5 (PDE-5) inhibitors that are prescribed for the treatment of erectile dysfunction). Slimming products (diet and weight management herbal food supplements) had included in their composition anorectics (like sibutramine and phentermine), diuretics (like bumentanide and furosemide) or antibiotics (like metronidasole). Sports nutrition supplements are under constant scrutiny for effectual adulteration with steroids, while stimulant adulteration, such as caffeine, for example, methamphetamine, amphetamine or methylphenidate is considered to be very dangerous;
- mislabelling of product in herbal products became a safety problem and has been estimated at 14-33% (Baker et al., 2012). Newmaster et al. (2013) have tested herbal products by DNA bar-coding and reported that 59% of the analysed products contained plants not listed on the label. In the same time, 33% of the authentically herbal products included in their composition contaminants and/or fillers, and Coghian et al. (2013) identified contamination of herbal products with poisonous plants.

Currently, there is a gap in our understanding to the extent of herbal products substitution, contamination and use of fillers.

The novel European concept “integrated benefit – risk assessment” as well as the American concept of “multidisciplinary approach of food fraud” calls for additional research support, educational activities and harmonization of regulation.

Taking into consideration this widely spread situation upon European level, EC together with EFSA have started a sustained activity of monitoring the food supplements and the medicinal plants from which they are obtained, for the purpose of evaluating as many risks as possible for the consumers, in order to provide them with correct information regarding the consequences of consumption of food supplements, on one side and on the other side, to impose the producers some mandatory standards of products quality and safety aiming to protect the public health.

4.2.3 SLOVAKIA

In connection with food quality, the MARD SR uses two systems, i.e. "SK Quality Label" and "EU Quality Policy". Within the production and consumption of domestic food production, one of the basic aspects is the "SK Quality Label" National Programme of Promotion of Agricultural Products and Foodstuffs, which was created to provide the consumer with sufficient information on safe and quality domestic products. The goal of this programme is to draw Slovak consumers' attention to quality domestic foodstuffs. Any Slovak producer can be awarded the SK Quality Label if its products are made of domestic raw materials and if the producer complies with declared technological procedure, quality parameters and the safety of foodstuffs as stipulated by the relevant legal regulations governing food law. In order to hold the SK Quality Label, at least 75% of raw materials must be made in Slovakia, while all the phases of the production process must take place in the Slovak Republic. A GOLD Quality

Label is awarded to products with the above-standard qualitative parameters, which distinguish them from other general foodstuffs and emphasise their higher quality. The list of companies and awarded products can be found at <http://www.znackakvality.sk>. "EU Quality Policy" is a philosophy of the development of quality of original, traditional agricultural products and foodstuffs, and the promotion of cultural traditions and regions where these products are produced. The system has been developed in response to the increasing counterfeiting of products and the misuse of traditional names that guaranteed the reputation of traditional, regional products. The "EU Quality Policy" means the protection of 27 agricultural products and foodstuffs and their promotion. These foodstuffs must meet certain qualitative parameters that distinguish them from other similar products, this based on their precisely defined requirements for raw materials and the technological procedure of the production.

Within the EU Quality Policy, the EU accepts, protects, supports, registers and inspects the products broken down into three categories named as follows: Protected geographical indication - PGI Protected designation of origin - PDO Traditional speciality guaranteed - TSG Within the EU Quality Policy system, the following:

- 5 Protected geographical indication - PGI
- 6 Protected designation of origin - PDO
- 7 Traditional speciality guaranteed – TSG.

4.2.3 SPAIN

There is little information about Spanish consumer's preferences or interests in AMCPs. Phitotherapy Research Centre INFITO* "Study on Consumption of Medicinal Plants in Spain 2007. First analysis: Habits, January 2007" is the only report founded in this topic.

Based in a sample of 1833 computer-assisted telephone surveys throughout the national territory INFITO study highlights the fact that 1 out of 3 Spaniards consume medicinal plants for therapeutic purposes, three out of four consumers are female and one in four people recognize that there is a family or local tradition in the use of herbal medicine,

Consumption frequency is higher with increasing age, and it is more present among those who do not buy in pharmacy. Remarkable is the "fidelity" of the buyer at herb shop, while most other sales points (i.e. pharmacies) share clients.

Another interesting study is the research article "Consumption of medicinal plants and dietary supplements: Opinion of the cardiovascular patient"* which was presented as oral communication in the XXIX Congress of the Spanish Association of Nursing in Cardiology, Zaragoza 2008, http://www.enfermeriaencardiologia.com/revista/50_09.pdf. The main conclusion of this study is that the patient believes in the safety of these products, not informing the health team. In large doses, use of certain herbs and / or dietary supplements may pose an added risk to patients with heart disease. The nursing history should include this kind of habit of our patients.

4.3 GUIDES OF CONSUMER ASSOCIATIONS AND HEALTH PROMOTION NGOs

4.3.1 PORTUGAL

DECO – Is the National Association of Consumers. There is no relevant work on this area publish or distributed.

4.3.2 ROMANIA

The following Consumer Associations are acting in Romania:

- APC Romania;
- ASCOR;
- ANPCPPSR;
- APC Pitesti;
- APC Campulung Muscel;
- APC Protect Consum Orastie;
- APC Campia Turzii;
- APC Euro-Protect Consum Campulung Moldovenesc;
- Asociatia profesionistilor pentru Protectia Consumatorilor;
- Asociatia pentru Apararea Drepturilor si Interesele Consumatorilor APSCONS Iasi
- Asociatia „Grup Asociativ pentru Protectia Consumatorilor”
- Asociatia ”Societatea Civila pentru Protectia Consumatorilor”;
- Asociatia „Societatea Civila pentru Protectia Consumatorilor”;
- Asociatia SOS Focsani;
- Federatia Judeteana a Asociatiilor pentru Protectia Consumatorilor „Teleormanul”;
- Asociatia Consumatorilor de Produse Alimentare din Romania „Optimum Cibus”.

4.3.3 SLOVAKIA

Within the EU Quality Policy system, the following Slovak products and foodstuffs were registered as of 11 February 2015: Skalický trdelník, Slovenská bryndza, Slovenská parenica, Slovenský oštiepok, Tekovský salámový syr, Zázrivský korbáčik, Oravský korbáčik - PGI; Bratislavský rožok/Pressburger Kipfel/Pozsonyi kifli, Ovčí hrudkový syr-salašnícky, Ovčí salašnícky údený syr, Lovecký salám/Lovecká saláma, Liptovská saláma/Liptovský salám, Špekáčky/Špekačky, Spišské párky - TSG and Žitavská paprika - PDO. As to the PGI, the European Commission has obtained applications for the following products: Klenovecký syrec and Zázrivské vojky (2012) and Levický slad (2013).

Up to now there were not published any official guides of the consumer associations and health promotion NGOs in the Slovak Republic.

4.3.4 SPAIN

Following the adoption of Directive 2002/46 / EC on food supplements, the Spanish specialized industry developed a first basic document, taking into account the specificities of food supplements. It was developed a Hazard Analysis and Critical Control Points (HACCP) Plan that any operator should have implemented in his food industry.

This first paper resulted in 2003 in the first "Guide to Good Practice for the Manufacture of Food Supplements," by AFEPADI.

The next step was given in 2007, adopting the first "Quality Guide for Food Supplements" developed by the European Federation of Associations of Health Product Manufacturers EHPM. This field guide that harmonized this sector at EU level and also introduced new elements that went beyond the mere application of the rules of hygiene: quality of food supplements was addressed.

Following the model launched in 2003, in 2011 the International Alliance of Dietary/Food Supplement Associations IADSA and the European Botanical Forum EBF developed Quality Guidelines.

In 2013 and taking into account the experience gained during the past 10 years, AFEPADI has revised and updated the contents of the Guide to Good Spanish Practices, incorporating to this new edition the specific information for food herbal supplements. As result, AFEPADI published in 2014 the "Fabrication and Distribution of Food Supplements: Good Practices Guide. AFEPADI 2014". This guide includes a specific chapter for Vegetal Ingredients Specific Requirements.



5 OTHER ISSUES

5.1 CULTURAL VALUES

5.1.1 PORTUGAL

In Europe the use of herbs and spices became widespread in the Age of Discoveries, with the Portuguese participation significantly contributing to the growth of global spice trade.

The Portuguese, through the establishment of trade relations with the East, introduced in Europe the spices (pepper, ginger, cinnamon, cloves and nutmeg), in exchange for other goods carried from Europe (silver, mercury, copper, wine, olive oil, textiles, glass and tools). Of all the spices traded with the East, pepper was the most important, serving until currency. The Portuguese were also responsible for the marketing of African spices in Europe (chili and pepper) in fifteenth century.

The use of plants, either for food or medicinal use, is almost as old as man himself, so the sector of spices and herbs was one of the most important in the world economy, belonging the commercial control of these products to the more rich and powerful countries.

Aromatic herbs are used in the food industry and dietary cuisine. Moreover, the traditional cuisine, characteristic of each region of the country, lives a lot from the special touch that is given by the herbs. Some of these plants have a mandatory presence in various dishes: coriander in fish soup, cumin in “tripas à moda do Porto”, oregano in snails, parsley in cod “à Brás”, garlic in the “coelho à caçador” and mint in rice “maranho”.

5.1.2 ROMANIA

History of knowledge development and tradition of use

Historical and ethnographic data show the tradition of medicinal plants use as therapeutic remedies, in our country, since long time ago.

First references about the ancient population herbs knowledge are in BC times, when Herodot (484-425 BC) described how local people, named Dacian, used herbs, certain medicinal species, for wound repairing and pain release. Other documents (Ovidius, 100-105) and Dioscorides also proved that natural remedies were known and used by the inhabitants of the old territories of Romania.

Since the XIV century, legal trade with medicinal plants was regulated by a commercial agreement that was signed between Mircea cel Batran, Tara Romaneasca (Southern of Romania) and Alexandru cel Bun, Moldova (Eastern Romania).

First data about cultivation of medicinal plants are linked to the monasteries that were organized as hospitals; the monks had developed “medicinal gardens” and patients’ diseases were treated by using local manufactured products based on herbs, minimal processed. Actually diverse powders, infusions, hydro-alcoholic plant extracts, oils, volatile oils, aromatic vinegars, syrups, creams, plant baths were easy to be obtained through drying and crushing plants, boiling, macerating or decocting of different parts of medicinal plants; water vapour distillation; seeds pressing for oil extraction; boiling water and concentrating sweet extracted from fruits or juicy parts of the plants; plant extraction in animal fats (lard, sheep or beef tallow), etc.

In 1494 the first pharmacy in Romania, in Sibiu, was attested by documents followed by the pharmacies in Brasov (1512) and Bistrita (1516).

It is interesting to notice that in the XVI century it was published a "Health Study" by Paul Kyr and a "Herbarium" in Cluj, while in the XVII century Teodor Corbea has described in a scientific book a number of 431 medicinal species together with their recommendation of harvesting and use (Paun, 1995).

The XVIII century was dedicated to description, classification and identification of therapeutic effects of medicinal plants, but the XIX century really meant the development of a National School of Pharmacy.

Under the coordination of Carol Davila, a lot of chemists/therapeutic practitioners have graduated and learned how to prepare pharmaceutical products and to use them as efficient therapeutic remedies: natural products for protection and improvement of digestive, respiratory, urinary and genital functions, tonics for the nervous and circulatory systems, strengthen of immune system, metabolism normalizing, anti-inflammatory, anti-toxic, energetic products; health-resort products.

The case of VOREL Laboratories, from Piatra Neamt is very relevant for the success of "green pharmacy" at the moment: in 1883 VOREL Laboratories got the license to supply the Romanian Royal Court with pharmaceutical products. As a result of good reputation and promotion of the products, at the end of 1942, VOREL Laboratories had had a portfolio of 120 well known products of plant origin, which had been exported all over the world.

The old activity of harvesting wild species firstly, for family needs, reached the industrial scale at the beginning the XX century, when it was developed a real Romanian network of plant processing companies (PLAFAR TRUST). In '80s, Romania had got its best performance in the field, becoming the 5th exporter from the world of medicinal plants in 20 countries. In the meantime, Romania has got the 8th place as volume of processed medicinal plants/year (Stoianov, 2003).

In this respect, an increasing of interest for medicinal plants study was registered; over 500 species were the subject of different botanical and ecologic studies, and more than 180 medicinal species were analysed from pharmacological point of view. According to Racz et al., 1986, a number of 79 PhD thesis were written in this field during the period 1958-1975. Most of the important monographs and plant inventories among the medicinal, aromatic, toxic and tinctorial species, were published in the same period. A lot of assessment studies, cartographies and biomass evaluations as well as studies on the environment impact were elaborated. In the year 1990, 150 species from spontaneous flora were collected. Almost all the schools from villages were involved in harvesting activities of wild medicinal plants, mushrooms and forest berries, starting from spring up to the autumn, getting thus additional funds/financial support for the education process and the poor pupil' supports.

In the same time, the increasing of industrial needs in this field was correlated with agriculture development. Since the year 1925 started to be organized cooperatives specialized in certain herbs species cultivation, named ADONIS, CHAMOMILLA and DIGITALIS. Step by step, exploiting the specific climatic conditions, medicinal plants were cultivated on larger areas (up to maximum 41,000 ha, in 1990), when Romania produced near 20,000 tones/year of dry weight material: 30% leaves, approximately 16% flowers, 15% herbal, 13% fruits, 11% roots, less than 5% seeds, 2.5% bark and 2% buds.

At the end of the XX century, the Revolution from 1989 had brought a lot of significant political changes resulted in the state monopole brake. This was also dramatically reflected in the food chain, in which interconnected links had been destroyed. Unfortunately, the transition period affected especially the agriculture and the famous cooperatives of medicinal plants disappeared, being replaced by private farms that have different others market interests. According to Romanian statistical year book (2004), during the period 1990-2000, 2000 being a negative reference year for medicinal plants, the cultivated areas registered a significant decrease and followed an unpredictable dynamics, being out of any control or national strategy. In 2000, the land cultivated was less than 5,000 ha and a the production

was at the level of 1,500 t dry weight, from which, only 800 t were collected from the wild areas, out of which 210 t were exported,

Despite of the existing promising prospects, due to the small quantities of chemical fertilizers used in the past (four times less than in the EU countries) and the severe decline of Romanian industry responsible by environment pollution, quite slow steps were made towards the organic farming of medicinal plants. The assessment studies showed there are many areas with remarkable "bio" potential or under conversion period in Timis, Mures, Buzau, Bacau, Suceava, Neamt counties. But the aromatic and medicinal species potential to be transformed in 'bio' products proved to be more important when herbs were associated to honey bee and other beehive products. Unfortunately, the lack of financial support for business opportunities resulted in the development of "bio" products only for local needs and certain interests of business food operators (mainly export). Even if the "green" and natural products presented in different international fairs and exhibition were very successful, in 2004 there were only 5 certified "bio" farms, which produced mainly aromatic species.

As a paradox, in the same period, real progresses were registered by the herbs processing industry. The market pressure through the increasing demands for natural products, the increasing of people trust in green pharmacy associated with the low price and the long term traditional use of the medicinal plants has influenced the appearing of many SMEs, which proved to be flexible and better adapted to the customer needs and very efficient from economically point of view. They had implemented new technologies using financial supports from different programmes (EU funds such as PHARE or SAPARD, WORLD BANK), diversified their production (40 traditional herbal medicine products, near 1300 food supplements) and developed new business partnerships (with foreign companies and investors) as well as import-export activities. Most of the SMEs proved to be responsible and in development, implementing the European standards of Quality Management System (ISO 9001/2000), Good Manufacture Practice (for plant cultivation and plant harvesting from wild flora), ISO 22000 (for food industry) or GMP (for pharmaceutical industry), etc. They were able to follow the European trends, starting to produce also organic products, and to sustain their own research, oriented towards the specific national needs as well as the market demands (60 culinary and food products addressed to specific nutritional needs, 32 products for health and body care).

5.1.3 SLOVAKIA

First, a comprehensive Slovak recipe containing instructions for treating diseases using herbs come from Orava, from Dolny Kubin, from 1760. The work is not done, but from what the author wrote in the introduction that, it was a man living in close contact with the Slovak people. The work titled "Trifolium sanitatis medicum or about health report to a medical" was written neat handwriting and released it to the press in 1987, after more than two hundred years, the publishing house Tatran in Bratislava as publication of cultural values. The work includes descriptions of diseases, their treatment instructions and recipes for the preparation of medicinal products predominantly from medicinal plants.

Slovak oilmen. Folk medicine in Slovakia has its deep traditions. From historical documents we learn that since the 16th century in the mountainous areas of Slovakia was Slovak oilmen. Most of them were the Turks, but was also known to the nature, Orava Liptove whether the Spis region. The inhabitants of these regions to know a large number of medicinal plants. Did they used to treat many diseases but to know the different ways of preserving and processing them. When they arrived in the 17th century, Klaster pod Znievom Jesuits who opened here Jesuit pharmacy, Slovak oilmen still intensified and reached its peak in the 18th and 19th centuries. Slovak oilmen with their oils and liniment were known in the 19th century throughout Europe and in many places in Asia. In early 20th century to sell their products far beyond the borders of Slovakia. The Turks were oilmen business extended in about 40 villages, for example, but only in Klaster pod Znievom treated in the 18th century to 113 families who

provided treatment business. As the population of the villages in those days you could say that, actually, in many places, this activity dealing with the whole community.

Oilmen produced and sold a variety of ointments and crushed herbs. All these products were kept in small bottles and brought them along in wooden cabinets. Many, especially the poorest passed these cabinets all regions over its own feet or occasionally took to passers-drawn carriages.

5.1.4 SPAIN

According to the results of the project "Spanish Inventory of Traditional Knowledge related to Natural Heritage and Biodiversity.2012-2013. TRAGSATEC" funded by the Spanish Ministry of Agriculture, Food and Environment and whose Main Researcher is Manuel Pardo de Santayana, Department of Biology (Botany) of the Faculty of Sciences of the Autonomous University of Madrid, in the last two decades have been read more than 30 doctoral thesis on topics related to plants, and numerous studies have been conducted within and outside academia. Ethnobotanical research on a specific aspect, such as medicinal plants or plants for food use of a region or an entire province (Akerreta 2009, Gonzalez-Tejero 1989; Late et al. 2002), or even a single species (Molina et al. 2009, Polo et al. 2009) has been carried out.

Considering the categories of use of plants, medicinal plants, with at least 1200 species used (Fernandez and Amezcua 2007), and wild food plants (Morales et al. 2011), with about 500 species in Spain (only peninsula), are the most important group. The importance of these two groups is also reflected at regional level, as shown in many ethnobotanical carried out studies. In Campoo (Cantabria), for example, 154 species were used in human medicine and 129 in food (Pardo de Santayana, 2008).

The knowledge of medicinal plants is certainly the best known aspect of traditional ecological knowledge of Spain. According to a recent review of medicinal plants of popular use in Spain (Fernandez and Amezcua 2007), the number of species used are around 1200, more than 15% of the Iberian flora. This is certainly an underestimate, because the review only includes a selection of studies. In the studied areas, Pallars (Catalan Pyrenees) is the area in which there has been a greater variety of medicinal plants, with more than 400 species used (Agelet and Valles 2001). Furthermore, it should be noted that the number of used species is a poor indicator of the local ethnobotanical knowledge, because each plant can treat various diseases and different parts of each species can be used in various forms of preparation and administration (cream, infusion, etc). Therefore, the number of remedies used is always considerably higher than the number of species recorded. For example, in Campoo (Cantabria) with 160 used species, 439 different remedies (Pardo de Santayana, 2008) were prepared.

The plants, animals, minerals or medicinal waters were mainly used to cure people, but they were also very important to treat the animals. For example, in Campoo 154 plant species for human medicine and 86 for the animal (Pardo de Santayana, 2008) and 229 and 60 were employed in the east of the province of Granada respectively (Benitez et al. 2010, 2012).

In Spain, traditional remedies have been used primarily for common illnesses such as colds, pneumonia, diarrhoea, stomach and intestinal distress, circulatory disorders, wounds, sprains or muscle pain in general (Aceituno, 2010). At home used to always be some vulnerary and other plants to treat common ailments of the respiratory and digestive. More specific ailments involved bonesetters or doctors. In all areas there were bonesetters or people with great knowledge of the local pharmacopoeia. One of the first modern ethnobiological studies, carried out by José Maria Palacin (1994) in the Region of Aragon, found three women who knew more than 100 medicinal plants. Of these, one knew 230 medicinal plants, 31 animals and 29 minerals with which prepared over 1450 remedies. This is definitely something exceptional that demonstrates how deep can become the traditional knowledge. To obtain so

many information was a really difficult task, because the woman was interviewed 69 times in a period of six years.

Despite the trend towards replacing many traditional remedies for drugs, especially in cities, ethnobotanical and epidemiological studies show that ethnopharmacological knowledge remains relevant in rural areas and even in urban areas. Wild or cultivated plants such as chamomile (*Matricaria recutita* or *Chamaemelum nobile*, etc.), lemon verbena (*Aloysia triphylla*), pennyroyal (*Mentha pulegium*), linden (mainly *Tilia platyphyllos*) or thyme (*Thymus vulgaris* and other species of gender) are still widely used (Devesa et al 2004; Peral et al 2009). According to a study conducted in Gandia (Valencia), 14% of respondents collected medicinal plants by themselves and 11% obtained them from relatives or friends (Devesa et al. 2004).

Another important plant in Spain is aloe vera. Its universality throughout history is a clear because its properties have been present in many different civilizations. The oldest data on the therapeutic use of aloe comes from Sumeria. In Mesopotamia some clay tablets were found in the city of Nippur dating from the eighteenth century BC and in which its laxative properties (Stevens, 2001) are described. In the Egyptian Book of Remedies (s. XVI BC) medicinal formulas that include aloe as an ingredient in balms to treat catarrh (Farelli, 2002) appear. Aloe vera is a plant known for its ability to regenerate, disinfecting and healing of skin tissue, it is used also in cosmetic and has over 30 different uses. It is very good for healing wounds, burns, is excellent for treating gastrointestinal discomfort or mouthwash. By its regenerative capacity of the skin, aloe is widely used in cosmetics mainly to prevent wrinkles. Its use is widespread in Spain

Spanish media also have reflected the importance of aromatic, medicinal and culinary plants. The National Spanish TV science divulgation program conducted by Eduardo Punset NETWORKS devoted a program to the medicinal plants <https://www.youtube.com/watch?v=2-liiqJahP8> and the National Radio of Spain, Radio 5, broadcasts the space "Good Herbs" which aim is to highlight the benefits of medicinal and aromatic plants.

Another interesting project is ALKEMILA <http://www.alkemila.com/>. This project was born in 1992 as a "handcraft" and traditional project. It is run by Palmira Pozuelo Herguido, pharmacist, specialized in Medicinal Plants, Professor of Phytotherapy and Aromatherapy, and teaches at the Botanical Garden of Madrid and various schools of naturism. Imparts interesting workshops relating the Winter Solstice - with the phytomedicinal remedies prepared this season, magical plants, sacred festivals and celebrations -, the Spring Equinox - with traditional feasts and celebrations like Celtic celebrations, magical and sacred plants - and the Summer Solstice - with the St. John's wort plant, a magical and medicinal plant by Saint John (24th June)

5.2. INTERNATIONAL COOPERATION – PROJECTS, INITIATIVES

5.2.1 PORTUGAL

The Continent Rural Development Program (ProDer) has supported several projects under the aromatic herbs and spices sector. This program funded the project CoFafe - Aromatics from Cooperativa dos Produtores Agrícolas de Fafe, which aimed to develop the agricultural potential of the region, boosting the rural areas of the county, focusing on maximizing the potential of farms, with guarantees of a strategic row, technically and economically viable, therefore profitable. This project consists of the installation of about 20ha of production with the following species: save (*Salvia officinalis*), lemon balm (*Melissa officinalis*), peppermint (*MenthaX piperita*), Hipercum from Gerês (*Hypericum androsaemum*)

and lemon verbena (*Aloysia tryphilla*). These plants will be produced by CoFafe and its associates in organic production. After harvest, herbs will be processed and packaged on the premises of CoFafe and subsequently traded.

The Association for the Development of Concelho de Moura has undertaken the project in Portugal, driven by the Program for the National Rural Network, whose main objective is to contribute for the creation of a political, social and economic environment, favorable to opportunities linked to the row of aromatic and medicinal plants, through the implementation of an integrated strategy for the sector, combining expansion and qualification of the investment (individual and collective), capitalization of best practices, technical training, strategic consultation and proposal of measures of policy. This project is organized in four areas of action, which include multiple activities to be held throughout the country.

Information from the System database of the Rural Development Programme 2007-2014 Continent (ProDer) on applications for investment support, presented since 2008 to the first quarter of 2013, cut up that were approved:

- 138 projects of young farmers;
 - 57 projects to support investment in farm, of which 35 young farmers;
 - 15 projects to finance small investments on farms, of which 14 young farmers.
- The sum of declared areas in investment projects relating to young farmers totaling 240.61 hectares.

5.2.2 ROMANIA

Relevant cooperation in the field of R&D between Romania and other countries

1. Cultural roots, people and countries, unity by tradition, natural attractions for tourists (ROUA BUCOVINEI), 2007-2008; Romania-Ukraine Neighbouring Program, PHARE;
2. Identification of new medicinal plants useful in prevention and treatment of malign tumours; Romania-Cyprus bilateral cooperation programme, 2007-2009; UMF Iasi;
3. Practical application of medicinal plants in Romania and China; Romania-China bilateral cooperation programme, 2007-2009; UMF Timisoara;
4. MedPlaNet - Sustainable development and environmental protection by cultivating medicinal and aromatic plants; cross border cooperation program Romania-Bulgaria, 2010-2012; INCDSB Bucuresti.

5.2.3 SLOVAKIA

ISEKI FOOD 4 Project. The main project objectives of the ISEKI_Food4 academic network are: To innovate the education and training of Food Science and Technology (FS&T) students, by the development of guidelines to update and modernise HE courses and training programmes and tools (including new scientific disciplines and training). To implement soft and personal skills to produce the FS&T professionals of the future; to implement the role of the third level of education (PhD, in particular) in promoting the employability and entrepreneurship of the graduated FS&T and Food professional by proposing (i) training tools to develop appropriate skills and (ii) a virtual environment to favour their networking. To create a framework offering lecturing qualification for university teaching staff. Project Start Date: 1st October 2011. End date: 30th September 2014.

The network is approved for 3 years and it includes a total of 89 partners: 86 partners are from 27 European eligible countries (69 reputed HE institutions – Universities or Associations, 6 Food-related Associations, 7 Research Organizations and 2 Private consultancy and services agencies) and 3 partners from non-European countries (HE institutions; Brazil, Israel, USA). The 38 associated partners involved, but not eligible, are from 23 countries (Argentina, Armenia, Belgium, Brazil, Canada, China, Croatia, Ecuador, Germany, Indonesia, Israel, Italy, Mexico, Morocco, New Zealand, Peru, Russia, Serbia, South Africa, Thailand, Tunisia, Ukraine and USA).

Project web sites: www.iseki-food4.eu/

Agrivoc - Tempus Project. AGRIVOC - Tempus project focuses on the improvement of vocational studies in agriculture (crop protection, animal husbandry, viticulture & viniculture, farming and crop protection), and food technology. The project aims to upgrade the knowledge base and practical ability of students to work in agricultural and food related field by improving the curriculum of courses, subjects and methods of teaching and by developing students' vocational training program. Local coordinator of the project is dr.h.c. prof. Ing. Peter Bielik and we suppose active participation of experts from the Faculty of Agrobiology and Food Resources, Faculty of Horticulture and Landscape Engineering and Faculty of Biotechnology and Food Science. For more information available at: <http://agrivoc.org/sr/index>.

5.2.4 SPAIN

Some initiatives are:

“Biodiversity: Roman gardens and gardens of the Loire”

Since February 2012, the cities of Tarragona (Spain) and Orleans (France), in a Comenius Regio partnership and sponsored by the European Council, have been developing the “Biodiversity: Roman gardens and gardens of the Loire” project. Several institutions have participated in this project.

The main goal of the project was to raise awareness and educate children (as well as the general population) on local biodiversity. Within this broad framework, gardens have been chosen as the common topic (focused in the study of the Roman gardens in the case of Tarragona and the gardens of the Loire in the case of Orleans) and more specifically on medicinal plants.

Recently this project has been selected by the Autonomous Agency for European Educational Programs (OAPEE) as one of the three best practices in Spain.

International Symposium: Food supplements and bioactive ingredients from plant sources, COMPLEMENTARIA, Barcelona, Sept. 14&15, 2015

Complementaria is the meeting point for key stakeholders involved in research, manufacturing and marketing, regulation and consumption of functional ingredients, especially those used in food supplements.

By means of a Symposium concept, the purpose of Complementaria is to present and discuss scientific and technical issues regarding food supplements and its ingredients. The "farm to fork" process and the main aspects such as usefulness, appropriateness and safety, will be observed with the aim of promoting:

- Dialogue and interaction between key players: Regulators-Government - Researchers-Consumers - Industry - Academia – Media.
- Research and knowledge transferred from universities and research centers to industry.
- An overall understanding of the specificities of the ingredients and products.

- A based on rigor communication to meet the needs of all audiences, eradicating myths and prejudices.

Expo Eco Salud 2015, 16th edition, 17th, 18th and 19th April 2015, Barcelona, Spain.

Expo Eco Salud, Exhibition of Health and Quality of Life, is the meeting point for all those interested in the natural and sustainable health care. Professionals and consumers come to Expo Eco Salud to find out the latest advances and news that the suppliers of products and services offer.

Expo Eco Salud is dedicated to food supplements, products intended for particular nutritional uses, ecological nutrition, natural cosmetics, natural therapies and to all products and services involved in health care.

SWOT ANALYSIS

PORTUGAL

Strenghts

- Natural Conditions
- Varity of Conditions across the Country and the Islands
- Actual Policy of Increasing the Production and the Value of Agro Products

Weaknessess

- Small Size of Farms and Producers
- Lack of an Organized Cooperation in this Sub-sector
- Lack of Specialized Competences and Training Offer in the Sub-Sector

Opportunities

- An Emergent Sub-sector and a potential Cluster
- Need of Added Value Transformation Industries
- Need of Specialized Suppliers
- Need of Training and Information Offer

Treaths

- Lack of a Culture of Cooperation
- Lack of the better Knowledge Base

ROMANIA

Strenghts

- Rich heritage: there is a long tradition of growing and manufacturing medicinal plants, due to the fact that climatic conditions and soil composition support the bio-active compound synthesis in different parts of the plants, but also due to the knowledge of the population;
- Ecologic plasticity of medicinal plants that could be adapted to less favorable lands, even when cultivated on polluted soils (have significant capacity of soil phyto-remediation); medicinal plants are also resistant to different stress such as hot and drought;
- Experience accumulated in breeding, elaboration of medicinal plant cultivation technologies and "organic" farm development;
- Efficient network of research and development (hundreds projects, a huge volume of scientific information, impressive number of published books and peer-reviews on this topic); interdisciplinary approaches, complementary activities of the universities, research institutes and industry;
- Romania is one of the first countries in the EU, in terms of the dynamics of market development and consumption of herbal food supplements;
- Romanian industry is still competitive and local products are well known brands;
- The professional organizations and associations in the field (EUROPAM, PRISA, OIPMA, Planta Romanica);
- A national authority (MADR), a national specialized office (SNPMAPS), a Technical Committee of experts working on positive and negative lists of medicinal plants, specific national rules and regulation, but also transposition of the EU common regulations in the national legal frame work and clear procedure of notification of herbal food supplements.

Organizations involved in medicinal and aromatic plant research and development

Legal Authority	Institution/ organization	Department	Focus on
Ministry of Education and Research	Universities	Faculties of biology/ Botany Departments	Botany/Genetics/Ecology
Ministry of Health	Medicine and Pharmacy Universities	Pharmaceutical Botany Pharmacology Department Pharmaco-dynamics Dept	Pharmaceutically active compounds/ Biochemical analysis/ Therapeutic effects
Academy of Agricultural and Forestry Sciences	Research and Production Stations National institutes	Research departments Research and Development (agribusiness)	Cultivation technologies; Plant breeding; Seed production Biotechnologies; Reforestation Biodiversity conservation
Ministry of Agriculture and Rural Development	Research institutes (under coordination)	Food safety Certification of "bio" products Packaging Biochemistry laboratories Microbiology laboratories	Food science; Natural products and bio-resource Other forest products than wood (wild berries, mushrooms); Soil science; Agro-chemistry
National Authority for Scientific Research and Innovation	Research Institutes Centers of excellence	Different laboratories	Botany/Biochemistry/Genetics / Ecology/ Biotechnology/ Microbiology/ Plant protection
Romanian Academy of Science	Botanical institute	Different laboratories	Endangered and protected species Natural reserves/ Protected areas
County councils	Natural science museum	Botany	Plant inventory/ Cartography /Herbarium
Private companies	Research departments	Different laboratories	Biochemical analyses; Genetic analyses

Weaknessess

- Brakes along the food chain (farms are not supported anymore by the processing industries (which prefer to import the raw material from non-EU countries, mainly Turkey, India and China); this had as result the covered areas cultivated with medicinal plants decreased year by year;
- Lost of the breeding results, lack of certified seeds producers in Romania (bankruptcy or insolvency of many agriculture research stations during transition period);
- Lack of financial support for developing, namely for the transfer of research projects' results into practice;
- Low financial capacity of local industry for innovation and competitiveness; significant loss of the Romanian market of herbal food supplements in favor of EU products or imported products from USA, Canada, Switzerland, Norway, China and other non-EU countries, which cover today more than 60%;

- Not so much interest for consumer protection (high standards of quality and efficacy) and health threats diminishing but high interest for economic profit of the food business operators;
- Lack of professional staff in the companies which import herbal food supplements, few knowledge about the quality and safety of the products they sale (sometimes adulterated);
- There is no Guide of good manufacture practices for herbal food supplements;
- Cooperation between authorities
- Not enough efficient official control policies
- Expensive laboratory tests
- Not sufficient number of competent testing laboratories

Opportunities

- increasing of the consumers' s interest for natural products and consumption of herbal food supplements;
- potential for agriculture to renewal the medicinal and aromatic plants sector in connection to the increasing ask for raw material (plants and plant extracts of high quality);
- Demonstrated decrease of disease risk factors by consumption of medicinal and aromatic plants (not only traditional use, but also clinical studies);
- Multifunctional species (herbal food supplements are used in synergy with certain synthetic drugs for efficient disease treatments; medicinal plants are valuable ingredients in functional beverage and food industry; aromatic plants are used as culinary spices, ornamental or bee plants; there are more and more asked natural products for body care and cosmetics);
- a single plant could be used in more natural remedies;
- international cooperation in R&D projects on this topic (creative solutions);
- strong need of small companies for training and knowledge transfer in food quality and safety field (good opportunity for R-D sector to organize training courses, e-learning platforms, new qualification through POSDRU projects, etc);

Treaths

The National Agency for Consumers Protection reports (2010-2012) showed non-compliance and deviations from the legal requirements in more than 66% cases of the official controls of herb food supplements operators in Romania, regarding:

- sold products with shelf life expired date;
- non-compliance of the label's information: lack of the name and address of importer and country of origin; no translation into Romanian language of the original label; discordance between the name of the product mentioned on the label and its content; use of unauthorised health claims; no warnings for vulnerable categories of consumers;
- non-compliance of the product composition with the declared properties from the label (for instance, concentration of alcohol in hydro-alcoholic extracts);
- illegal trade (no notification, lack of notification certificate);
- lack of documents to prove the product quality and safety (certificates of compliance, test and analysis reports);

- illegal promotions and advertising of food supplements (inducing confusion with traditional medicine herbal products, due to recommendation of HFS consumption for diseases treatment).

The scientific literature and some SNPMAPS controls on herbal food supplements (2011-2013) showed also a lot of non-compliances, specific to different categories of herbal products:

- Herbal teas: use of the whole plant (namely “herb”) in tea bags, instead of inflorescence (for example in camomile) or leaves (for example in pepper mint); use of old raw material (harvested more than 2-3 years ago); lack of pharmacologically active substances, especially essential oils but also other efficient compounds (plants cultivated or processed under non-compliant conditions); presence of different “artefacts” instead of medicinal plants, such as: sand, wood, plastic, dead insects, etc.; products declared as “natural”, but in bags we have found chemical substances supplying colour, taste and flavour; point of view of safety, we have detected microbial contaminants, such as fungi;
- Tablets and capsules: there were identified undeclared ingredients that increase the product efficiency in slimming and sexual enhancement products (adulterants);
- Hydro-alcoholic extracts (tinctures)-could happened ethanol to be replaced by methanol or the ethanol concentration is found less than 40% as declared; regarding the ingredients, sometimes there are used in HFS not only plants (as in traditional products) but also “concentrated plant extracts” imported from China, that are not standardized;
- Fat oils: there are many expensive fat oils replaced by cheap ones (pumpkin or *Hyppophae rhamnoides* by sun flower oil); quite frequent it happened the stability study to be not considered, thus the oil to be found altered before the expiry date;
- Essential oils: i.e. replacing lavender oil by *Anethum graveolens* oil.
- Food fraud and illegal trade;
- Quantity production detrimental to product quality;
- Unfair competition on the market;
- Reduced biodiversity of wild flora when is irrational harvested;
- Under funding of all sectors (agriculture, industry, research, promotion)
- No support for Romanian farmers (this experienced human resource will disappear, shifting for other economic activities).

SLOVAKIA

Major strengths

Agricultural land. Of the total area of Slovakia (4 903 423 hectares) agricultural land covers 49.7 % and forest land 40.84 %. Decrements in the agricultural land were not significant in recent years, however it was possible to observe a change of arable land to meadows and pastures.

The highest share of used agricultural land (2 255 000 ha) is represented by arable land (61.7), which is the basis of intensive plant production, mainly in production areas of Slovakia. Mainly cereals (58 %), fodders (19%) and industrial crops (15.8 %) are grown on the arable land.

Enterpreneurial structure. Former socialist cooperatives and state-owned companies have been transformed into private business companies and co-partner cooperatives. These legal persons farm on the majority of used agricultural land, while cooperatives farm on 49% of land and business companies (private limited companies and joint stock companies) on 37%. The remaining land is cultivated by

independent farmers (12.4 %).

Cooperatives farm on land of an area amounting to 1600 hectares on average, while business companies use 930 hectares on average.

Structural changes which are being carried out in Slovak agriculture have led to a decrease of the share of cooperatives in the total number of farms, and to an increase in the number of business companies. The number of independent farmers increased in the first years of the transformation, and has stabilised at present.

According to preliminary data of the Statistical Office of the Slovak Republic, **the food sector** of the Slovak Republic (the production of food, beverages and tobacco products) in 2013 posted a positive profit before tax in the amount of €184.5 mil.

Major weaknesses

According to the Statistical Office of the Slovak Republic preliminary data for 2013, **agriculture** reached a negative economic result of - €6.3 mil. On a year-on-year basis, the economic result decreased by €41.3 mil. The economic performance of agriculture dropped, which was reflected in lower income that was higher than the decreased costs. Value added dropped by €43.4 mil. (9.4%), and the consequences of the digressive price development of agricultural commodities have been reflected in the economy of products and subsequently in the economy of agricultural holdings. 5 Ten years after the Slovak Republic joined the EU and the adoption of the EU CAP, we have not succeeded in the matching of support - direct payments in Slovak agriculture to the level of the EU-15.

In 2013, State Veterinary and Food Institutes analysed and evaluated within the commodities of plant products and tobacco products 10,821 samples, of which 342 (3.2%) **did not meet the requirements** of the Food Code of the Slovak Republic or other binding legal regulations in terms of labelling (14.5%), labelling of allergens (6.4%), sensory indicators (6.2%), physical-chemical indicators (2.5%), additives (1.2%), contaminants (0.5%), GMO labelling (0.5%) and microbiological indicators (0.3%)

In 2013, public health authorities in the Slovak Republic conducted 40,014 inspections in 17,324 inspected **food operations**, including mass caterers, of the total number of 47,760 operations registered by public health authorities. During inspections, 7,292 inconsistencies with the current applicable legal regulations were identified in 4,116 operations. Of the total number of 16,219 examined samples of food, meals, additives in foodstuffs and materials intended to come into contact with foodstuffs, 1,229 samples in total were unsatisfactory, which accounts for 7.6%. In total, the highest percentage of unsatisfactory samples, compared to other samples of foodstuffs, was identified in the case of sweeteners (57.7%), fruit and vegetables (26.8%), fast food (13.5%), delicatessens (10.4%) and confectionery products (8.9%). It mainly applied to microbiologically unsatisfactory samples, where contamination was identified in 8.8% of samples, and 0.3% of food samples were unsatisfactory due to chemical contamination. It mainly applied to additives and contaminants.

SPAIN

This SWOT analysis is based on the one made by the ASSOCIATION OF PRODUCERS OF AROMATIC AND MEDICINAL PLANTS ANIPAM in its Presentation Dossier 2014 <http://www.anipam.es/downloads/52/dossier-presentacion-anipam.pdf> and in the other one performed by CTC and UCAM with technical experts from aromatic, medicinal and seasoning plants industries.

Weaknesses:

Very small productions and many micro enterprises.

The industrial sector is almost nonexistent in many regions of Spain and is widespread throughout the whole of Spain.

Little information on markets and prices

Sometimes it is very difficult to know the real origin of the raw material

Low availability of commercial seeds

Lack of technical expertise in the sector.

Threats:

Many competitors in a global market especially those in third countries where labour costs are much cheaper.

Possibility of losing control of local resources by the entry in the factories of foreign capital.

Dependence on imports of raw materials.

Lack of a national level policy for these products

Research and Development activities in Universities, Research and Technological Centres are few and very isolated.

Pesticide spraying planes affect wild productions.

Strengths

Notable endemic plants are highly appreciated in international markets

Spain is a country with very good soil and climatic conditions for growing the medicinal and aromatic plants.

The quality of the productions is internationally recognized

Spice companies with advanced technologies and exporting their productions.

Great tradition in the cultivation and wild collection of many species.

Opportunities

Growing global demand for natural products, including plants and their derivatives.

Sector growth prospects.



Possibility of organic production.

International actions like staff, knowledge or technologies exchange.

The tech farming can be a profitable and sustainable alternative to wild collection.

Increased research and scientific production (research centres, universities, technological centres, etc.)

Partnerships and contracts with processing companies.


Cooperation with countries of the Mediterranean basin.

CONCLUSIONS

1. For **Portugal**, the conclusions are based on the results of the SWOT analysis carried out with cooperation with some producers, agro-food cluster members and the perspective of consumers.

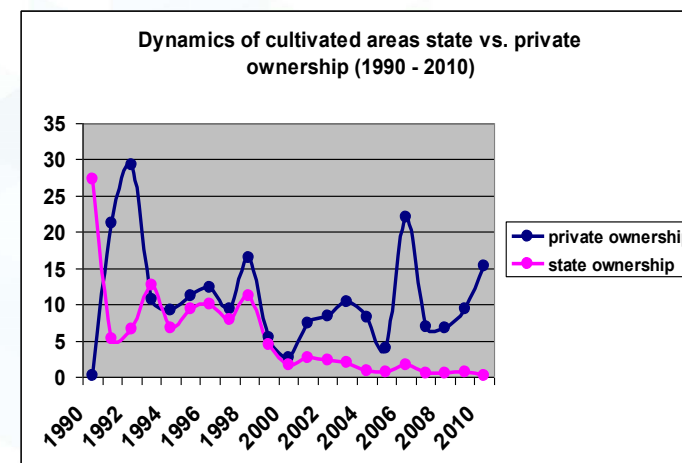
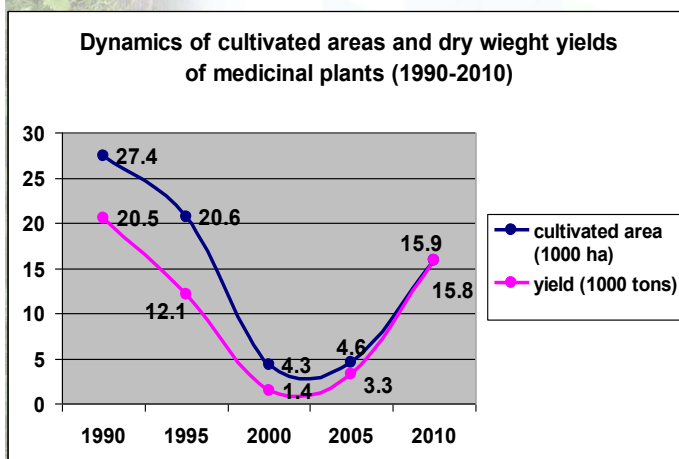
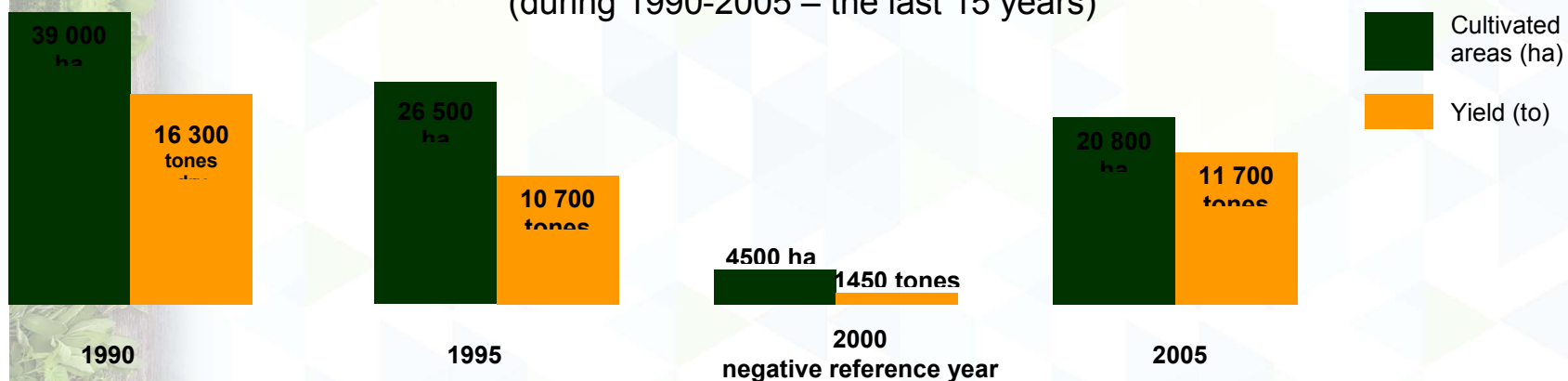
Main conclusions are:

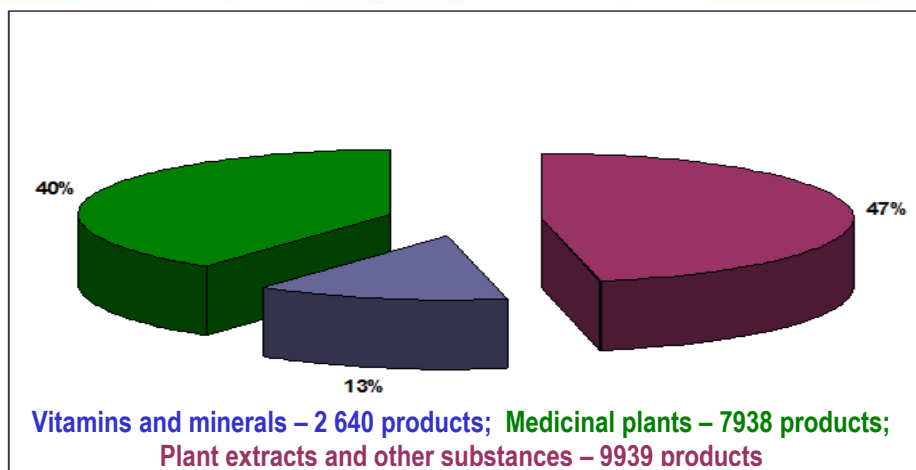
- Organisation of the sub-sector by promoting the association of producers
 - Promoting the development of the value chain associated
 - Creating incentives to the development of the transformation and the industrial orientation in the sub-sector
 - Promotion of research and development, in areas such are: acclimatization and cultivation of wild species, profile of native species, influence on environmental factors and crop management. Research on industrial adaptation of varieties and in the application of the different possible products is also need.
 - Plantations insurance, at a competitive cost, against accidents, disease and drought.
 - Promotion of quality control and certification processes for both plants and processed products.
 - To establish cooperation with industry to adapt the production to the needs of the industry and the consumers.
 - Create links with industries and related organizations in other countries, especially with regard to competences and knowledge, innovation and markets.
2. **Romania** has a great potential in the field of aromatic and medicinal herbs but also in their processing.
 3. The market of food supplement in **Romania** is huge and this market comes with several issues to be solved:
 - Better collaboration between authorities;
 - more efficient policies for official control.
 - Because of very complex matrices of aromatic and medicinal herbs, more reliable and efficient laboratory methods of testing are necessary.
 4. The strategic objective of the agricultural and food policy in the **Slovak Republic** is preserving agriculture in all production conditions within the scope justified by the ability to produce competitive products and by the need to ensure more effective use, protection, regeneration and permanent reproduction of natural sources, as well as by the need to preserve balanced environment, cultural, country and rural settlement.
 5. For **Spain** the conclusions (needs of the sector) are based on the results of the SWOT analysis carried out by the ASSOCIATION OF PRODUCERS OF AROMATIC AND MEDICINAL PLANTS ANIPAM in its Presentation Dossier 2014 <http://www.anipam.es/downloads/52/dossier-presentacion-anipam.pdf> and in the results of the other SWOT analysis performed by CTC and UCAM with technical experts from aromatic, medicinal and seasoning plants industries:
 - Consolidation of the sector by promoting production growth and its industry orientation.

- 
- To facilitate technical and professional information, organizing a producers, manufacturers, researchers, etc directory. It would be interesting to create a Price Observatory with information of international prices.
 - New sterilization methods to avoid irradiation.
 - Promotion of research and technical development in Spain. Research is necessary in acclimatization and cultivation of wild species, chemical profile of native species and its influence on environmental factors and crop management decisions. Research on industrial adaptation of varieties is also needed.
 - Plantations insurance, at a competitive cost, against accidents, disease and drought, as already existing for other crops.
 - Promotion of quality control and certification processes for both plants and processed products.
 - To establish direct communication links with national industry to adapt the production to the needs of the industry.
 - Create direct communication links with industries and related organizations in other countries, especially with regard to prices and industrial demand.

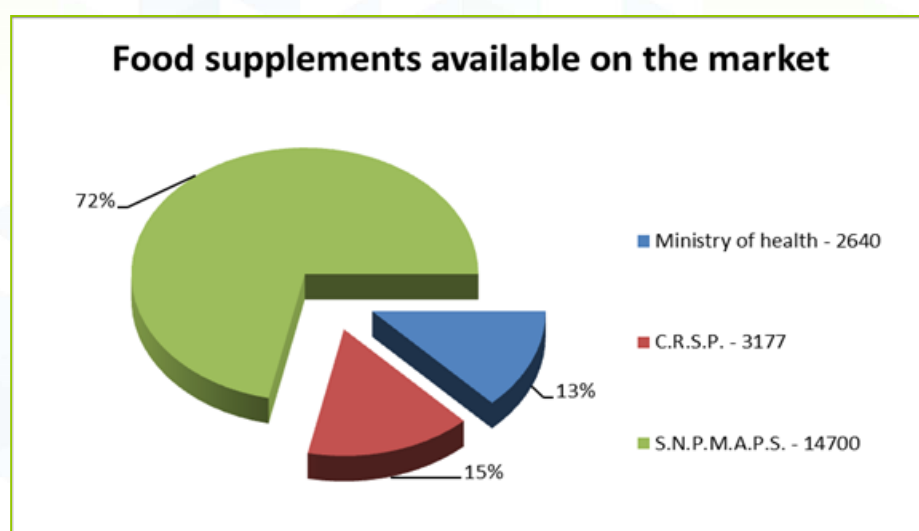
ROMANIA

Dynamics of cultivated areas and dry weight yields of medicinal plants (during 1990-2005 – the last 15 years)





Categories of notified food supplements in Romania



Romania: A wide market on food supplements

Region	Local industry	Importers
Romania (all companies)	135	402
In Bucharest	63	265

SLOVAKIA

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P. O. BOX 52
837 52 Bratislava 37
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Fax: (00421)2-547-77-983
E-mail: office@health.gov.sk
www.health.gov.sk

Ministry of Agriculture
Dobrovicova 12
812 66 Bratislava
Phone: (00421)2-592-66-111
www.mpsr.sk

Ministry of Environment of the
Nam. L. Stura 1
812 35 Bratislava
Phone: (00421)2-595-62-222
Fax: (00421)2-595-62-222
E-mail: info@enviro.gov.sk
www.enviro.gov.sk

State Veterinary and Food Administration
Botanicka 17
842 13 Bratislava
Phone: (00421)2-602-57-212
Fax: (00421)2-654-20-242
www.svssr.sk

Office of public health service of the SR
Trnavska ul. 52
82645 Bratislava
Phone: (00421)2-492-84-111
Section of Hygiene
e-mail: truskova@szusr.sk
Phone: (00421)2-492-84-392
www.uvzsr.sk

Import and export licenses (AGRIM, AGREX):
The Agricultural Payment Agency
Dobrovicova 12
815 26 Bratislava
E-mail: info@apa.sk
Phone: (00421)2-527-33-800
http://www.mpsr.sk/apa/index_en.php

Industrial Property Office
Svermova 43
974 04 Banska Bystrica 4Slovak Republic
E-mail: urad@indprop.gov.sk
Phone: (00421)048-4300-131
www.indprop.gov.sk

Slovak Office Of Standards, Metrology And Testing
Stefanovicova 3, P. O. Box 76
810 05 Bratislava 15
Phone: (00421)2-524-910-85
<http://www.unms.sk>

SPAIN

FoodDrinkEurope orientative document about the REGULATION (EC) No 1334/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on flavourings and certain food ingredients with flavouring properties for use in and on foods. Translated by FIAB*.

Documento orientativo de FoodDrinkEurope sobre el Reglamento (CE) nº 1334/2008 sobre los aromas y determinados ingredientes alimentarios con propiedades aromatizantes utilizados en los alimentos. Elaborado por FoodDrinkEurope y traducido por FIAB*.

http://www.fiab.es/archivos/documentoMenu/documentomenu_201110232300756.pdf

European Spice Association. Document about the minimum quality requirements. Rev 4. Adopted in the Technical Commission Committee 1st December 2011*

Asociación Europea para las Especies. Documento de Mínimos de Calidad Rev. 4 Adoptado en la reunión de la Comisión Técnica de 1 de diciembre de 2011*

http://www.google.es/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCMQFjAA&url=http%3A%2F%2Fwww.e-sa-spices.org%2Fdownload%2Fesqualityminimadocument191104final-trans.pdf&ei=wwi4VJK9MofPaMO2gDq&usq=AFQjCNHa11T75j4bqP_0mqGTyJ668srAtg&bvm=bv.83829542,d.d2s

International Organization of Spice Trade Associations IOSTA. General guide for Good Agricultural Practices. Spices*.

Organización internacional de asociaciones de comercio de especias IOSTA. Pautas generales para las buenas prácticas agrícolas, Especies*

http://iostanet.org/pdf/IOSTA_GAP_FinalSpanish.pdf

Guide for the sustainable production of aromatic and medicinal plants 2010*. INTRADER proyect. E. Moré; M. Fanlo; R. Melero; R. Cristóbal, Forest Technological Centre from Catalonia

Guía para la producción sostenible de plantas aromáticas y medicinales 2010*. Proyecto INTRADER. E. Moré; M. Fanlo; R. Melero; R. Cristóbal, Centro Tecnológico Forestal de Cataluña

<http://apsb.ctfc.cat/docs/GUIA%20PAM-CASTELLAfinal.pdf>

Organic production of aromatic and medicinal plants. Strengthening agrobiodiversity and rural employment. Agroecology Magazine Ae15. Spring 2014*.

Producción ecológica de plantas aromáticas y medicinales. Fortaleciendo la agrobiodiversidad y el empleo rural. Revista Agroecología Ae15. Primavera 2014*.

<http://www.agroecologia.net/wp-content/uploads/2014/03/portada-revistaae151.jpg>

La regulación legal de plantas aromáticas y medicinales, JUAN RAMÓN HIDALGO MOYA, EROSKI CONSUMER, 17 de enero de 2005

<http://www.consumer.es/seguridad-alimentaria/normativa-legal/2005/01/17/16211.php>

Orden de 3 de octubre de 1973 por la que se establece el registro especial para preparados a base de especies vegetales medicinales (BOE 247/1973, de 15 octubre 1973).

Ley 25/1990, de 20 de diciembre, del medicamento (BOE 306/1990, de 22 diciembre 1990).

Orden SCO/190/2004, de 28 de enero, por la que se establece la lista de plantas cuya venta al público queda prohibida o restringida por razón de su toxicidad (BOE 32/2004, de 6 febrero 2004).

Guía de Buenas Prácticas de Fabricación AFEPADI 2014 <http://complementosalimenticios.info/index.php/guia-2014>

ASOCIACIÓN DE PRODUCTORES DE PLANTAS AROMÁTICAS Y MEDICINALES ANIPAM, Dossier de Presentación 2014

<http://www.anipam.es/downloads/52/dossier-presentacion-anipam.pdf>

JORNADAS TÉCNICAS DEDICADAS A PLANTAS AROMÁTICAS Y MEDICINALES Fomento y Desarrollo de la Producción y Transformación de PAM. Aplicaciones y Comercialización. BRIHUEGA (GUADALAJARA) 18, 19 y 20 de enero de 2007

<http://www.anipam.es/downloads/42/jornadas-tecnicas-dedicadas-a-plantas-aromaticas-y-medicinales.pdf>

Estudio INFITO sobre el Consumo de Plantas Medicinales en España 200. Primer análisis: Hábitos de consumo, Enero 2007. Centro de Investigación sobre Fitoterapia *

<http://www.fitoterapia.net/img/pdf/infito-estudio-consumo-2007.pdf>

CONSUMO DE PLANTAS MEDICINALES Y SUPLEMENTOS DIETÉTICOS. OPINIÓN DEL PACIENTE CARDIOVASCULAR *. XXIX Congreso Nacional de la Asociación Española de Enfermería en Cardiología. Zaragoza 2008.

http://www.enfermeriaencardiologia.com/revista/50_09.pdf

Distribución comercial de plantas aromáticas y medicinales en Cataluña, Centro Tecnológico Forestal de Cataluña (CTFC) y Escuela Técnica Superior de Ingeniería Agraria (ETSEA) de la Universidad de Lérida.*

http://www.inia.es/gcontrec/pub/aromaticas_1161160167703.pdf