

Natural ingredients in herbal food supplements

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INCDBA - IBA Bucuresti is the only one organization in Romania working as national research and development institute of public interest in the field of food bioresources

1. Food safety: food preservation, food contaminants, food packaging

- Detecting and reducing the level of food contaminants (chemical and microbiological);
- Food authenticity (quality and origin);
- Food micro-ecology;
- Innovative preservation methods.

2. Food nutrition: influence of diet on health, food intolerance (celiac disease and phenylketonuria), functional food

- New food matrices improved in bioactive compounds for different consumers categories and improved sensorial attributes;
- Functional food;
- Understanding the role of whole meal in health and well-being.





3. Food technologies

- The influence of technology and food matrix in nutrients bioavailability;
- Ecological food technologies;
- Decreasing the level of additives in food;
- Mild food technologies keeping the initial level of nutrients in raw materials;
- Clean technologies;
- Technologies with low energy consumption;
- Increase the diversity of vegetal raw materials in food.



4. Consumer sciences

- Understanding the attitude of consumers related to food choices;
- Identify the determinants of food to be chosen as part of diet;
- Relation between consumer and food market availability;
- Relation about labelling, health and nutrition claims
- Increasing food self life
- Disease prevention by healthy food
- Traditional food/ organic food
- Nutritional improvements in food (fermentation, mycoproteins, others)
- Sensorial properties
- (Bio) disponibilidad of nutrients through fermentation (Ca, Fe).



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Integration of good practices and new methods for professional training in the field of herbs processing for food and food supplements

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Partners:

1. National R&D Institute for Food Bioresources, IBA Bucharest, Tatiana Onisei, coordinator - Romania
2. AEI Centro Tecnológico Nacional de la Conserva, CTC, Angel Sanmartin Martinez - Spain
3. Saint Anthony Catholic University of Murcia, UCAM, Pilar Zafrilla Rentero - Spain
4. Universidade Católica Portuguesa, Centro Regional do Porto, UCP-ESB, Eduardo Luís Cardoso - Portugal
5. Citizens' Association No Gravity, Gabriel Adamek - Slovakia

Objectives

- To educate, train, inform and disseminate the latest/new scientific evidences, legislation in force, hygienic rules;
- To disseminate the best manufacturing practices of herbs in order to ensure the quality, safety, nutritive and functional quality, useful for food and food supplements industries.
- To increase the opportunities of professional development and improved the professional competence, cooperation and competitiveness.

Report on actual context in the field of herb processing and innovative methods for teaching/learning/training, available on website from May 2015

e-Good Herbs Platform with 80 hours course on herb processing having 3 main parts: food spices, natural food ingredients and food supplements available on website since May 2016;

One Demonstrative Movie available on website since May 2016;

50 people trained through Intensive Study Programs for learners;

One conference and one workshop in Murcia, Spain (14th of May 2015);

One conference and workshop in Bucharest in July 2016.

Website: www.good-herbs.eu



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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.
- new complex and personalized food for preventing them against the diseases
- new sources of bioactive compounds to restaure or complete the human body metabolic needs.



Food supplements are concentrated sources of nutrients or other substances with a nutritional or physiological effect whose purpose is to supplement the normal diet. They are marketed 'in dose' form i.e. as pills, tablets, capsules, liquids in measured doses etc. (EU definition).



Supplements may be used to correct nutritional deficiencies or maintain an adequate intake of certain nutrients. However, in some cases excessive intake of vitamins and minerals may be harmful or cause unwanted side effects; therefore, maximum levels are necessary to ensure their safe use in food supplements.



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.

Multifunctionality of medicinal and aromatic plants

Condiment and culinary herbs

Traditional herbal medicine

Food supplements

Aromatherapy

Cosmetics and body care

Food additive (natural coloring and flavors)

Honey bee plants

Ornamental

Fiber coloring agents





- amino acids
- enzymes
- pre- and probiotics
- essential fatty acids
- botanicals and botanical extracts
- miscellaneous bioactive substances

Garlic (*Allium sativum* (L.))
Green tea extract (*Camellia sinensis*)
Garcinia extract (*Garcinia cambogia*)
Guarana extract (*Paullinia cupana*)
Miscellaneous bioactive substances
Lycopene
Lutein
Coenzyme Q10
Taurine
Carnitine
Inositol
Glucosamine
Chitosan
Spirulina
Soy isoflavone

Essential fatty acids
Gamma-linoleic acid
EPA/DHA
Evening Primrose oil (*Oenothera biennis* (L.))
Borage oil (*Borago officinalis*)
Flax seed oil (*Linum usitatissimum* (L.))
Botanicals & botanical extracts
Aloe (*Aloe vera* (L.))
Ginkgo (*Ginkgo biloba*)
Ginseng (*Panax ginseng*)

Amino acids
L-arginine
Other essential amino acids
Non-essential amino acids
Enzymes
Lactase
Papaine
Pre- and Probiotics
Inulin
Lactobacillus acidophilus
Bifidobacterium species
Yeast species



The number of substances other than vitamins and minerals used in food supplements on the European market is estimated to be over 400.

Some of the most commercially significant include fish oils, probiotics and **herbal ingredients (botanicals)**.

Other substances include amino acids, enzymes, prebiotics, essential fatty acids, botanicals, other substances like lycopenes, and glucosamine.

Food supplements from botanicals and derived preparations made from plants, algae, fungi or lichens have become widely available on the EU market.

Examples include ginkgo, garlic, St. John's Wort and ginseng.

Such products are typically labeled as natural foods and a variety of claims are made regarding possible health benefits.

They can be bought over the counter in pharmacies, supermarkets, specialist shops and via the Internet.



EU legislation

- There is currently no EU legislation specifically for botanicals other than the general EU food legislation Regulation 178/2002.
- EFSA is currently discussing what the permitted types of botanical ingredients and how their safety should be assessed.
- EFSA is also discussing which health claims should be permitted and on which levels and types of evidence they should be based.
- 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.



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Medicinal and aromatic plants

- **EU - the main market** for pharmaceutical ingredients - 36% of the global production of pharmaceuticals;
- plant extracts, traditional herbal medicines, pharmaceuticals, homeopathic, medicinal and herbal teas, dietary supplements, spices and culinary herbs, fragrances and perfumes, cosmetics and body care, food and beverage, food ingredients, aromas and essences/air wicks, coloring/dye agents, etc.
- About **2000 species** are used in EU for medicinal purpose;
- About 1200-1300 species are harvested from wild flora and **only 130 species are cultivated in EU.**



The ten largest MAP collections

Country	Species	N° Accessions
Hungary	<i>Papaver somniferum</i>	828
Israel	<i>Sinapis alba</i>	363
Spain	<i>Rosmarinus officinalis</i> L.	335
Turkey	<i>Salvia</i> spp.	332
Spain	<i>Lavandula latifolia</i> Medik.	277
Turkey	<i>Origanum</i> spp.	219
Turkey	<i>Sideritis</i> spp.	206
Austria	<i>Papaver somniferum</i>	196
Portugal	<i>Humulus lupulus</i>	162
Spain	<i>Salvia lavandulifolia</i> Vahl.	151

History of herbs in Romania

400 B.C - Herodot;
100 -105 Ovidius, Dioscorides;
XIV-XV-th centuries - monasteries, monks; first trade agreements;
XVI-th century - the first pharmacy in Sibiu, the first published books about medicinal plants (“Health Study”- by Paul Kyr; “Herbarium”- Cluj);
XVII-th century - 431 species of medicinal plants already known - Teodor Corbea, together with their recommendation of harvesting and use;
XVIII-th century – description, classification, therapeutic effects;
XIX-th century – National School of Pharmacy – Carol Davilla – opened by chemists and practitioners who knew to use as remedies different medicinal plants;
XX - industrial dimension, large scale production in specialized farms; research and development, breeding, high quality raw material, standardized extracts; assesment studies.





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The variety of relief, soil and climate in Romania



- different climatic and microclimate conditions;
- different soil texture and chemistry.



Medicinal and aromatic plants in Romania

- 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.
- **more than hundred species of tinctorial value** 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 .
- Taking into account the life cycle, 51% of the medicinal plants are annual species, 31% are perennial species and 18% are biannual species.



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Biologic activity of the most used plants

Anti-inflammatory

Boswellia serrata
Vaccinium sp
Salix sp
Devil's claw
Glucosamine
Chondroitin

Colesterol Control

Fat oils (*Linum*, *Cannabis*,
Juglans)
Arctium lappa
Betula verucosa
Fish oil

Afrodisiac

Lypidium meienii
Rodiola rosea
Tribullus terrestris
Eletaria cardamon
Trigonella coerulea
Schizandra chinensis
Nelumbo nucifera

Tonic

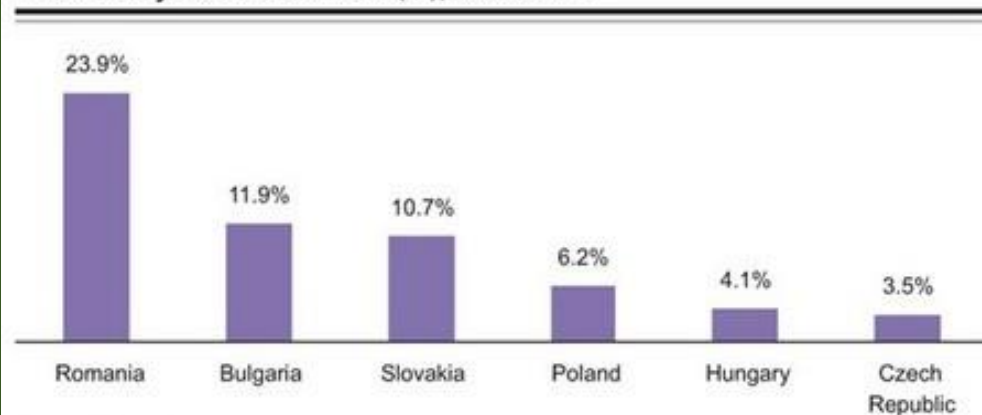
Gingko biloba
Panax ginseng
Spirulina
Ribes nigrum
Hypericum perforatum
Guarana



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.

Average CAGR for dietary supplement markets in the analysed CE countries (%), 2010-2011



Note: growth in local currency; Pharmacy sales.

Source: report "Dietary supplements market in Central Europe 2012. Comparative analysis and development forecasts for 2012-2014", PMR, 2013



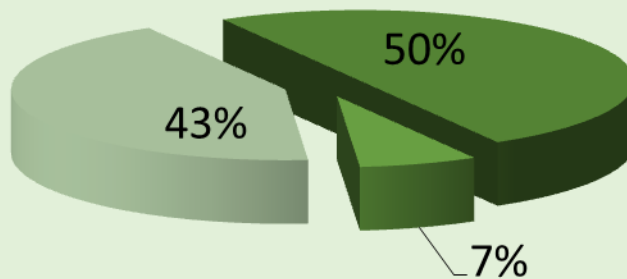


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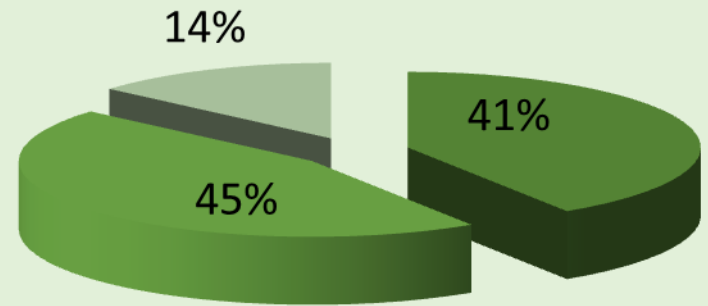
Food supplements

Food supplements notified in EU



- vitamins and minerals
- tonics
- other substances (including medicinal plants)

Food supplements notified in Romania



- plant extracts and other substances with nutritional and physiological effect
- medicinal plants
- vitamins and minerals



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Uses for:

- **Manufacture products** - powder, infusion, hydro-alcoholic plant extracts, volatile oils, medicinal and aromatic vinegar, syrups, creams, plant baths, etc
- **Industrial products** – based on plant extracts and powder (40 natural phyto-pharma-ceutical products (tablets, capsules), homeopathy, 1300 food supplements, 32 products for health and body care products, more than 60 culinary and food products
- **Therapeutic use** - natural products for protection and improvement of digestive, respiratory, urinary and genital functions, tonics for the nervous and circulatory systems, stimulation of immune system, metabolism normalizing, anti-inflammatory, anti-toxic, energetic products; balneo-therapic products



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 South neighbouring areas.

The network of distribution companies 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.



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Local industry, import and distribution channels

Local industry

All companies – 164

In Bucharest - 83

Importers:

All companies – 473

In Bucharest - 325

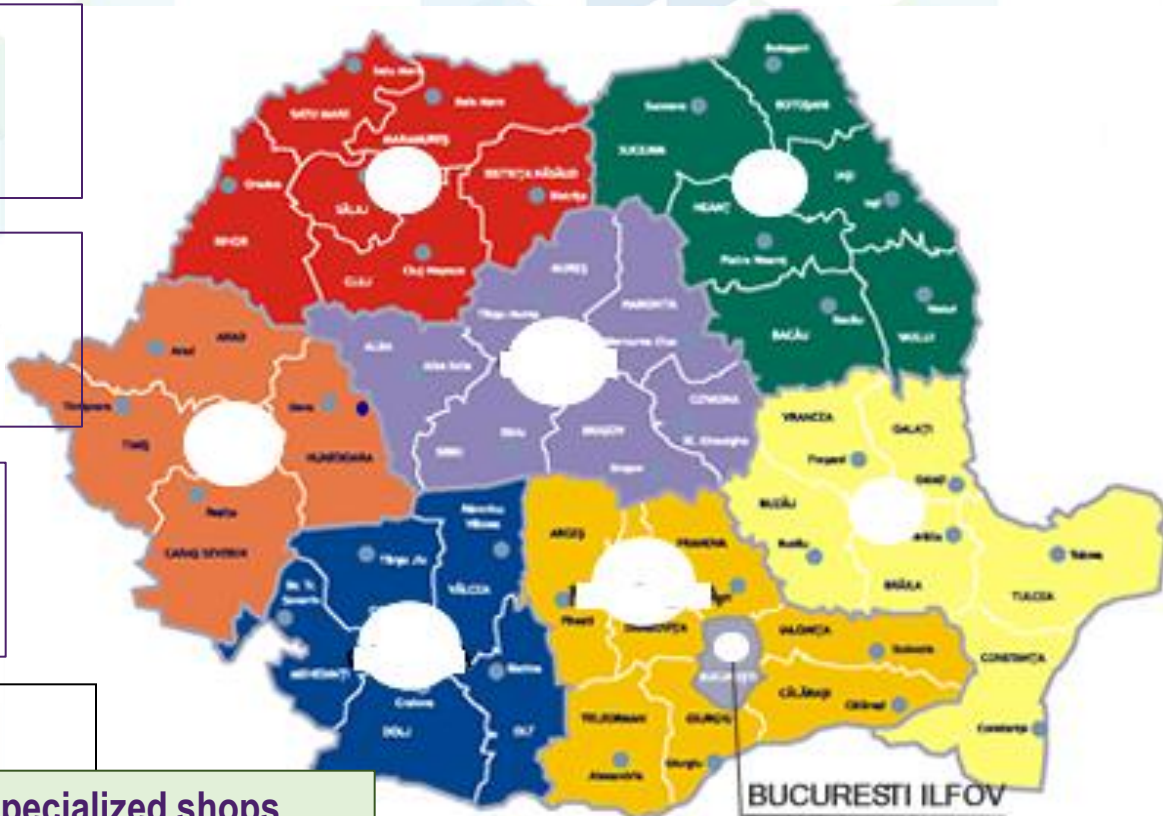
Volume of sales

366,836,046 Ron

(81,519,565 Euro)

- Drug stores
- Supermarkets
- Fitness clubs
- Sex shops

- Specialized shops
- Internet
- Individual dealers
- Local news papers
- Medical offices





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

ROMANIAN OPERATORS

OPERATORS STRUCTURE

Producers

Importers

Full chain

Chain links

Own distribution

Joint distribution

- ❖ Own farms
- ❖ Own recipes
- ❖ Original products
- ❖ Own + joint distribution

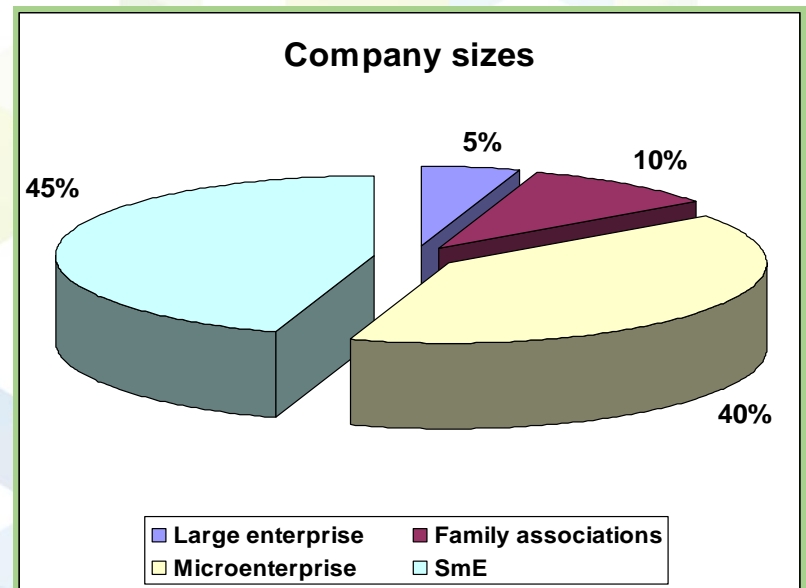
- ❖ Import ingredients/raw materials
- ❖ Own or imported recipes
- ❖ Packaging
- ❖ Own + joint distribution

❖ Single chain

❖ Multiple chains

En-gros and en-detail sales

Nr. products/Firm
10 - 500



Manufactured products

Food supplements

Drugs

Food

External use

Cosmetics

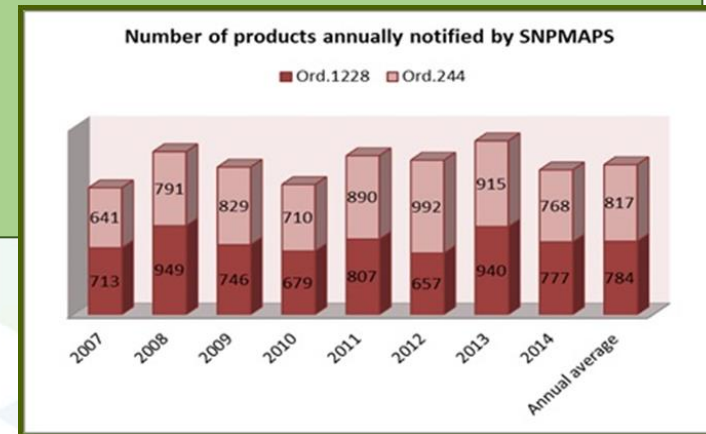


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- The Romanian food supplements market (estimated to 300 – 500 mil. Euro/year) seems to be not yet saturated. Starting in 2006, the HFS monitoring showed that every year approximately 1,500 new products (Fig. 1) enter the market (nearly 50% of them are coming from China).
- According to Stoia and Oancea (2013), a significant increasing of HFS sales was registered between 2008 (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 seem 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.





- 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 **partnerships** 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 of 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).

