EU MARKET SURVEY 2002

NATURAL INGREDIENTS FOR PHARMACEUTICALS

VOLUME II

CENTRE FOR THE PROMOTION OF IMPORTS FROM DEVELOPING COUNTRIES

EU MARKET SURVEY 2002

NATURAL INGREDIENTS FOR PHARMACEUTICALS

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Update of EU Market Survey Natural Ingredients for Pharmaceuticals (2001).

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REPORT SUMMARY

This EU market survey profiles the EU market for natural ingredients for pharmaceuticals. The emphasis of the survey lies on those products which are of importance to developing country suppliers. The major national markets within the EU for those products are highlighted. The survey includes contact details of importers, trade associations, and other relevant organisations. Furthermore, statistical market information on consumption, production and trade, and information on trade structure and prices and margins is provided.

As an exporter, you need this information in order to formulate your own market and product strategies. To assist you with this, CBI has developed a matching EU Strategic Marketing Guide natural ingredients for pharmaceuticals. It offers a practical handbook for exporters engaged, or wishing to engage, in exporting natural ingredients for pharmaceuticals to the European Union. It aims to facilitate exporters in formulating their own market and product strategies, through the provision of practical information and a methodology of analysis and ready-to-fill-in frameworks.

As mentioned above, statistical market information on consumption, production and trade, and information on trade structure and prices and margins, which is required for the ready-to-fill-in frameworks, can be found in this EU Market Survey.

Market research
This EU Market Survey and the EU Strategic Marketing Guide serve as a basis for further market research: after you have read this survey and then filled in the frameworks in the strategic marketing guide, it is important to further research your target markets, sales channels and potential customers.

Market research depends on secondary data (data that have been compiled and published earlier) and primary data (information that you collect yourself). An example of secondary data is this EU Market Survey. Primary data are needed when secondary data fall short of your needs, for example when researching your specific type of consumer about the acceptance of your specific product. Sources of information are, among others, (statistical) databanks, newspapers and magazines, market reports, (annual) reports from branch associations, but also shops in target countries, products or catalogues from your competitors, and conversations with suppliers, specialists, colleagues and even competitors. After you have received/collected your information, you should analyse it. In order to judge the attractiveness of the market, sales channel or customer you should use/develop a classification or score system.

For more detailed information on market research, reference is made to CBI's Export Planner (2000).

The natural ingredients discussed in this market survey fall under the following groups:
- Medicinal & aromatic plants
- Medicinal and vegetable saps and extracts
- Vegetable alkaloids

It is important to note that these natural ingredients are not only used by the pharmaceutical industry, but also find applications in other product groups such as cosmetics.

Consumption and trends
There certainly is a market for natural ingredients for herbal medicines in Europe. Global demand for herbal medicines has increased dramatically during the last ten years. Herbal medicines represent a range of product types. These include products sold as raw herb (dried or fresh), and others which are processed to varying degrees, including tinctures (an infusion of herbs in alcohol) and extracts (greater concentration of the active material of the plant with the aid of a solvent). Trade in herbal medicines is estimated at US$ 9 billion (€ 10.1 billion) annually and is growing in excess of 10% annually (Nutraceuticals International, January 2001). Consumption of vitamins, minerals and herbs/botanicals[1] is estimated at US$ 38.5 billion (€ 41.8 billion) in 2000 (NBJ, 2000).

According to Nutrition Business Journal, global sales for herbs/botanicals accounted for US$ 17.5 billion (€ 16.5 billion) of sales in 1999. The major market is Europe, accounting for some 38% of the world market. The leading European market is Germany, accounting for over 50% of the European market, followed by France, the United Kingdom and Italy. The medicinal plant trade is largely conducted through Germany. Most importers are found in Germany and it is the leading market for exporters in developing countries.

In general, herbal medicines are growing at a faster rate than conventional chemical drugs. Average annual growth rates for herbal medicines in Europe between 1985 and 1995 were 10 percent, but are expected to slow down to 5-10 percent over the next few years

1 *The term botanical medicine is common in the USA, while in Europe the term herbal medicine is used. We will mostly use the term herbal medicine, but when referring to specific reports, we will use the term used in the report quoted.*

(ten Kate & Laird, 1999). In the USA, sales of most supplements were flat or down in 2000 following the combination of bad press and the demise of many of the dot-coms in the health sector. Other issues mentioned are ongoing commoditisation of essential nutrients and therefore continued price erosion and excess capacity among nutritional supplements suppliers (NFM, June 2001).

Trends which have an impact on demand for botanical medicines and, consequently, the demand for natural pharmaceutical ingredients include, amongst others:

- Consumers seek an alternative or complement to pharmaceutical drugs and modern healthcare. The increase in demand for 'natural' medicine is also strongly related to the rise of the green consumption movement.
- The entry of large pharmaceutical and Over-The-Counter (OTC) companies has placed botanical medicines more strongly on the mass market.
- Increased advertising budgets and media attention for botanical medicines have contributed to rapid growth in consumer demand.
- Increased emphasis on safety, efficacy and quality has resulted in more research and development, a shift towards standardised products, and requirements for high-quality raw materials. This expanded research and development has improved the legitimacy of botanical medicines.
- Acceptance of botanical medicines by national (Germany and Japan) and commercial insurance companies (USA). However, at a global level re-imbursement is currently decreasing
- Some claim that the innovation and expansion of the pharmaceutical biotechnology sector, which is based on natural materials, has produced a scientific and financial environment open to the potential medical benefits of other natural products, including botanicals.

Moreover, more and more innovative companies are requesting organically certified raw material or value added products, especially for the development of new products. There is increasing demand for certified raw material and value added products.

Trade structure

European-based companies, and German companies in particular, dominate the global herbal supply industry. The biggest herbal raw materials group is Martin Bauer Group, a German-based corporation with annual sales of over US$ 250 million (ten Kate & Laird, 1999).

About 4,000 to 6,000 botanicals are of commercial importance. Lewington (1993) reported that between 500 and 600 medicinal plants are traded via Hamburg, which made it the world's leading trading centre in plants. However, the position of Hamburg has decreased in recent years.

Manufacturers of herbal medicines used to acquire their raw materials from traders, but now some have their own plantations or have direct contacts with producers. Manufacturers of herbal products are increasingly interested in having direct relationships with producers of the required materials, in order to ensure a sustained source and/or to save costs.

Exporters should realise that the Internet is an important medium in the sourcing of raw materials for herbal products. A number of users/traders of natural ingredients mentioned that they use the Internet in order to find new suppliers.

EU trade and developing countries

In 2000, the leading developing country suppliers of medicinal & aromatic plants to the EU were China, India, Egypt, Morocco, Chile, Turkey, and Albania. Almost two thirds of EU imports from developing countries of medicinal and vegetable saps and extracts originated in Madagascar, China, an Congo. More than eighty percent of vegetable alkaloids from developing countries originated in Congo, Turkey, China, and Brazil. EU imports of the three product groups decreased considerably between 1998 and 1999. In 2000, imports of medicinal plants increased (in tonnes and €)[2], imports of medicinal and vegetable saps and extracts decreased, while imports of vegetable alkaloids increased considerably.

Opportunities for exporters

It is not easy to present an overview of promising products for exporters from developing countries. There is a big transfer of natural ingredients from developing countries to the pharmaceutical industry for research purposes. Large pharmaceutical companies are engaged in bio-prospecting, which refers to the exploration of biodiversity for commercially valuable genetic and biochemical resources. This type of trade in natural ingredients is research-driven. Pharmaceutical companies study the properties and effects of specific medicinal plants and the knowledge is used with the aim to develop new medicines, which can be patented.

2 The US$ is the basic currency unit used in Chapter 5 and 6 to indicate the imported values. Please note, however, that Eurostat trade statistics are expressed in € and transferred into US$. The developments in the imports expressed in values are therefore also influenced by the € / US$ exchange rate. Imports of medicinal and aromatic plants in € increased, but declined in US$. Please refer to Appendix 1 for detailed import and export statistics.

Product group	EU imports in € million, 2000	Main EU importers and their share in EU imports	Share of developing countries in EU imports
medicinal & aromatic plants	333	Germany (28%), France (17%), Italy (15%)	40%
medicinal and vegetable saps & extracts	125	Germany (39%), Italy (21%), France 15%)	6%
vegetable alkaloids	529	UK (29%), France (14%), Italy (12%)	14%

Source: Eurostat (2001)

This so-called bio-prospecting is strongly dominated and controlled by large pharmaceutical companies. Exporters from developing countries will find more opportunities in the trade of ingredients with known properties and effects, which are not patented and which can be traded freely (for a selection, please refer to Table 3.2 and 9.1 of this survey).

In Europe, some 2,000 medicinal and aromatic plants are used on a commercial basis. A number of botanical species are consistently cited by industry representatives in the USA and Europe as the most important today, and likely in the next five years (Laird et al., 2002). Echinacea was cited as the top product now and in the years to come, in both the USA and Europe. European companies continue to consider St Johns wort and Kava kava extremely important, while USA industry representatives tended to think both might be in decline due to controversial recent studies and bad press. Other important botanicals cited include: Gingko, Ginseng, Valerian, Goldenseal, and Garlic. USA companies also cited Black cohosh and Astragalus as good performers, while European companies have had continued success with Hawthorn and Chamomile.

Most buyers in The Netherlands are not interested in plant material, but in plant extracts. There are only a few developing countries which are able to supply extracts conforming to the requirements of western industry.

Current issues in the trade are Good Agricultural Practices, organic production and certification. A proper marketing strategy for ingredients takes into account these issues as well as CITES regulations on certain protected species. A number of companies supply certified organic ingredients and a new development is certification based on criteria and principles of the Forest Stewardship Council. In 2001, a Brazilian company earned FSC certification for 80 thousand ha of native forest, where extraction of raw materials for producing medicines and cosmetics takes place.

Marketing strategies still have to be adapted to national regulations, as regulations for herbal products in the EU have not yet been not harmonised. However, a positive development with respect to herbal medicinal products is the proposal (COM 2002/1) of 17 January 2002 for a Directive to amend Directive 2001/83/EC, prescribing that no medicinal product may be placed on the market without having obtained a marketing authorisation on the basis of harmonised requirements. Normally, a lot of tests are required for such an authorisation. For many herbal medicinal products, published scientific literature is not available so that a well-established medicinal use cannot be demonstrated. The proposed Directive would provide for a special registration and, hence, the marketing of certain traditional herbal medicinal products without requiring very extensive tests.

CBI services

Please also refer to the EU Strategic Marketing Guide 'Natural Ingredients for Pharmaceuticals'.
For information on current CBI Programmes and training & seminars, and for downloading market information and CBI News Bulletins, please refer to www.cbi.nl. Currently, CBI has an export promotion programme for companies that manufacture natural ingredients for pharmaceuticals and/or cosmetics.
Other interesting CBI publications are the EU Market Survey 'Natural Ingredients for Cosmetics' and the EU Strategic Marketing Guide 'Natural Ingredients for Cosmetics'.

1 PRODUCT CHARACTERISTICS

1.1 Product groups

The natural ingredients discussed in this market survey fall under the following groups:

- Medicinal & aromatic plants
- Medicinal and vegetable saps and extracts
- Vegetable alkaloids

These natural ingredients are not only used by the pharmaceutical industry, but also find applications in other product groups such as cosmetics. The complexity of the trade in medicinal plants was already illustrated in the 1982 ITC report on Medicinal Plants and their Derivatives; from which we quote:

'It is not possible to assess the volume or value of the trade in all botanicals that are used medicinally because trade statistics do not identify all the plants individually and of those listed, the statistics do not identify medicinal and other uses separately. Products reported as medicinal plants often include gums, spices and plants used in the food industry; certain plant products include those used for teas and infusions; large volumes of plants such as pyrethrum are used in manufacture of insecticides; plants used by the cosmetic industry are also included'.

Moreover, Lewington (1993) reports that the situation in medicinal plants' trade is rather more complicated because of the levels of secrecy maintained by traders, and the complexity of the trade structure itself.

Besides the medicinal plants and the plant extracts, there is a range of natural products which is used as ingredients by the pharmaceutical industry, including essential oils, vegetable oils, natural gums & resins and natural colours. These ingredients, however, do not have a specific medicinal activity and only a small proportion of the total trade in these products is used by the pharmaceutical industry. For more information on these ingredients, please refer to CBI's market surveys Essential oils and oleoresins, Natural gums and resins, and Natural Ingredients for Cosmetics.

Other raw materials such as vitamins and hormones are not included in this market survey. Although these products partly include natural products or entities derived from natural products, the exact components cannot be determined. Moreover according to EU trade data, only a few developing countries, e.g. Brazil, China and India, play a role in the trade in these products.

1.2 Customs/statistical product classification

On January 1, 1988, a unified coding system was introduced to harmonise the trading classification systems used world-wide. This system is called the Harmonised Commodity Description System (HS) and was developed by the World Customs Organisation (WCO). The system comprises about 5,000 commodity groups, each identified by a six digit code, arranged in a legal and logical structure and is supported by well-defined rules to achieve uniform classification.
The system is used by more than 177 countries and economies as a basis for their Customs tariffs and for the collection of international trade statistics. After the six-digit code, countries are free to use further subheadings. In the trade data of Eurostat, an 8 digit system is used. Most codes, however, end with two zeros, i.e. effectively only using 6 digits. In some countries even 10 digits are sometimes used.

Most of the natural ingredients used in the pharmaceutical industry do not have an exclusive HS Code and are incorporated in a broader product code. Below, a four to six-digit list of the main product groups is presented. These product groups can be further divided into sub-groups to the extent of ten digits.

HS code	Product description
1211	Plants and parts of plants (including seeds and fruits) of a kind used primarily in perfumery, in pharmacy or for insecticide, fungicide or similar purposes, fresh or dried, whether or not cut, crushed or powdered
1302 1991	Medicinal and vegetable saps and extracts
2939	Vegetable alkaloids, natural or synthetic, and their salts, ethers, esters and other derivatives

2 INTRODUCTION TO THE EU MARKET

The European Union (EU) is the current name for the former European Community. Since 1 January 1995, the EU has consisted of 15 member states. Negotiations are in progress with a number of candidate member states, many of which already have extensive trade and co-operation agreements with the EU. It is envisaged that five of these countries will become members in 2004.

According to the first demographic estimates for 2001, published on January 11, 2002 by Eurostat, the population of the EU on 1 January 2001 was expected to total 379.4 million. While the pace of population growth in the EU has slowed greatly in the last 30 years, the increase by 0.4% in 2001 was slightly higher than the figure in recent years. Total GDP in 2000 equalled US$ 7,856.6 billion at current prices, while the average GDP per capita (at current exchange rates) amounted to US$ 20,759 in 2000 (OECD, 2002).

The most important aspect of the process of unification (of the former EC countries) which affects trade is the harmonisation of rules in the EU countries. As the unification allows free movement of capital, goods, services and people, the internal borders have been removed. Goods produced or imported into one member state can be moved around between the other member states without restrictions. A precondition for this free movement is uniformity in the rules and regulations concerning locally produced or imported products. Although the European Union is already a fact, the regulations have not yet all been harmonised. Work is in progress on uniform regulations in the fields of environmental pollution, health, safety, quality and education.

Since January 1, 2002 the euro is used as legal currency in 12 EU member states. Since 1 January 1999, the euro (€) was already used by banks as legal currency in eleven EU member states: Austria, Belgium, Finland, France, Germany, Italy, Ireland, Luxembourg, The Netherlands, Spain, and Portugal. Greece joined the Economic and Monetary Union (EMU) on 1 January 2001.

The most recent Eurostat trade statistics quoted in this survey are from the year 2000. In 1998, the European Currency Unit (ECU) was still used as a monetary instrument by financial institutions to simplify financial procedures. On 1 January 1999, statistical and contractual values in ECU were converted into euros on a 1:1 exchange rate. The € / US$ exchange rate currently (June 2002) stands at around US$ 0.95 for one euro.

The US$ is the basic currency unit used to indicate value in this market survey. The Eurostat trade statistics are based on the € values and transferred into US$ with the exchange rates presented below.

Trade figures quoted in this survey must be interpreted and used with extreme caution. The collection of data regarding trade flows has become more difficult since the establishment of the single market on 1 January 1993. Until that date, trade was registered by means of compulsory Customs procedures at border crossings, but, since the removal of the intra-EU borders, this is no longer the case. Statistical bodies like Eurostat cannot now depend on the automatic generation of trade figures. In the case of intra-EU trade, statistical reporting is only compulsory for exporting and importing firms whose trade exceeds a certain annual value. The threshold varies considerably from country to country, but it is typically about € 100,000. As a consequence, although figures for trade between the EU and the rest of the world are accurately represented, trade within the EU is generally underestimated.

Exchange rates of EU currencies in US$

Country	Currency	1997	1998	1999	2000	2001	June 2002
European Union	ECU	1.13	1.12	-	-		-
	€	-	-	1.06	0.92	0.89	0.95
Denmark	Dkr	0.15	0.15	0.13	0.12	0.12	0.13
Sweden	Skr	0.13	0.13	0.12	0.11	0.10	0.10
United Kingdom	GB£	1.64	1.66	1.62	1.51	1.44	1.48

Source: CBS Statline (July 2002)

3 CONSUMPTION

3.1 Market size

Data regarding the trade and use of natural pharmaceutical ingredients are scattered and difficult to obtain. One of the underlying problems is that most of the ingredients are also traded for other end-users (e.g. the food and cosmetics industries). Therefore, we will first give an overview of the pharmaceutical market as an entry point to gain insight into the market for natural pharmaceutical ingredients. The pharmaceutical market is strongly dominated and controlled by large pharmaceutical companies. Exporters in developing countries will find more opportunities in the trade of ingredients with known properties and activity, which are not patented and which can be traded freely. The herbal medicine market, which is more interesting for exporters, is discussed separately.

Another reference for market information is "A Guide to the European Market for Medicinal Plants and Extracts" published by Commonwealth Secretariat and is available at £15. Please refer to www.thecommonwealth.org for more information on this guide.

Pharmaceutical market

IMS data show that audited global pharmaceutical sales grew 12% at a constant dollar rate in 2001, to reach US$ 364.2 billion (€ 409.2 billion). North America continued to push the growth with a 17 percent increase, while the European market grew by 10%. IMS Health's World Review tracks actual sales of approximately 90% of all prescription drugs and certain over-the-counter (OTC) products in more than 60 countries. Proprietary data projection methodologies are used to estimate total global pharmaceutical sales, which grew to US$ 392 billion (€ 440.5 million) in 2001.

The pharmaceutical market is increasingly global in scope. Previously, companies might launch a number of products in one or two of the three major markets (USA, Europe and Japan). Today, in order to derive a satisfactory return on R&D, pharmaceutical companies generally launch products in all three markets. In 1998, the top 10 corporate pharmaceutical companies accounted for some 35 percent of world sales.

In 2001, North America accounted for the largest share (50%) in the global pharmaceutical market, followed by Europe (24%). In Figure 3.1, we present the value of drug purchases through retail pharmacies in leading European markets for 2001. IMS publications can be bought online at www.open.imshealth.com, while at www.ims-global.com information on regional markets can be found (e.g. Latin American market).

However, pharmaceutical products concern a very broad range of products. We will look at the self-medication category as this includes the bulk of herbal medicine sales. As Table 3.2 shows, expenditures on self medication are highest in Germany, followed by France. In Germany, if prescribed by doctors, patients are reimbursed by the national health services for herbal medicines.

Table 3.1 Sales of pharmaceutical products in leading European markets, 2001

Country	Sales in US$ billion	Growth rate 00/01 (%)
Germany	15.3	7
France	13.8	4
Italy	9.6	9
United Kingdom	9.4	5
Spain	5.7	7

Source: IMS, 2002

Table 3.2 Total pharmaceutical and self-medication expenditure (in € million), 2001

Country	Pharmaceuticals	Self-medication
Germany	30,670	4,269
France	23,390	2,063
Italy	17,379	1,275
UK	14,434	2,750
Spain	10,512	868
Netherlands	4,287	510
Austria	3,296	259
Belgium	3,261	465
Sweden	3,184	310
Portugal	2,609	204
Finland	2,004	263
Greece	1,918	169
Denmark	1,513	206
Ireland	1,043	178

Source: AEGSP, 2002

Natural pharmaceutical products

Some 42 percent of the sales of the top 25 selling drugs world-wide are either biologicals, natural products, or entities derived from natural products[3] (ten Kate & Laird, 1999). Modern pharmacopoeia (official publications containing a list of drugs, formulas, doses, etc.) still contain at least 25% of drugs derived from plants (FAO, 1997). Despite the historical and current prevalence of plants in the pharmacopoeia, only between 5 and 15 percent of the approximately 250,000 - 500,000 species of higher plants have been investigated for the presence of bioactive compounds. Estimates for the overall value of natural product pharmaceuticals vary considerably. In 1995, world-wide sales of the following plant-derived pharmaceuticals were significant: opiates (US$ 1.5 billion), taxanes (US$ 400 million), digoxins and related compounds (US$ 200 million), Ergot alkaloids (US$ 150 million), and Catharanthus derivatives (US$ 100 million) (ten Kate & Laird, 1999).

Herbal medicine market[4]

Herbal medicines, as distinct from pharmaceuticals, are produced directly from whole plant material. As a result, they contain a large number of constituents and active ingredients working in conjunction with each other, rather than a single, isolated active compound. Because the drug approval process and patenting systems do not provide incentives for companies to conduct (expensive and time-consuming) research on the synergistic and collective function of active ingredients in whole plants or plant formulas, botanical medicines are often scientifically poorly understood (ten Kate & Laird, 1999). However, most herbal medicines have long histories of traditional use, which confirm safety and efficacy, and as documented are used in many regulatory systems to guide the approval of commercial products.

Herbal medicines represent a range of product types. These include products sold as raw herb (dried or fresh), and others that are processed to varying degrees, including tinctures (an infusion of herbs in alcohol) and extracts (greater concentration of the active material of the plant with the aid of a solvent). Herbal medicines are part of larger markets, referred to in the USA, for example, as the 'dietary supplement' market. Dietary supplements encompass vitamins, minerals, herbs/botanicals, and other natural medicines.

Trade in herbal medicines is estimated at US$ 9 billion (€ 10.1 billion) annually and is growing in excess of 10% annually (Nutraceuticals International, January 2001). Consumption of vitamins, minerals and

3 *Biologicals: an entity that is a protein or polypeptide either isolated directly from the natural source or more usually made by recombinant DNA techniques followed by production using fermentation (e.g. insulin).*
Natural product: an entity that though occasionally manufactured by semi-synthesis, is chemically identical to the pure natural product (e.g. Vitamin C, paclitaxel, and cyclosporine).
Derived from a natural product: an entity that starts with a natural product which is then chemically modified to produce the drug (e.g. penicillin, simivastatin).

4 *The term herbal medicine is common in Europe, while in the USA the term botanical medicine is used. We will mostly use the term herbal medicine, but when referring to specific reports, we will use the term used in the report quoted.*

herbs/botanicals was estimated at US$ 38.5 billion (€ 41.8 billion)in 2000 (NBJ, 2000).The largest markets for herbal medicines are found in Germany, China, Japan, the USA, France, Italy, the UK and Spain (ten Kate & Laird, 1999). According to Nutrition Business Journal, global sales for herbs/botanicals accounted for US$ 17.5 billion (€ 16.5 billion) of sales in 1999. The major market is Europe, accounting for some 38% of the world market. The leading European market is Germany, accounting for over 50% of the European market, followed by France, the United Kingdom and Italy. The medicinal plant trade is largely conducted through Germany. Most importers are found in Germany and it is the leading market for exporters in developing countries. The large European markets (Germany and France) are consolidating, while smaller markets show stronger growth. New markets at a global level include Brazil, Argentina and Mexico.

Around the world, demand for herbal medicines has increased dramatically during the past ten years. In general, herbal medicines are growing at a faster rate compared to conventional chemical drugs (Gruenwald, 1998). Average annual growth rates in Europe for herbal medicines between 1985 and 1995 were 10 percent, but are expected to slow down to 5-10 percent over the next few years (ten Kate & Laird, 1999).

In 2000, in the USA there was growth in certain dietary supplements (e.g. green tea and children's multivitamins). However, sales of most supplements were flat or down. Vitamin C sales were down and Cat's claw sales dipped by 50 percent. According to Karl Riedel, president of Nature's Life, a supplements maker, "the primary growth drivers were, and continue to be, products that are focused on addressing specific health issues for consumers, especially the combination/ solution formulas that are based on solid science and that are delivered at effective ingredient amounts" (Natural Foods Merchandiser, June 2001).

According to Rob McCaleb, president of the non-profit Herb Research Foundation "the combination of bad press, the unexpected decline in mass-market sales and the demise of many of the dot-coms in the health sector, reduced sales and increased inventories in 2000" (NFM, June 2001). Other issues mentioned by company representatives are ongoing commoditisation of essential nutrients and therefore continued price erosion and excess capacity among nutritional supplements suppliers (NFM, June 2001).

Top-selling species used in commercial herbal medicine products vary by country and region. The bulk of the Japanese and Chinese markets, for example, are based on Traditional Chinese Medicine. European markets tend to follow similar species.

Regulatory frameworks set standards for proof of safety, efficacy, and quality; determine the scope of claims made about products, the information included on labels, and the content of advertisements. As a result, they help determine the nature of the industry, including the demand for 'new' materials. In most of Europe and in Japan, monographs are produced for herbal medicines in trade, and research and testing in support of claims to safety and efficacy is required. Materials 'new' to these markets previously took a slower route to the consumer than in the USA, where products were considered safe unless proven otherwise. This situation has changed now and standards are being developed in the USA. Over-the-counter (OTC) drugs must meet a US Pharmacopeia and National Formulary (USP-NF) existing or proposed monograph(s) for active ingredients or botanical drug substances.

Table 3.2 lists the top selling medicinal plants in Europe. A study by Laird et al. (2002) shows that a core of botanical species was consistently cited by industry representatives in the USA and Europe as the most important today, and likely in the next five years. Echinacea was cited as the top product now and in the years to come, in both the USA and Europe. European companies continue to consider St. John's Wort and Kava extremely important, while USA industry representatives tended to think both might be in decline due to controversial recent studies and bad press. The position in Europe towards Kava has changed now. In June 2002, Germany banned the supply of the herbal remedy kava-kava after reports linking it to fatal liver failure. Britain's Medicines Control Agency (MCA) has proposed to ban kava-kava but a decision is only expected around December 2002. Other important botanicals cited include: Gingko, Ginseng, Valerian, Goldenseal, and Garlic. USA companies also cited

Table 3.2 Top selling medicinal plants in Europe

Product	US$ Million	Product	US$ Million
Gingko	600	Butcher Broom	120
Valerian	300	Evening Primrose	110
Horse Chestnut	250	Pygeum	105
Saw Palmetto	230	Melilot	100
Bitter Orange Extract	220	Grape Seed	90
Garlic	200	Milk Thistle	80
Hawthorn	140	Melissa	65
Ginseng	140	Nettle	60
Psyllium	125	Bilberry	60
Echinacea	120	Chamomile	45
Total			**3,160**

Source: M.K. Eaves, 1998 in Commonwealth, 2000

Black Cohosh and Astragalus as good performers, while European companies have had continued success with Hawthorn and Chamomile.

Data charts on the global nutrition industry are available at a fee at www.nutritionbusiness.com. Some interesting data charts are included under the heading Herbal and Botanical Supplements Market Data. Charts provided are 2000 Wholesale Herb & Botanical Sales by Company, 2000 & 1999 Top 75 Herb & Botanical Consumer Sales, Top Herb & Botanical Raw Material Suppliers in 2000, 1999 Top Herb & Botanical Manufacturers/Marketers, Top Herbal Product Manufacturers, Top Herb & Botanical Raw Material Suppliers in 1998. Prices of the charts are generally around US$ 100.

3.2 Market segmentation

The market for natural ingredients for pharmaceuticals can be segmented into:

- ingredients required by the pharmaceutical industry
- ingredients required by the herbal medicine industry.

Pharmaceutical industry

Pharmaceutical companies are traditionally large, vertically-integrated concerns that conduct the full range of activities, from creating libraries of compounds to marketing the drugs which emerge from their pipelines. However, since the 1980s the number of small pharmaceutical biotech companies has grown rapidly. Today, there are some 1,000 such companies in Europe (ten Kate & Laird, 1999). There is growing opportunity for partnerships, since large, traditional drug firms increasingly out-source research and development through alliances, collaborations, and joint ventures with smaller drug discovery companies, academia, and research institutions.

The majority of companies does not conduct field collections, but relies instead on existing in-house collections of material, or buying in-compound or culture collections. Most companies outsource, or contract to others, the acquisition of samples for their screening programmes. They obtain samples through brokers, agents, or through specific deals with supplier organisations. The bulk of collecting activities is conducted by non-profit organisations (universities, research institutes, botanical gardens) (ten Kate & Laird, 1999).

Herbal medicine industry

Exporters in developing countries will find opportunities in the trade of ingredients with known properties and activity, which are not patented and which can be traded freely. The market segment of herbal medicines, produced directly from whole plant material, is of particular interest to exporters in developing countries. In general, the market for herbal medicines is growing at a faster rate than that for conventional chemical drugs. For an overview of the trade structure in this industry, please refer to Chapter 7.

3.3 Consumption patterns and trends

Trends which have an impact on demand for botanical medicines and, consequently, the demand for natural pharmaceutical ingredients are the following:

- Consumers seek an alternative or complement to pharmaceutical drugs and modern healthcare. The increase in demand for 'natural' medicine is also strongly related to the rise of the green consumption movement.
- The entry of large pharmaceutical and Over-The-Counter (OTC) companies has placed botanical medicines more strongly on the mass market.
- Increased advertising budgets and media attention for botanical medicines have contributed to rapid growth in consumer demand.
- Increased emphasis on safety, efficacy and quality has resulted in more research and development, a shift towards standardised products, and requirements for high-quality raw materials. This expanded research and development has improved the legitimacy of botanical medicines.
- Acceptance of botanical medicines by national (Germany and Japan) and commercial insurance companies (USA). However, at a global level re-imbursement is currently decreasing.
- Some claim that the innovation and expansion of the pharmaceutical biotechnology sector, which is based on natural materials, has produced a scientific and financial environment open to the potential medical benefits of other natural products, including botanicals.

Current problems in the trade are the relatively slow amount of new products and the on-going price battle.

A positive development with respect to herbal medicinal products is the proposal (COM 2002/1) of 17 January 2002 for a Directive to amend Directive 2001/83/EC, prescribing that no medicinal product may be placed on the market without having obtained a marketing authorisation on the basis of harmonised requirements. This would mean that exporters would no longer have to deal with different national regulations for herbal products. The application for such an authorisation has to contain the results of tests and trials on quality, safety and efficacy of the products. However, for many herbal medicinal products, which are used for a long period, sufficient published scientific literature is not available so that a well-established medicinal use cannot be demonstrated. The proposed Directive would provide for a special registration and, hence, the marketing of certain traditional herbal medicinal products without requiring

particulars and documents on tests and trials on safety and efficacy. If the pharmaceutical market becomes more easily accessible for producers of some herbal medicinal products, this would also have positive effects for producers of natural ingredients for pharmaceuticals.

Certification and conservation issues
Another trend in the phyto-pharmaceutical[5] market is that more and more innovative companies are requesting organically certified raw material and value added products, especially for the development of new products. There is increasing demand for certified raw material and value added products. Another indication of this trend is that more and more conventional importers and traders receive approval to deal with organically certified material. Regarding the requirements for organic products, please refer to EU Regulations EEC 2092/91 and EC 1804/1999 (see Legislation in Force at http://europa.eu.int/eur-lex/en/search.html), or contact Skal (see Appendix 8).

In October 2000, representatives from the phyto-pharmaceutical industry in Germany (e.g. Weleda, Madaus, Martin Bauer), practitioners' associations, and international organisations including the International Council on Medicinal and Aromatic Plants (ICMAP), WWF, IUCN and TRAFFIC demonstrated their commitment to the conservation of natural medicine resources by signing a Joint Declaration for the Health of People and Nature. Working Groups have been formed to establish criteria for the use of medicinal plants, to discuss labelling and legislation and to exchange market information (for more information contact honeff@wwf.de).

An interesting publication on certification is "Tapping the green market" by P. Shanley et al. (2002).
The purpose of the manual is to explore the feasibility of certification of non-timber forest products.
It includes details on criteria for certification based on Forest Stewardship Council (FSC) principles. In 2001, a Brazilian company earned FSC certification for 80 thousand ha of native forest where extraction of raw materials for producing medicines and cosmetics takes place.

Research by TRAFFIC Europe conducted in 2000 in Belgium, France, Germany, The Netherlands and the United Kingdom showed that there is low awareness among retailers and traders of the EU laws and regulations governing the trade in certain Traditional Chinese Medicines (TCM). TCM products purporting to contain CITES-listed species were available in all of the five countries surveyed. The findings of this study were made available to national enforcement agencies in all five countries, leading to a number of significant seizures of illegal TCM. As a follow-up activity, TRAFFIC Europe will commence outreach and awareness work towards the TCM communities in Western Europe.

TRAFFIC Europe is also studying the TCM user communities in Germany. There are two main user groups, one being composed of Asians living in Germany - traditional users of TCM who buy their medicines in Asian speciality shops or import them from overseas. According to recent population figures, almost 800,000 Asians live in Germany with the majority of potential TCM users being of Vietnamese or Chinese origin. Furthermore, over 20 organisations in Germany teach TCM, mainly to German medical practitioners. The largest TCM association claims to have over 10,000 members. TRAFFIC's investigation will involve contact with members of the Chinese communities in Germany, with communication conducted in their own languages, to establish the extent and nature of the use of TCM. For more information please refer to www.traffic.org and www.naturheilkunde-online.de.

5 Phytopharmaceuticals are plant and herb-based remedies

4 PRODUCTION

Medicinal and aromatic plants
Medicinal and aromatic plant material is obtained both from plants growing in the wild and from cultivated stock. Collection in the wild still plays a vital role in the use of, and trade in, medicinal and aromatic plant material in Europe, since cultivation has not proved to be profitable for the majority of plants traded. This is because: many plants are difficult to cultivate; many are required in small quantities; the quality of some wild-harvested material is supposed to be superior; the costs associated with obtaining plant material from the wild are relatively low.
Moreover, collection in the wild contributes to a wider distribution of cash-income in rural areas, originating in fair-trade market partnerships.

Lange (1998) estimates that about 2,000 medicinal and aromatic plant species are used on a commercial basis in Europe, of which two-thirds are native to Europe.
In the EU, medicinal and aromatic plants are cultivated on an estimated 70,000 ha. Leading species are: lavender (*Lavandula spp.*), Opium Poppy (*Papaver somniferum*), Caraway (*Carum carvi*) and Fennel (*Foeniculum vulgare*). France and Spain are EU countries with many hectares under cultivation. However, in Spain wild-harvesting and cultivation of medicinal and aromatic plants has declined. There is some cultivation in Germany, where leading producers of herbal medicines have their own plantations for popular products. Finzelberg, for example, cultivates St. John's wort and echinacea in Germany. The area under cultivation, however, is small as cultivation in Eastern European countries is much cheaper.
Eastern European countries such as Bulgaria, Hungary and Albania are major EU suppliers of material from medicinal and aromatic plants.
For detailed information about production of medicinal and aromatic plants in Europe, please refer to the publication "Europe's Medicinal and Aromatic Plants: Their trade use and conservation" by Lange.
This publication is obtainable through Traffic (see Appendix 8).

Data reported in the Commonwealth report "A Guide to the European Market for Medicinal Plants and Extracts" are listed in Table 4.1.

Table 4.1 Medicinal and aromatic plant production in Europe

Country	Hectares
France	25,000
Spain	19,000
Germany	5,700
Austria	4,300
Netherlands	2,500
Italy	2,300
UK	2,000
Finland	1,900
Total	**62,700**

Source: Commonwealth, 2000

There are two distinct trends in European medicinal plant production. Large-scale cultivation of relatively low value products such as Evening Primrose, Thyme and Milk Thistle is generally on the decline and is being replaced by imports. Production of more specialist plants is, however, increasing, especially using organic or bio-dynamic cultivation techniques (Commonwealth, 2000).

Medicinal and vegetable saps and extracts
The EU is a leading producer of extracts. Germany is among the leading pharmaceutical plant importers and big extract producers such as Finzelberg, Spreewald, General Extract Products and Gehrlicher are located in Germany. Other leading producers are Indena and Hammer Pharma in Italy.

Vegetable alkaloids
According to our information, there is no production of cinchona or ephedrine in Europe. There are, however, companies such as Buchler GmbH in Germany that process and trade these products.

5 IMPORTS

5.1 Total imports

It is not particularly worthwhile to give an indication of total imports of natural pharmaceutical ingredients. Besides the medicinal & aromatic plants, the medicinal and vegetable saps and extracts, and the vegetable alkaloids, there is a range of natural products that is used as ingredients by the pharmaceutical industry, including essential oils, vegetable oils, natural gums & resins and natural colours. These ingredients, however, do not have a specific medicinal activity and only a small proportion of the total trade in these products is used by the pharmaceutical industry. For more information on these ingredients, please refer to CBI's market surveys Essential oils and oleoresins, Natural gums and resins, and Natural Ingredients for Cosmetics. Moreover, it is important to note that most of the ingredients are not only traded for the pharmaceutical industry, but also find their way to the food and cosmetics industry.

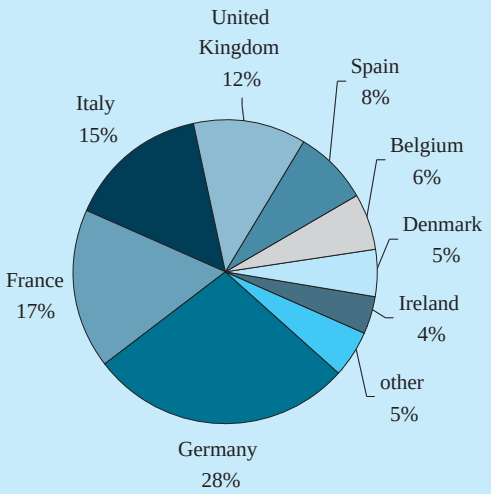
5.2 Imports by product group

Medicinal & aromatic plants

Figure 5.1 shows that, in terms of value, the leading suppliers of medicinal and aromatic plants to the EU were the USA, China and Germany. Compared to the preceding year, imports by EU member countries decreased by 8 percent in terms of value but increased by 5 percent in terms of volume, amounting to US$ 306 million or 117 thousand tonnes in 2000. However, it should be noted that, although the US$ is the basic currency unit used to indicate the imported values, the trade statistics are based on the € values and transferred into US$. Hence the developments in the imported values are also influenced by the € / US$ exchange rate. For more information about the exchange rate, please refer to Chapter 2 of this survey.

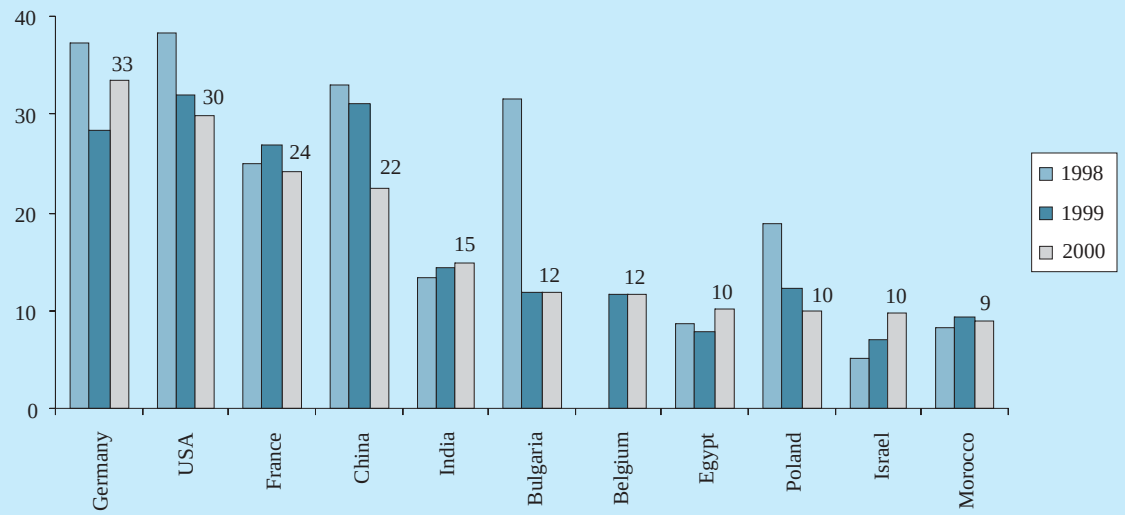
In 2000, developing countries accounted for 40 percent of the imported value and 54 percent of the imported volume.

Figure 5.2 Leading EU importers of medicinal & aromatic plants and their shares in EU imports, 2000
% of total imported value



Source: Eurostat (2001)

Figure 5.1 Leading suppliers of medicinal and aromatic plants to the EU, 1998-2000, US$ million



Source: Eurostat (2001)

Figure 5.2 shows that in 2000, Germany was, by far, the leading EU importer of medicinal & aromatic plants. Between 1998 and 2000, however, Germany saw its share in EU imports decrease from 38 percent to 29 percent, while the United Kingdom experienced an increase from 7 to 12 percent. The Netherlands was a small importer of medicinal & aromatic plants, being only the 12th leading EU importer.

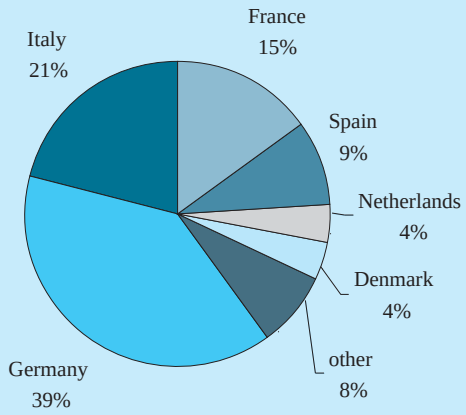
Medicinal and vegetable saps and extracts

As from 1998, imports by EU member countries of plant extracts decreased by 44 percent in terms of value and by 25 percent in terms of volume, amounting to US$ 115 million or 2.5 thousand tonnes in 2000.

Figure 5.3 shows that the leading suppliers to the EU were France, Ireland, Italy, Switzerland, Spain and Germany, together supplying 82 percent of the imported value of medicinal and vegetable saps and extracts by EU member countries in 2000. Developing countries accounted for only 6 percent of the imported value.

Figure 5.4 shows that Germany is, by far, the leading importer of medicinal and vegetable saps and extracts, followed by Italy and France. All these countries saw their share in EU imports decrease between 1998 and 2000, which was at the advantage of relatively smaller importers like Spain, The Netherlands and Denmark, all of which managed to increase their respective shares by 2 percentage points.

Figure 5.4 Leading EU importers of medicinal and vegetable saps & extracts and their shares in EU imports, 2000, % of total imported value

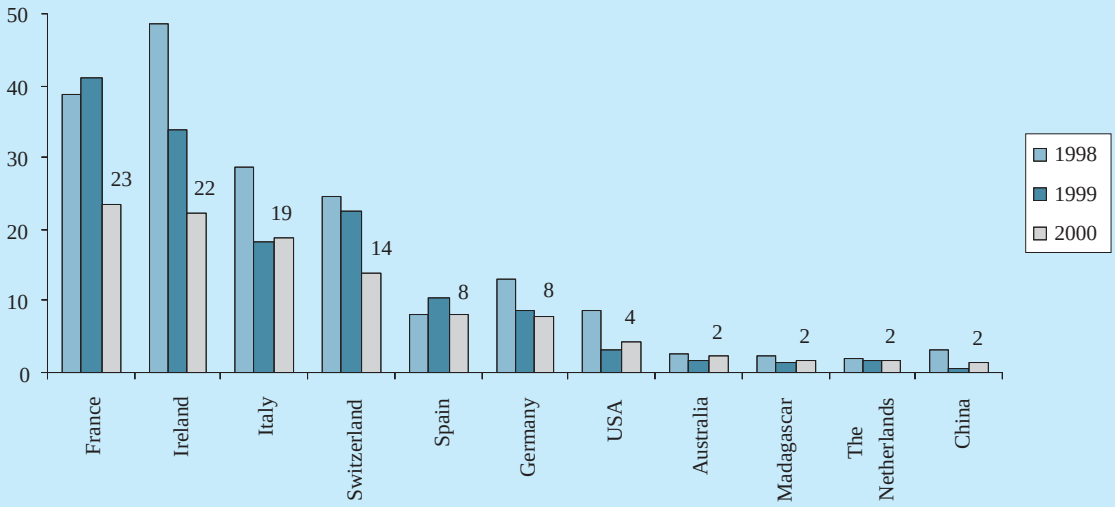


Source: Eurostat (2001)

Vegetable alkaloids

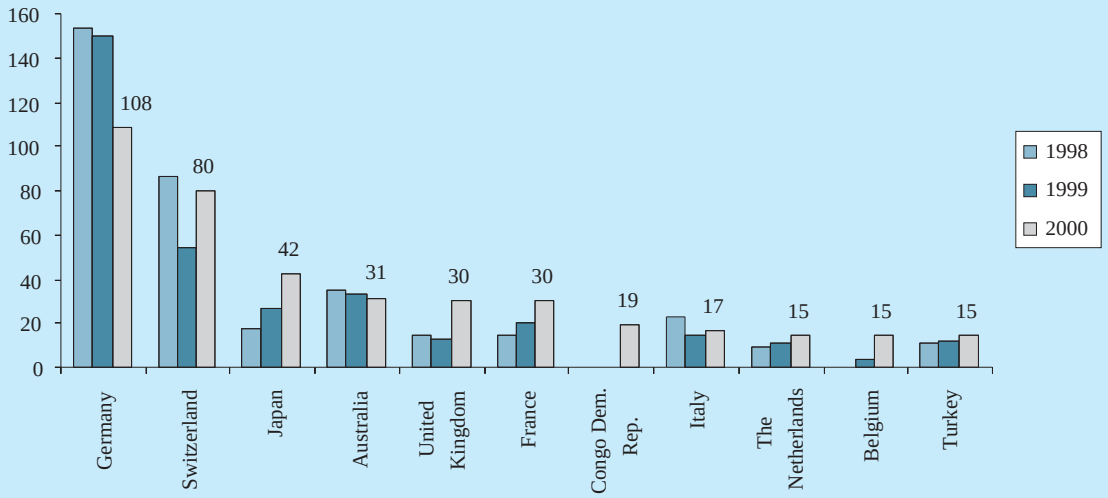
Between 1998 and 2000, imports by EU member countries of vegetable alkaloids, increased by 4 percent in terms of value and by 37 percent in terms of volume, amounting to US$ 486 million or almost 11 thousand tonnes. Leading EU suppliers were Germany and Switzerland, accounting for 22 and 16 percent, respectively, of the imported value in 2000. In the same year, developing countries supplied 14 percent of the imported value and 19 percent of the imported volume of vegetable alkaloids.

Figure 5.3 Leading suppliers of medicinal and vegetable saps and extracts to the EU, 1998-2000, US$ million



Source: Eurostat (2001)

Figure 5.5 Leading suppliers of vegetable alkaloids to the EU, 1998-2000, US$ million

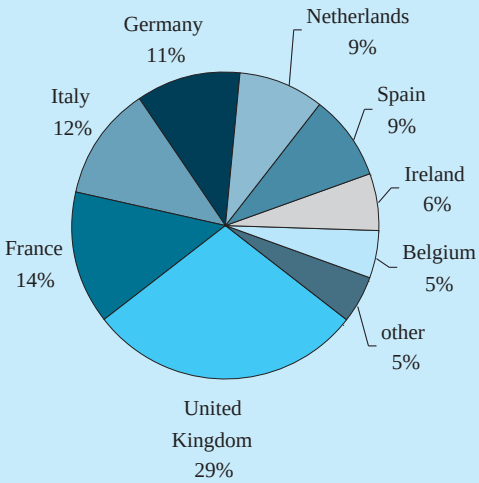


Source: Eurostat (2001)

Figure 5.6 shows that the United Kingdom was the leading EU importer of vegetable alkaloids, followed by France, Italy, and Germany. Between 1998 and 2000, the United Kingdom saw its share in EU imports (in value) increase from 22 percent to 29 percent, while France decreased its share from 24 percent in 1998 to 14 percent in 2000. The Netherlands witnessed the largest absolute and relative increase and saw its share increase from 2 percent in 1998 to 9 percent in 2000.

Under the group HS 2939 of vegetable alkaloids, some derivatives from medicinal plants have a specific HS code (including quinine, alkaloids of cinchona and ephedrine(s)).

Figure 5.6 Leading EU importers of vegetable alkaloids and their shares in EU imports, 2000, % of total imported value



Source: Eurostat (2001)

Table 5.1 EU imports of selected vegetable alkaloids, 2000, US$ thousand

HS Code	EU imports	DCs	Leading suppliers
HS 293921	32,723	23,476	Congo Dem. Rep. (18,978), Indonesia (4,086), The Netherlands (3,381)
HS 293929	2,836	17	The Netherlands (1,351), France (881), Germany (423)
HS 293941	2,341	226	Japan (1,416), Germany (519), India (226)
HS 293949	2,027	86	Japan (1,433), Germany (260), France (71)

HS 293921: Quinine and its salts (from medicinal plant Cinchona sp); HS 293929: Alkaloids of cinchona (excl. Quinine and its salts) and their derivatives and salts.; HS 293941: Ephedrine and its salts (from Ephedra sp); HS 293949: Ephedrines and their salts (from Ephedra sp).
DCs: Developing countries
Source: Eurostat (2001)

5.3 The role of the developing countries

Medicinal & aromatic plants

In 2000, developing countries were particularly strong in the supply of medicinal & aromatic plants, accounting for 40 percent of imports by EU member countries in terms of value and 54 percent of imports by EU member countries in terms of volume. Since 1998, the share of developing countries in EU imports has fluctuated closely around these levels. China and India, as a result of their long tradition in the field of natural medicine and their vast land area, comprising all climatic zones, were leading producers of natural ingredients for pharmaceuticals. Fiji increased its exports of medicinal & aromatic plants to the EU from just over US$ 2 million in 1997 to US$ 12 million in 1998. This was the result of the exploding international demand for kava kava which is endemic to the South Pacific. Vanuatu is another Pacific island which profited from the increased demand. After 1998, EU imports from Fiji decreased again to their previous level.
In June 2002, Germany banned the supply of the herbal remedy kava-kava after reports linking it to fatal liver failure. Britain's Medicines Control Agency (MCA) has proposed to ban kava-kava but a decision is only expected around December 2002. From the box below, it also becomes clear that East European countries were major suppliers of medicinal & aromatic plants to the EU.

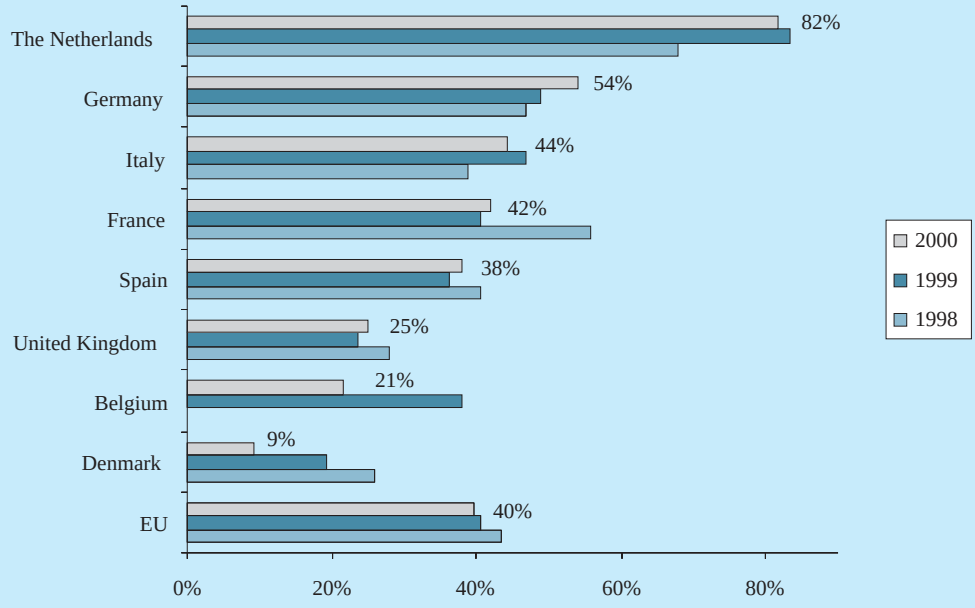
Although The Netherlands was only a small European importer of medicinal & aromatic plants in 2000, relatively it obtained the biggest share of its imports from developing countries. Kenya and Congo together supplied over 45 percent of The Netherlands' imports in 2000.

EU imports of medicinal & aromatic plants from selected developing countries, 2000, US$ million

China	22.4	Brazil	5.1	Macedonia	1.8	Namibia	0.9
India	14.9	Sudan	3.3	Iran	1.5	Yugoslavia,	0.8
Egypt	10.1	Thailand	3.1	Mexico	1.3	Federal Republic	
Morocco	8.9	Argentina	2.8	Madagascar	1.2	Guatemala	0.8
Chile	7.4	Croatia	2.8	Kenya	1.1	Congo Democratic	0.8
Turkey	7.2	South Africa	2.2	Peru	1.1	Republic	
Albania	5.1	Fiji	2.1	Cameroon	1.0	Congo	0.7

Source: Eurostat (2001)

Figure 5.7 Share of developing countries in imports of medicinal & aromatic plants into the EU, 1998-2000
% of imported value



Source: Eurostat (2001)

Medicinal and vegetable saps and extracts
In 2000, developing countries accounted for 6 percent of the imported value by EU member countries of medicinal and vegetable saps and extracts.
About 75 percent of the supplies from developing countries originated in four countries, i.e. Madagascar, China, Congo Democratic Republic and Cameroon. France accounted for 37 percent of imports (in value) by EU member countries originating in developing countries, The Netherlands for 15 percent and Germany for 12 percent.

Vegetable alkaloids
In 2000, developing countries accounted for 14 percent of the imported value by EU member countries of the product group vegetable alkaloids. More than 80 percent of the supplies from developing countries originated in four countries, i.e. Congo Democratic Republic, Turkey, China and Brazil. The Netherlands accounted for 34 percent of imports (in value) by EU member countries originating in developing countries, United Kingdom for 25 percent and Germany accounted for 21 percent. Please also refer to Table 5.1.

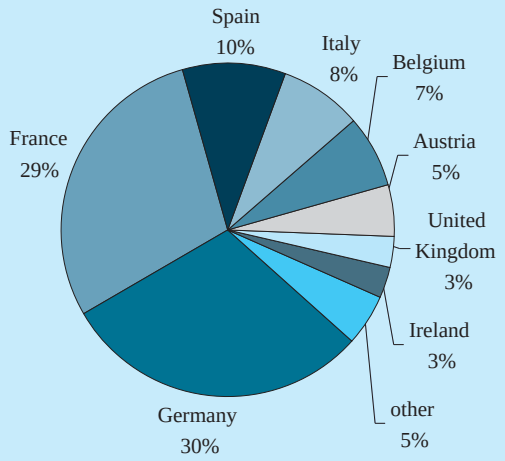
Although they do not feature in Eurostat figures, other countries of origin and of value-added production of quinine products, next to Indonesia and India, are Ecuador, Bolivia, Brazil, Tanzania, Rwanda and Congo (Dürbeck, p.c.). There is forestry containing cinchona varieties in these countries and in most of them value-added processing has been conducted through local companies. The cultivation and processing in Rwanda and Congo is done by European companies from Germany and The Netherlands. Tanzania and Ecuador are traditional exporters of the dried bark of cinchona varieties. In Bolivia, Brazil, Indonesia and India, the extraction is done by local companies primarily for the local markets, but also for the export of extracts. The products from cinchona varieties in the international market are Quinine hydrochloride and Quinine sulphate.

Ephedra has been used in China for over 4,000 years. Several companies in Europe use the extract for herbal medicines. Extraction of Ephedra alkaloids is carried out in China and in Europe.

6 EXPORTS

Medicinal & aromatic plants
Between 1998 and 2000, exports by EU member countries of medicinal & aromatic plants decreased by 12 percent in value and 5 percent in volume, amounting to US$ 181 million or 42 thousand tonnes in 2000. In the same year, the leading destinations were France and Germany, each importing 12 percent of exports by EU member countries, followed by Switzerland (9%), the United Kingdom (6%), USA (6%), Italy (6%), Belgium (5%) and The Netherlands (5%). Figure 6.1 shows the leading EU exporters.

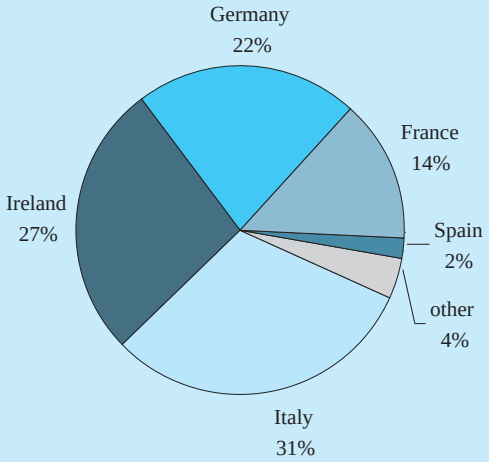
Figure 6.1 Leading EU exporters of medicinal and aromatic plants, 2000, % of total exported value



Source: Eurostat (2001)

Medicinal and vegetable saps and extracts
Exports by EU member countries of medicinal and vegetable saps and extracts decreased by more than 40 percent in value as from 1998, amounting to US$ 170 million in 2000. In terms of volume, exports increased by 86 percent between 1998 and 1999, but decreased afterwards by 27 percent, amounting to 5 thousand tonnes in 2000. The leading destination was France, receiving 24 percent of the exported value in 2000, followed by Germany (19%), the USA (13%), Switzerland (8%), Italy (7%) and Brazil (3%). Figure 6.2 shows the leading EU exporters.

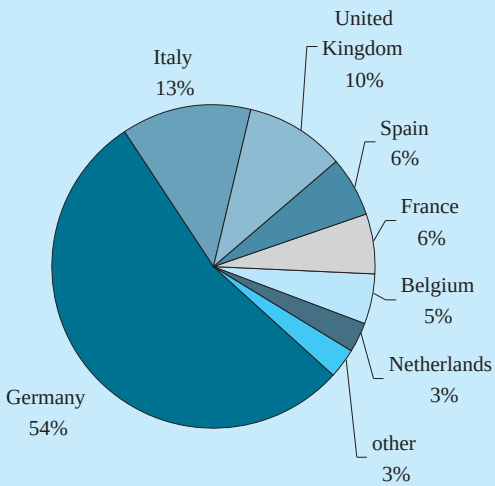
Figure 6.2 Leading EU exporters of medicinal and vegetable saps and extracts, 2000, % of total exported value



Source: Eurostat (2001)

Vegetable alkaloids
Compared to the preceding year, exports by EU member countries of vegetable alkaloids increased by 7 percent in value and 8 percent in volume, amounting to US$ 512 million or 11.6 thousand tonnes in 2000. In the same year, the leading destination was the USA, receiving 21 percent of the exported value, followed by the United Kingdom (6%), Japan (6%), Italy (5%), France (5%) and Ireland (3%). Figure 6.3 shows the leading EU exporters.

Figure 6.3 Leading EU exporters of vegetable alkaloids, 2000, % of total exported value



Source: Eurostat (2001)

7 TRADE STRUCTURE

7.1 EU trade channels

Pharmaceutical industry
Advances in research techniques have allowed the pharmaceutical industry to conduct large-scale natural products screening programmes, which over the past decade have increased demand for natural product samples, many collected from the biologically-rich tropical countries. The bulk of these samples is collected by sub-contracted collectors, most of whom are based in developed countries.

The collection of biological samples for industry (biodiversity prospecting) generally involves two or sometimes three direct relationships:

- that between the company and the contracted collector (usually described in a contract which is legally binding under the law of the country in which the company is situated);
- that between an outside collector and in-country collaborators (usually more informally defined, although increasingly detailed in agreements of some kind, and regulated by national legislation);
- that between an ethnobotanical collector and local communities that provide traditional knowledge on collected samples, which will subsequently be supplied to commercial companies.

The transfer of samples from a collector to a company is the most direct path by which biological and cultural diversity travels to commercial interests, and generally the most direct path upon which benefits return.

Structure of the botanical medicines industry

Cultivation or wild-crafting of plants
Plants are cultivated or wild-crafted. Plant material is cleaned and dried. The majority of plant material in trade is in dried form. Drying methods must bring moisture content down to <14 percent, while retaining the chemical composition of the plant. A minority of material is traded fresh, or preserved in alcohol.

Exporters/importers/wholesalers/brokers/traders
Plant material is purchased either directly from wild-crafters or cultivators, or after it has passed through a number of traders (e.g. local dealers, village cooperatives, district traders). Brokers and agents act on behalf of purchasing companies. Wholesalers, importers and exporters may specialise in a few raw materials, or in a few thousand, which they sell as commodities to a number of different companies. Wholesalers/traders may also process plant material. Some companies apply testing, or use voucher specimens at this stage, to ensure correct species identification and quality.

Bulk ingredient suppliers and processing companies
Plant material is tested for contamination (e.g. pesticides). It is formed into bulk ingredient, either coarsely cut, rasped, or ground into powdered form (for use in crude herbal products and in the preparation of extract). Due to consolidation in the industry, the production of bulk ingredients is often undertaken by wholesalers/traders. Further processing in the form of extraction, particularly standardised extracts, is undertaken by processing companies, many of which also produce branded lines which they sell directly to distributors or retail outlets.

Manufacturers of finished products
Bulk and processed ingredients are supplied to companies which manufacture (e.g. might add excipients to extracts to make tablets and capsule products, based on in-house formulae), label, and package products for retail sales. Some sell lines directly to health professionals, others sell directly to consumers through multi-level marketing and mail order. Some companies use brokers or distributors to supply their products to retail outlets, others market directly to mass and specialty outlets.

Distributors
Some manufacturers (usually smaller companies) use distributors to sell finished products to retail outlets.

Retail/consumer sales
The bulk of finished products is sold through retail outlets, either mass market (e.g. chain pharmacies, supermarkets, grocery stores) or speciality (e.g. health food stores, pharmacies), although direct sales command a significant proportion of the market

Source: ten Kate & Laird, 1999

Structure of the botanicals trade in Germany Drug brokers

Seven brokers or agents are involved in the trade in Germany. Most are active on a global scale, although some specialise in specific countries. Brokers represent foreign import-export companies, traders, farmers and manufacturers. They deal mostly for wholesalers, and to a lesser extent for pharmaceutical companies or herbal tea companies. Most brokers also trade in spices.

Wholesalers (traders in bulk material)
In Germany, the mainstream bulk trade in botanicals is dominated by about 20 wholesalers, with further consolidation of the trade in the past few years. 95 percent of plants sold by German wholesalers are sold as dried plants and plant parts, with the remaining 5 percent comprised of plants preserved in alcohol, mainly for use in homeopathy. Traders deal with a range of customers including the food industry, pharmaceutical companies, cosmetics, liqueur, extract-producing companies, and colouring agent companies. Overall volumes imported by individual traders range from 1,000 tonnes to 30,000 tonnes annually. On average, each company trades in 400-500 botanical species.

Processing
Wholesalers are often responsible for processing the plant material before sale, including cleaning, cutting and grinding it into a powder. Some wholesalers are also involved in producing extracts, herbal teas, or herbal mixtures.

Manufacturing
Processed material is supplied to manufacturers of pharmaceuticals, plant extracts, cosmetics, liqueurs, dyes, etc., as well as to second-level retail suppliers, and to other wholesalers and tea-packing companies. Bulk extract producers and pharmaceutical companies often manufacture intermediary products which are then sold to cosmetics, pharmaceuticals, or food companies which manufacture finished products.

Source: ten Kate & Laird, 1999

However, there are many other groups which are indirectly involved in and affected by this exchange although they are not written into two-party arrangements, but are increasingly addressed in international and national law and policy such as: Communities which live in biodiversity-rich areas where samples are collected; national governments which, as written into the Convention on Biological Diversity (CBD), now claim national sovereignty over their country's genetic and biochemical resources; the international community which, through documents and agreements such as the CBD, have expressed interest in the conservation and sustainable and equitable use of biodiversity.

Herbal medicine industry
European-based companies, and German in particular, dominate the global herbal medicine supply industry. The biggest herbal raw materials group is Martin Bauer Group, a German-based corporation with annual sales of over US$ 250 million (ten Kate & Laird, 1999). Martin Bauer Group owns Finzelberg, Plant Extract, PhytoLab and Phytocon, and acquired Muggenberg (which took over Heinrich Ambrosius earlier), another large German supply company in 1998. Other leading companies include the German Madaus of (US$ 400 million annual sales from herbal medicines alone) and the Italian Indena (US$ 200 million).

Lewington (1993) reported that between 500 to 600 medicinal plants are traded via Hamburg, which made it the world's leading trading centre in plants. However, the position of Hamburg has decreased in recent years.

The boxes in which the structure of the industry and trade are presented are relevant for the product group Medicinal and aromatic plants. Processed products falling under the product group Vegetable saps and extracts, in which developing countries do not have an important stake, are directly traded with manufacturers of finished products (e.g. bark extract of *Prunus africana* to Indena in Italy). Quinine, a vegetable alkaloid, is traded via trading houses. Internationally, there are more than 60 trading houses trading quinine, of which 15 in Germany and 12 in the United Kingdom. Trading houses in Germany include Buchler GmbH and Henry Lamotte, in the United Kingdom they include StanChem International.

With respect to TCM, research by TRAFFIC Europe revealed that twelve major distributors of Chinese drugs and patented medicines in Germany import their products from Hong Kong and China or obtain them from one of the few large European importers.

7.2 Distribution channels for developing country exporters

Exporters should realise that the Internet is an important medium in the sourcing of raw materials for herbal products. Several users/traders of natural ingredients mentioned that the Internet is an important source for finding suppliers.

A very interesting link for exporters is www.herbworld.com/cropshop/, where growers and buyers of botanicals can get together. Growers can list which crops they have available, date of availability, price, quantity, etc. Buyers can also list what they are looking for.
The site www.ingridnet.com is a marketing instrument for companies which supply ingredients. The database includes contact details of 10,000 ingredient suppliers and is used by the food, cosmetic and pharmaceutical industries to source ingredients.

Please refer to Appendix 10 for a list of importers of natural pharmaceutical ingredients. Many of the importers have an Internet site, where interested parties can find more information on the field in which these importers are active. Most of the interesting contacts can be found in Germany. Agrimedia has published the Business Guide 2000: Medicinal and Spice Plants including over 1,500 addresses of organisations and companies active in this field (for contact details, please refer to Appendix 6).

Interesting contacts in the market for medicinal and aromatic plants are for example Alfred Galke, Cealo and Madaus in Germany. Most of the importers mentioned in Appendix 10 import raw materials. There are only a few companies importing extracts directly. Indena, for example, imports bark extract of *Prunus africana*.

Organisations working with pharmaceutical companies in bio-prospecting arrangements are referred to the Earthscan publication “Biodiversity and Traditional Knowledge” (for contact details see Appendix 9). This practical manual demonstrates how to arrive at equitable and successful arrangements on access to, and commercial development of, genetic resources.

8 PRICES AND MARGINS

8.1 Prices and margins

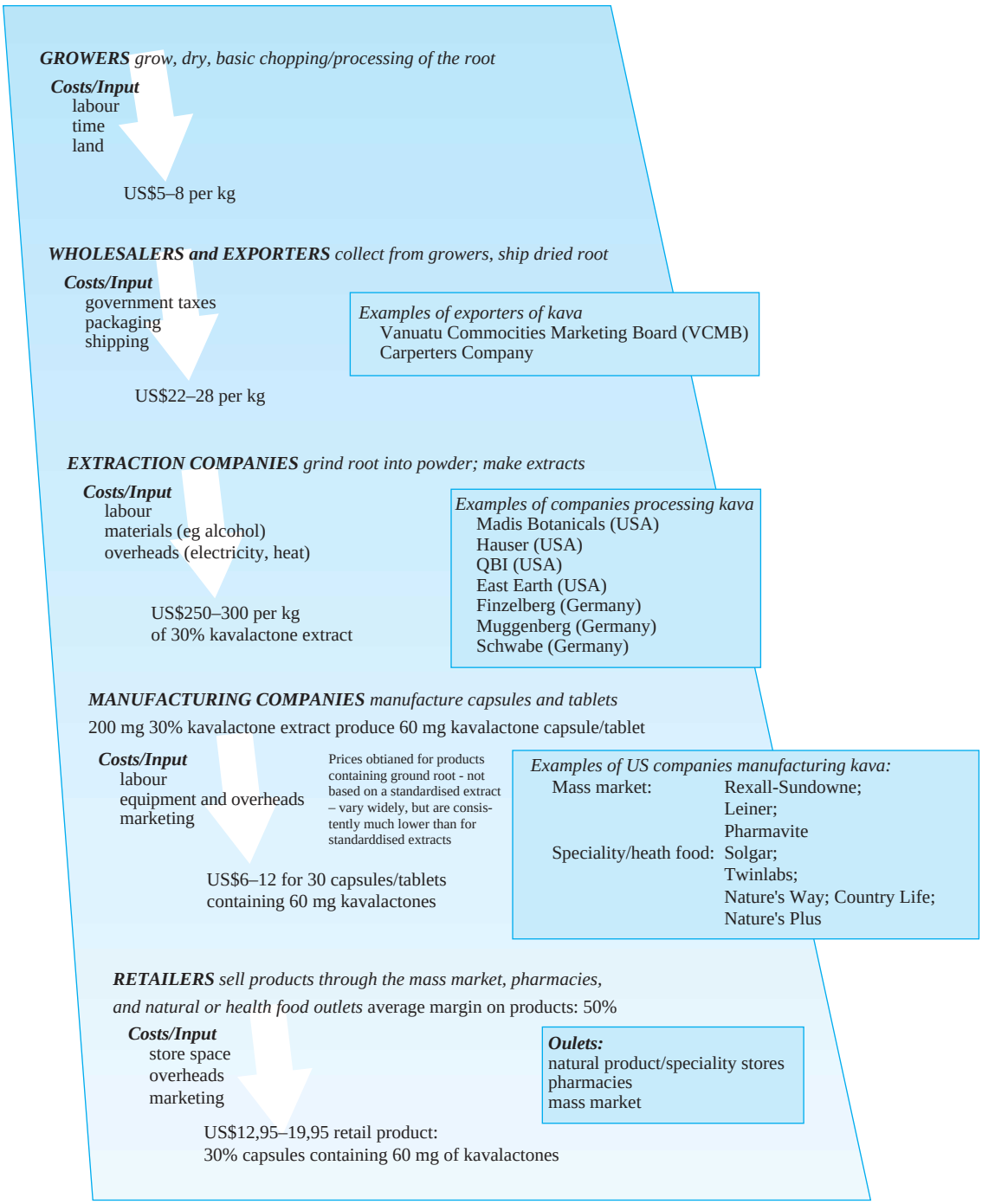
The margins for the different intermediaries in the trade structure (importers, agent, etc.) are difficult to determine because they are influenced by many factors, such as:

- Size of the order;
- Length of the trade channel;
- Quality of the product;
- Availability of the product;
- Added value.

In the box below we give an overview of the kava kava chain of value and production (January 1999).

8.2 Sources of price information

Internet is a good source for obtaining an idea of retail prices for raw materials. Please refer to Appendix 3 for addresses. At some sites professional users can request samples and offers for ingredients.



Source: ten Kate & Laird, 1999

The Internet site of the Herb Growing and Marketing Network includes a herb crop shop, where growers and buyers of botanicals can come together (www.herbworld.com/cropshop/).

Prices for the following raw materials are published weekly in the Public Ledger (see Appendix 3):

- crude drugs including balsam, bayberry root bark, cochineal, echinacea and valerian
- herbs and spices including cloves, ginger, black pepper and turmeric
- waxes and gums
- 38 essential oils including amyris, geranium, lemongrass and vetiver
- oilseeds, oils and fats including soya oil, sunflower seed oil, groundnut/peanut oil, palm oil and castor oil.

At the end of 2000, ITC started with a Market News Service for Medicinal Plants and Extracts. The bulletin is published quarterly and is available from ITC MNS. The bulletin includes, among other things, price information of raw materials and extracts.

9 OPPORTUNITIES FOR EXPORTERS

There is a big transfer of natural ingredients from developing countries to the pharmaceutical industry for research purposes. Large pharmaceutical companies are engaged in bio-prospecting, which refers to the exploration of biodiversity for commercially valuable genetic and biochemical resources. This type of trade in natural ingredients is research driven. Pharmaceutical companies study the activities of specific medicinal plants and the knowledge is used with the aim to develop new medicines which can be patented.

Controversial examples of medicinal plants which were patented include ayahuasca and neem. An American citizen received a USA patent for what was commonly thought to be a variety of ayahuasca, originally cultivated by an indigenous community in Ecuador. When indigenous leaders, activists and environmental lawyers at the Centre for International Environmental Law (CIEL) learned of the patent, they mobilised an international campaign to repeal the patent. The Patent Trade Office (PTO) eventually suspended the patent in November 1999. At the same time that the ayahuasca patent was being challenged, the government of India was challenging several USA patents on a number of traditionally utilised Indian plants (P. Shanley, 2002).

This so-called bio-prospecting is strongly dominated and controlled by large pharmaceutical companies. The interest in equitable partnerships between pharmaceutical companies and indigenous communities or local universities is increasing, but still in its infancy. For a good overview see (Laird, 2002). Exporters in developing countries, however, will find more opportunities in the trade of ingredients with known properties and activity, which are not patented and which can be traded freely.

There certainly is a market for natural ingredients for herbal medicines in Europe. Global demand has increased dramatically during the last ten years. Trade in herbal medicines is estimated at US$ 9 billion annually and is growing in excess of 10% annually (Nutraceuticals International, January 2001). Consumption of vitamins, minerals and herbs/botanicals is estimated at US$ 38.5 billion (€ 41.8 billion) in 2000 (NBJ, 2000). At the end of the 1990s, the market for herbal medicines was growing at a faster rate than for conventional chemical drugs. However, since 2000, the USA market slowed down significantly due to negative press on safety and efficacy. In the EU, however, sales remained strong. This is due to a number of factors, including historical differences in the marketplaces, the active role of pharmacists, doctors, and researchers in botanicals in Europe, and stricter quality control and regulation in Europe (NBJ, March 2001; Gruenwald, 2000). One of the reasons that the market in the USA grew relatively very fast was that new materials could previously be more easily introduced in the USA than in the EU or Japan, as USA legislation considered products safe unless proven otherwise. This situation has changed now and standards are being developed in the USA. Over-the-counter (OTC) drugs must meet a US Pharmacopeia and National Formulary (USP-NF) existing or proposed monograph(s) for active ingredients or botanical drug substances.

Manufacturers of herbal medicines used to acquire their raw materials from traders, but now some have their own plantations or have direct contacts with producers. Manufacturers of herbal products are increasingly interested in having direct relationships with producers of required materials, in order to ensure a sustained source and/or to save costs. In some cases, these producers require a certain minimum supply of the raw material. In other cases, however, you can easily access the market with 10 kg of extract, or 100 kg of flowers. Small producers need to search for small demand, which is easier in the organic market. Salus-Haus in Germany, for example, is a medium-sized company, only buying organic certified raw material. Moreover, in Germany a number of phyto-pharmaceutical demonstrated their commitment to the conservation of natural medicine resources by signing a Joint Declaration for the Health of People and Nature (refer to Section 3.3). Regarding the requirements for organic products, please refer to EU Regulations EEC 2092/91 and EC 1804/1999 (please refer to Legislation in Force at http://europa.eu.int/eur-lex/en/search.html), or contact Skal (see Appendix 8).

There is not only increased interest in certified organic production, but also in other forms of certification. The publication “Tapping the green market” by P. Shanley et al. (2002) explores the feasibility of certification of non-timber forest products. It includes details on criteria for certification based on Forest Stewardship Council (FSC) principles. In 2001, a Brazilian company earned FSC certification for 80 thousand ha of native forest where extraction of raw materials for producing medicines and cosmetics takes place.

Exporters should realise that the Internet is an important medium in the sourcing of raw materials for herbal products. A number of users/traders of natural ingredients mentioned that they use the Internet in order to find new suppliers.

Table 9.1 Claimed activity of selected top selling herbal medicines

Product	Plant part	Activity
Ginseng	root	increases energy and sex drive
Siberian ginseng	root	defuses nervous tension and fights fatigue
Kava kava	root	combats anxiety and stress
Green tea	Leaves	a powerful anti-oxidant and cholesterol reducer
St. John's wort	herb	anti-depressant
Psyllium	seeds	anti-constipation; helps weight loss
Hawthorn	fruit	lowers blood pressure
Saw palmetto	seeds	treats prostate problems
Valerian	root	relieves insomnia, anxiety, menstrual cramps, headaches
Liquorice	root	treats ulcers and stomach disorders
Wild yarn	roots	alleviates PMS and menopausal symptoms
Aloe	Leaves	treats wounds and skin problems
Camomile	flowers	alleviates moods and skin problems, calming
Garlic	bulb	boosts the immune system; lowers cholesterol
Calendula	flowers	soothes skin; fights bacterial, viral and fungal infections
Echinacea	root, flowers	boosts immune system; prevents colds
Ginger	rhizomes	treats nausea; inflamed joints
Gingko	Leaves	improves energy, mood and brain function

Source: ten Kate & Laird (1999)

It is not easy to present an overview of promising products for exporters in developing countries. In Europe, some 2,000 medicinal and aromatic plants are used on a commercial basis. A number of botanical species are consistently cited by industry representatives in the USA and Europe as the most important today, and likely in the next five years (Laird et al., 2002). Echinacea was cited as the top product now and in the years to come, in both the USA and Europe. European companies continue to consider St Johns Wort and Kava extremely important, while USA industry representatives tended to think both might be in decline due to controversial recent studies and bad press. Other important botanicals cited include: Gingko, Ginseng, Valerian, Goldenseal, and Garlic. USA companies also cited Black cohosh and Astragalus as good performers, while European companies have had continued success with Hawthorn and Chamomile.

Most buyers in The Netherlands are not interested in plant material, but in plant extracts. There are only a few developing countries which are able to supply extracts conforming to the requirements of western industry.

Appendix 12 gives a list of plants containing biologically active constituents which are processed industrially for local and international markets. The list also indicates the market potential for export and the region of availability.

Exporters should focus on ingredients with known activity. The box below gives a selected overview of top selling herbal medicines and their claimed activity.

Product profiles of Echinacea, Devil's Claw, Kava kava, *Prunus africana*, and Cat's Claw are included in the EU Strategic Marketing Guide.

Although farmers in developing countries have no knowledge of plants not native to the tropics , a number of medicinal plants, which are not day-length sensitive (i.e. requiring many hours of sun-light), were successfully moved into sub-tropics. Argentina, for example, has substantial cultivation areas of camomile and St. Johns wort. Top-selling species such as Echinacea are now also supplied by developing countries such as Bolivia, Costa Rica and Malawi.

Development organisations increasingly promote the cultivation of local and indigenous medicinal plants, as the return is higher than for traditional crops. In Europe, there are also activities in terms policy towards traditional medicine. The European Commission, for example, is working on a possible directive on traditional medicinal products. A draft version of April 2001 is available at www.mca.gov.uk (see Appendix 11).

Current issues in the trade are Good Agricultural Practices (providing guidelines for cultivation, harvest, processing, packaging and storage), organic production and certification. A proper marketing strategy for

ingredients takes into account these issues as well as CITES regulations on certain protected species (please refer to EU Marketing Guidelines for details on GAP and CITES).

Marketing strategies still have to be adapted to national regulations, as regulations for herbal products in the EU have not yet been not harmonised. However, a positive development with respect to herbal medicinal products is the proposal (COM 2002/1) of 17 January 2002 for a Directive to amend Directive 2001/83/EC, prescribing that no medicinal product may be placed on the market without having obtained a marketing authorisation on the basis of harmonised requirements. Normally, a lot of tests are required for such an authorisation. Published scientific literature is not available for many herbal medicinal products, so that a well-established medicinal use cannot be demonstrated. The proposed Directive would provide for a special registration and, hence, the marketing of certain traditional herbal medicinal products without requiring very extensive tests.

Although it helps to look at the European market, developing country exporters should draw up a marketing strategy aiming at markets at national, regional, and international level. While adopting this approach, developing country exporters will not be solely dependent on one market sector. In this way, fluctuations in the international market can be buffered by demand in the national and regional market. In its June 2001 edition, The Natural Foods Merchandiser published the article “Latin America: Emerging Markets For Botanicals, Organics”. The article specifically discussed the following countries: Argentina, Brazil, Chile, Costa Rica, Ecuador, Honduras, Mexico and Peru. Moreover, the exhibition organiser Penton launched its first Natural Products Expo Asia in Hong Kong in May 2002. It included 5 concurrent events: Traditional Chinese Medicine Asia, Herbal Asia, Nutraceuticals Asia, Functional Foods Asia and Organics Asia. Target countries included Hong Kong, China, Taiwan, Japan, Korea, Australia, India, Malaysia, Thailand and Indonesia.

APPENDIX 1 DETAILED IMPORT/EXPORT STATISTICS

The source of the data presented below is Eurostat COMEXT 2001.

Table 1 EU imports of medicinal and aromatic plants, 1998-2000, US$ thousand / € thousand / tonnes

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	426,356	137,054	332,297	313,488	111,553	306,114	332,733	116,951
Extra-EU	303,257	108,953	218,893	206,503	85,773	199,117	216,432	90,785
Developing countries	185,133	74,328	135,171	127,520	59,224	121,176	131,713	63,493
Top 5 suppliers								
Germany	37,155	9,198	28,274	26,674	8,402	33,356	36,256	9,363
USA	38,410	5,485	31,914	30,108	5,560	29,892	32,491	4,886
France	24,917	5,105	26,900	25,377	5,420	24,126	26,224	5,231
China	33,033	9,282	31,017	29,261	7,923	22,384	24,330	6,572
India	13,348	6,427	14,293	13,484	6,890	14,884	16,178	6,917
Developing countries								
Egypt	8,627	5,183	7,803	7,361	4,639	10,115	10,995	6,371
Morocco	8,215	5,877	9,408	8,875	6,373	8,898	9,672	7,192
Chile	29,178	6,821	11,921	11,246	3,503	7,412	8,057	3,066
Turkey	12,302	5,529	7,946	7,496	3,874	7,248	7,878	4,194
Albania	8,803	4,247	5,518	5,206	3,721	5,076	5,517	3,366
Brazil	4,383	1,017	4,407	4,158	1,023	5,052	5,491	1,038
Sudan	5,304	4,032	2,533	2,390	2,301	3,310	3,598	3,433
Thailand	1,884	658	2,248	2,121	668	3,081	3,349	873
Argentina	5,940	2,137	3,870	3,651	1,673	2,840	3,087	1,210
Croatia	2,186	1,080	2,648	2,498	1,183	2,771	3,012	1,443
South Africa	2,147	753	2,109	1,990	952	2,212	2,404	1,144
Fiji	12,000	804	3,910	3,689	320	2,127	2,312	314
Macedonia	3,772	1,631	1,497	1,412	1,007	1,753	1,905	1,406
Iran	1,726	941	1,278	1,206	803	1,500	1,630	876
Mexico	532	230	949	895	384	1,273	1,384	448
Madagascar	844	428	1,077	1,016	611	1,173	1,275	684
Kenya	2,752	1,430	2,416	2,279	1,358	1,142	1,241	581
Peru	1,010	313	943	890	279	1,063	1,155	425
Cameroon	1,631	1,169	899	848	561	950	1,033	874
Namibia	645	338	1,465	1,382	439	886	963	281
Yugoslavia, Fed. Rep.	2,445	1,323	1,158	1,092	805	799	868	642
Guatemala	383	246	589	556	308	792	861	365
Congo Dem. Rep.	1,790	1,294	822	775	942	765	831	949
Congo	252	139	71	67	101	736	800	1,054
Togo	1,484	1,036	477	450	378	683	742	638
Tunisia	1,280	745	797	752	672	666	724	604
Pakistan	489	425	552	521	776	642	698	1,187
Vietnam	304	85	431	407	97	531	577	161
Syria	595	257	326	308	154	523	569	276
Slovenia	447	72	509	480	73	512	557	108

Table 2 EU imports of medicinal and vegetable saps and extracts, 1998-2000, US$ thousand / € thousand / tonnes

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	211,934	3,342	160,518	151,432	2,995	115,290	125,315	2,504
Extra-EU	57,605	973	36,517	34,450	498	31,380	34,109	718
Developing countries	16,252	220	6,382	6,021	71	6,643	7,221	228
Top 5 suppliers								
France	38,629	389	41,043	38,720	455	23,407	25,442	607
Ireland	48,450	66	33,918	31,998	90	22,294	24,233	56
Italy	28,672	289	18,238	17,206	240	18,875	20,516	229
Switzerland	24,460	448	22,409	21,141	253	13,966	15,180	249
Spain	8,024	425	10,512	9,917	786	8,067	8,769	393
Developing countries								
Madagascar	2,232	16	1,446	1,364	15	1,874	2,037	25
China	3,156	13	525	495	17	1,555	1,690	122
Congo Dem. Rep.	4,850	149	0	0	0	935	1,016	20
Cameroon	3,877	5	2,952	2,785	5	667	725	1
Slovenia	277	3	632	596	0	621	675	2
Ecuador	0	0	0	0	0	523	569	27
Honduras	427	1	95	90	0	167	181	0
India	828	18	251	237	15	144	156	12
Chile	0	0	220	208	8	65	71	16
Brazil	80	3	14	13	1	51	55	3

Table 3 EU imports of vegetable alkaloids, 1998-2000, US$ thousand / € thousand / tonnes

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	468,788	7,969	413,186	389,798	7,629	486,349	528,640	10,880
Extra-EU	218,323	2,266	179,765	169,590	1,824	245,446	266,789	2,601
Developing countries	45,923	1,434	41,323	38,984	1,421	66,422	72,198	2,075
Top 5 suppliers								
Germany	153,925	2,406	150,217	141,714	3,312	108,298	117,715	2,785
Switzerland	86,081	146	54,455	51,373	85	79,940	86,891	123
Japan	17,028	108	26,724	25,211	108	42,150	45,815	122
Australia	34,621	72	32,896	31,034	71	31,336	34,061	83
United Kingdom	14,305	118	12,616	11,902	81	30,362	33,002	818
Developing countries								
Congo Dem. Rep.	0	0	0	0	0	18,978	20,628	451
Turkey	11,384	22	12,390	11,689	28	14,773	16,058	29
China	12,277	1,222	10,228	9,649	1,206	11,213	12,188	1,325
Brazil	9,866	5	6,971	6,576	3	10,184	11,070	6
Indonesia	4,231	75	4,321	4,076	80	4,086	4,441	97
India	3,837	95	3,238	3,055	84	3,672	3,991	124
Mexico	2,066	13	2,627	2,478	12	2,122	2,307	1
Slovenia	1,010	1	877	827	2	606	659	1
Peru	645	0	409	386	0	216	235	1
Iran	174	0	146	138	0	157	171	0

Table 4 EU imports of medicinal and aromatic plants, 1998-2000, US$ thousand / € thousand / tonnes

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	426,356	137,054	332,297	313,488	111,553	306,114	332,733	116,951
Extra-EU	303,257	108,953	218,893	206,503	85,773	199,117	216,432	90,785
Of which by								
Germany	161,756	53,399	102,865	97,042	42,258	87,427	95,029	44,241
France	68,601	26,261	63,525	59,929	23,674	51,275	55,734	23,403
Italy	52,245	14,795	45,443	42,871	12,582	44,661	48,545	12,721
United Kingdom	31,549	8,522	29,250	27,594	6,931	36,549	39,727	8,576
Spain	43,751	13,940	29,668	27,989	10,148	25,195	27,386	11,509
Belgium	n.a.	n.a.	22,348	21,083	5,984	19,211	20,881	5,090
Denmark	3,779	561	6,322	5,964	706	14,287	15,529	2,391
Ireland	13,350	3,880	11,460	10,811	3,233	11,100	12,065	3,104
Austria	11,268	4,255	6,878	6,489	1,874	5,840	6,348	1,786
Sweden	4,338	474	4,486	4,232	467	3,341	3,631	450
Portugal	2,085	362	2,337	2,205	529	2,168	2,357	516
Netherlands	2,210	940	2,048	1,932	1,030	1,492	1,622	866
Luxembourg	n.a.	n.a.	2,603	2,456	270	1,449	1,575	96
Greece	1,734	1,215	1,743	1,644	1,247	1,310	1,424	1,877
Finland	1,187	618	1,318	1,243	620	816	887	325
Belgium & Luxembourg	28,503	7,832	-	-	-	-	-	-

Table 5 EU imports of medicinal and vegetable saps and extracts, 1998-2000, US$ thousand / € thousand / tonnes

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	211,934	3,342	160,518	151,432	2,995	115,290	125,315	2,504
Extra-EU	57,605	973	36,517	34,450	498	31,380	34,109	718
Of which by								
Germany	90,446	1,498	60,873	57,427	1,550	45,667	49,638	876
Italy	51,355	809	47,335	44,656	682	24,052	26,143	583
France	37,031	432	21,447	20,233	325	17,117	18,605	393
Spain	14,366	133	14,395	13,580	69	10,303	11,199	176
Netherlands	3,664	75	2,556	2,411	45	4,686	5,094	114
Denmark	3,864	73	3,692	3,483	39	4,253	4,623	43
United Kingdom	2,209	47	1,756	1,657	44	2,840	3,087	122
Portugal	2,983	18	2,633	2,484	22	2,017	2,192	18
Belgium	n.a.	n.a.	2,740	2,585	125	1,793	1,949	72
Austria	1,144	37	1,508	1,423	55	1,162	1,263	36
Sweden	747	28	856	808	29	966	1,050	45
Finland	430	11	616	581	10	303	329	10
Greece	118	0	109	103	0	119	129	14
Ireland	315	50	3	3	0	15	16	2
Luxembourg	n.a.	n.a.	0	0	0	0	0	0
Belgium & Luxembourg	3,261	131	-	-	-	-	-	-

Table 6 EU imports of vegetable alkaloids, 1998-2000, US$ thousand / € thousand / tonnes

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	468,788	7,969	413,186	389,798	7,629	486,349	528,640	10,880
Extra-EU	218,323	2,266	179,765	169,590	1,824	245,446	266,789	2,601
Of which by								
United Kingdom	101,287	769	122,879	115,924	441	141,445	153,745	502
France	112,867	1,200	78,418	73,979	992	66,191	71,947	730
Italy	65,958	1,521	55,887	52,724	1,709	59,431	64,599	1,638
Germany	56,687	792	42,284	39,891	616	54,673	59,427	695
Netherlands	10,772	318	9,151	8,633	274	43,479	47,260	935
Spain	39,562	633	29,813	28,125	832	41,479	45,086	1,089
Ireland	33,850	2,134	30,594	28,862	2,157	28,942	31,459	1,962
Belgium	n.a.	n.a.	11,695	11,033	112	25,748	27,987	2,788
Austria	9,120	175	6,773	6,390	193	6,537	7,105	217
Denmark	9,228	159	9,551	9,010	133	6,236	6,778	161
Greece	5,310	16	4,206	3,968	25	4,259	4,629	14
Sweden	4,322	65	4,883	4,607	37	3,346	3,637	62
Portugal	4,785	27	4,880	4,604	66	3,314	3,602	73
Finland	2,423	43	2,092	1,974	42	1,182	1,285	12
Luxembourg	n.a.	n.a.	93	88	0	90	98	2
Belgium & Luxembourg	12,636	117	-	-	-	-	-	-

Table 7 EU exports of medicinal and aromatic plants, 1998-2000, US$ thousand / € thousand / tonnes

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	204,768	44,411	184,454	174,013	41,722	180,907	196,638	42,263
Extra-EU	74,950	14,239	66,617	62,846	14,731	67,723	73,612	13,596
Of which by								
Germany	76,357	16,519	65,268	61,574	16,127	55,449	60,271	14,300
France	44,734	9,087	45,577	42,997	9,203	52,308	56,856	9,950
Spain	17,098	4,170	19,144	18,060	4,652	17,637	19,171	5,826
Italy	16,313	4,044	16,506	15,572	3,758	14,244	15,483	3,599
Belgium	n.a.	n.a.	10,295	9,712	1,695	12,011	13,055	1,885
Austria	9,985	3,657	6,786	6,402	2,711	8,849	9,619	3,937
United Kingdom	9,533	804	6,425	6,061	607	5,834	6,341	568
Ireland	7,478	475	2,089	1,971	334	5,740	6,239	630
Sweden	3,750	49	3,592	3,389	37	4,155	4,516	44
Netherlands	6,152	1,692	6,190	5,840	1,532	3,040	3,304	962
Greece	1,626	1,085	1,567	1,478	889	831	903	392
Denmark	815	77	693	654	68	389	423	89
Luxembourg	n.a.	n.a.	63	59	16	256	278	11
Portugal	383	143	220	208	87	158	172	70
Finland	44	11	41	39	6	11	12	0
Belgium & Luxembourg	10,499	2,598	-	-	-	-	-	-

Table 8 **EU exports of medicinal and vegetable saps and extracts, 1998-2000, US$ thousand / € thousand / tonnes**

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	290,005	3,672	236,501	223,114	6,830	170,307	185,116	4,954
Extra-EU	138,584	1,875	103,349	97,499	1,220	71,398	77,607	1,084
Of which by								
Italy	85,589	784	77,885	73,476	755	54,343	59,069	705
Ireland	63,965	131	49,591	46,784	2,602	46,314	50,341	978
Germany	88,677	1,609	53,471	50,444	922	37,576	40,843	837
France	33,040	373	45,725	43,137	451	23,224	25,243	393
Spain	14,205	457	2,368	2,234	99	2,822	3,067	192
Austria	116	26	2,563	2,418	1,718	2,128	2,313	1,628
Netherlands	2,019	229	2,802	2,643	186	2,034	2,211	111
Belgium	n.a.	n.a.	1,358	1,281	76	1,072	1,165	44
United Kingdom	1,092	20	490	462	15	415	451	56
Denmark	223	3	64	60	0	239	260	2
Sweden	113	2	166	157	4	51	55	1
Portugal	16	0	5	5	1	45	49	5
Finland	6	0	15	14	1	44	48	2
Greece	0	0	0	0	0	0	0	0
Luxembourg	n.a.	n.a.	0	0	0	0	0	0
Belgium & Luxembourg	944	38	-	-	-	-	-	-

Table 9 **EU exports of vegetable alkaloids, 1998-2000, US$ thousand / € thousand / tonnes**

	1998		1999			2000		
	value US$	volume	value US$	value €	volume	value US$	value €	volume
Total	547,903	11,952	478,827	451,724	10,805	511,796	556,300	11,646
Extra-EU	302,586	7,323	284,817	268,695	6,643	321,952	349,948	7,596
Of which by								
Germany	307,089	8,042	248,140	234,094	7,272	278,737	302,975	8,621
Italy	83,270	1,012	66,228	62,479	982	68,496	74,452	842
United Kingdom	42,618	679	41,228	38,894	127	51,543	56,025	193
Spain	19,806	1,084	23,893	22,541	722	28,463	30,938	1,049
France	10,815	342	21,432	20,219	718	28,315	30,777	245
Belgium	n.a.	n.a.	9,169	8,650	147	25,069	27,249	67
Netherlands	9,200	254	12,391	11,690	106	17,302	18,806	330
Ireland	50,441	292	45,199	42,641	422	5,477	5,953	58
Austria	312	39	1,916	1,808	68	4,286	4,659	30
Denmark	1,590	98	1,225	1,156	94	2,832	3,078	113
Sweden	4,735	10	4,464	4,211	11	1,061	1,153	5
Portugal	172	0	218	206	0	134	146	0
Finland	4,012	31	3,314	3,126	135	88	96	93
Greece	0	0	14	13	1	0	0	0
Luxembourg	n.a.	n.a.	0	0	0	0	0	0
Belgium & Luxembourg	13,841	69	-	-	-	-	-	-

APPENDIX 2 STANDARDS ORGANISATIONS

INTERNATIONAL
The World Health Organization
Address: Avenue Appia 20, 1211 Geneva 27, Switzerland
Telephone: + 41 (0)22 7912111
Fax: + 41 (0)22 7913111
E-mail: info@who.int
Internet: www.who.org

EUROPEAN UNION
European Agency for the Evaluation of Medicinal Products (EMEA)
Address: 7 Westferry Circus, Canary Wharf, London E14 4HB, United Kingdom
Telephone: + 44 (0)171 418 8400
Fax: + 44 (0)171 418 8416
Internet: www.eudra.org

Comité Européen de Normalisation (CEN)
European Normalisation Committee.
Address: Third Countries Unit, Rue de Stassart 36, B-1050 Brussels, Belgium
Telephone: + 32 (0)2 5500811
Fax: + 32 (0)2 5500819
E-mail: infodesk@cenclcbel.be
Internet: www.cenorm.be

AUSTRIA
Österreichisches Normungsinstitut (ON)
Address: P.O. Box 130, A-1021 Vienna, Austria
Telephone: + 43 (0)1 213 00
Fax: + 43 (0)1 213 00 650
E-mail: infostelle@on-norm.at
Internet: www.on-norm.at

BELGIUM
Institut Belge de Normalisation (IBN)
Address: Avenue de la Brabanáonnelaan 29, B-1000 Brussels, Belgium
Telephone: + 32 (0)2 738 01 11
Fax: + 32 (0)2 733 42 64
E-mail: info@ibn.be
Internet: www.ibn.be

DENMARK
Dansk Standard (DS)
Address: Kollegievej 6, DK-2920 Charlottenlund, Denmark
Telephone: + 45 (0)39 96 61 01
Fax: + 45 (0)39 96 61 02
E-mail: dansk.standard@ds.dk
Internet: www.ds.dk

FINLAND
Suomen standardisoimisliito r.y. (SFS)
Address: P.O. Box 116, 00241 Helsinki, Finland
Telephone: + 358 (0)9 1499331
Fax: + 358 (0)9 1464925
E-mail: info@sfs.fi
Internet: http://www.sfs.fi

FRANCE
Association Française de Normalisation
Address: Tour Europe, 92049 Paris la Défense, France
Telephone: + 33 (0)1 42915555
Fax: + 33 (0)1 42915656
Internet: www.afnor.fr

GERMANY
Deutsches Institut für Normung eV (DIN)
Address: Postfach, D-10772 Berlin, Germany
Telephone: + 49 (0)30 2601 0
Fax: + 49 (0)30 2601 1231
E-mail: postmaster@din.de
Internet: www.din.de

GREECE
Hellenic Organisation for Standardisation
Address: 313 Acharnon, GR-1145 Athens, Greece
Telephone: + 30 (0)1 2120 100
Fax: + 30 (0)1 2286 219
E-mail: info@elot.gr
Internet: www.elot.gr

ITALY
Ente Nazionale Italiano di Unificazione (UNI)
Address: Via Battinotti Stassi 11B, I-20133 Milano, Italy
Telephone: + 39 02 700241
Fax: + 39 02 70106106
E-mail: uni@uni.unicei.it
Internet: www.unicei.it

IRELAND
National standards Authority of Ireland (NSAI)
Address: Glasnevin, Dublin 9, Ireland
Telephone: + 353 (0)1 8073800
Fax: + 353 (0)1 8073838
E-mail: nsai@nsai.ie
Internet: www.nsai.ie

LUXEMBOURG
Service de l'Energie de l'Etat (SEE)
Address: Département Normalisation, B.P. 10, L-2010 Luxembourg
Telephone: + 352 (0)46 97 46 1
Fax: + 352 (0)46 97 46 39
E-mail: see.normalisation@eg.etat.lu
Internet: www.etat.lu/see

THE NETHERLANDS
Nederlands Normalisatie Instituut (NNI)
Netherlands Standardisation Institute
Address: P.O.Box 5059, 2600 GB Delft, The Netherlands
Telephone: + 31 (0)15 2690390
Fax: + 31 (0)15 2690190
E-mail: info@nni.nl
Internet: www.nni.nl

PORTUGAL
Instituto Português Da Qualidade (Ipq)
Address: Rua António Gião, 2, P-2829-513 Caparica, Portugal
Telephone: + 351 (0)21 294 81 00
Fax: + 351 (0)21 294 81 01
E-mail: ipq@mail.ipq.pt
Internet: www.ipq.pt

SPAIN
Asociación Española de Normalización y Certificación (AENOR)
Address: Genova 6, 28004 Madrid, Spain
Telephone: + 34 (0)91 4326000
Fax: + 34 (0)91 3104032
E-mail: info@aenor.es
Internet: www.aenor.es

SWEDEN
Standardiseringen i Sverige (SIS)
Address: P.O. Box 6455, 11381 Stockholm, Sweden
Telephone: + 46 (0)8-6103000
Fax: + 46 (0)8-307757
E-mail: info@sis.se
Internet: www.sis.se

UNITED KINGDOM
British Standards Institution (BSI)
Address: 389 Chiswick High Road, London W4 4AL, United Kingdom
Telephone: + 44 (0)208 996 90 00
Fax: + 44 (0)208 996 74 00
E-mail: info@bsi.org.uk
Internet: www.bsi.org.uk

APPENDIX 3 SOURCES OF PRICE INFORMATION

International Trade Centre (ITC)
MNS Medicinal Plants & Extracts
Address: Palais des Nations, P. O. Box 10,
1211 Geneva 10, Switzerland
Telephone: + 41 (0)22 7300111
Fax: + 41 (0)22 7334439
E-mail: itcreg@intracen.org
Internet: www.intracen.org

Agra Europe Ltd.
publisher of 'The Public Ledger'
Address: 80 Calverly Road, Turnbridge Wells, Kent,
TN1 2 UN, United Kingdom
Telephone: + 44 (0)1892 533813
Fax: + 44 (0)1892 544895
E-mail: marketing@public-ledger.com
Internet: www.public-ledger.com

INTERNET
Herb crop shop
(at Herb Growing and Marketing Network)
www.herbworld.com/cropshop

Sites for retail prices for herbal materials include:
- www.herbmarket.com/
- http://libertynatural.com

APPENDIX 4 TRADE ASSOCIATIONS

AESGP Association of the European Self-Medication Industry
(At the site you can find contact details of EU national organisations)
Address: 7 Avenue de Tervuren, B-1040 Brussels, Belgium
Telephone: + 32 (0)2 735 51 30
Fax: + 32 (0)2 735 52 22
E-mail: info@aesgp.be
Internet: www.aesgp.be

European Federation of Pharmaceucial Industries and Associations
Address: Avenue Louise, 250, Box 91, B-1050 Brussels, Belgium
Telephone: + 32 (0)2 626 25 55
Fax: + 32 (0)2 626 25 66
E-mail: info@efpia.org
Internet: www.efpia.org

The European Pharmaceutical Wholesaler Association (GIRP)
Address: Avenue de Broqueville 40. B-1200 Brussels, Belgium
Telephone: + 32 (0)2 777 9977
Fax: + 32 (0)2 777 3601
E-mail: euro.keys@euro-keys.com
Internet: www.girp.org or www.euro-keys.com

A source of useful addresses is the Internet site of GIRP (The European Association of Pharmaceutical Wholesalers) (http://www.girp.org/).

European Scientific Cooperative on Phytotherapy (ESCOP)
Address: Argyle House, Gandy Street, Exeter, Devon, EX4 3LS, United Kingdom
Telephone: + 44 (0)1392 424626
Fax: + 44 (0)1392 424864
Internet: www.exeter.ac.uk/phytonet/escop.html

Naredi
Federation
Address: Zavelput 7, 1000 Brussel, Belgium
Telephone: + 32 (0)2 2186679
Fax: + 32 (0)2 2177900
Email: info@naredi.be
Internet: www.naredi.be

Nehoma
Association of Netherlands producers and importers of phytomedicines
Address: Uiterwaardenstraat 13, 8081 HJ Elburg, The Netherlands
Telephone: + 31 (0)525 686 001
Fax: + 31 (0)525 685 905
Email: info@nehoma.nl
Internet: www.nehoma.nl

Neprofarm
Association of the Netherlands Self-Medication Industry
Address: P.O. Box 27, 1270 AA Huizen, The Netherlands
Telephone: + 31 (0)35 6970821
Fax: + 31 (0)35 6970822
E-mail: info@neprofarm.nl
Internet: www.neprofarm.nl

Natuur & Gezondheidsproducten Nederlands (NPN)
Address: P.O. Box 373, 3850 AJ Ermelo, The Netherlands
Telephone: + 31 (0)341 554023
Fax: + 31 (0)341 561772
E-mail: secretariaat@natuur-gezondheidsproducten.nl
Internet: www.natuur-gezondheidsproducten.nl/

APPENDIX 5 TRADE FAIR ORGANISERS

Bio Fach
Ökowelt TMBH
Address: Industriestrasse 12, 91186 Büchenbach, Germany
Telephone: + 49 (0)91 714011
Fax: + 49 (0)91 714016
Internet: www.biofach.de

In December 2001, Bio Fach will also be held in Tokyo, Japan. For more information please refer to: www.nuernbergglobalfairs.com/va/BIOFACHJapan/e/index.html

CPhI
Address: P.O. Box 200, 3600 AE Maarssen, The Netherlands
Telephone: + 31 (0)346 559444
Fax: + 31 (0)346 573811
E-mail: exponl@ibm.net
Internet: www.cphi.com

FIE
Address: P.O. Box 200, 3600 AE Maarssen, The Netherlands
Telephone: + 31 (0)346 559444
Fax: + 31 (0)346 573811
E-mail: exponl@ibm.net
Internet: www.fi-events.com

Health Ingredients Europe
Address: P.O. Box 200, 3600 AE Maarssen, The Netherlands
Telephone: + 31 (0)346 559444
Fax: + 31 (0)346 573811
E-mail: exponl@ibm.net

Natural Products Expo Europe
Telephone: + 44 (0)20 8232 1600
Fax: + 44 (0)20 8232 1622
Internet: www.expoeurope.com

Natural Products Expo Asia
Telephone: + 852 3402 5005
Fax: + 852 2857 6144
Internet: www.naturalproductsexpo.com

IN-COSMETICS
Address: Reed Exhibition, Oriel House, 26 The Quadrant, Richmond, Surrey, TW9 1DL, United Kingdom
Telephone: + 44 (0)181 9107878
Fax: + 44 (0)181 9107813
Internet: www.in-cosmetics.co.uk/page.cfm

SANA
Exhibition of Health Food, Health and Environment
Address: Illaria Borri, Via San Vittore 14, I-20123 Milan, Italy
Telephone: + 39 02 86451087
Fax: + 39 02 86453506
E-mail: fierecom@starlink.it
Internet: www.sana.it

Vitafoods International Ltd.
Address: McLaren House, St. Georges Road, Truro Cornwall TR1 3JE, United Kingdom
Telephone: + 44 (0)1872 263 682
Fax: + 44 (0)1872 263 689
Email: vitafoods@macace.co.uk
Internet: www.vitafoods.co.uk

APPENDIX 6 TRADE PRESS

GERMANY

Drogenreport

Addresss: Artemisia e.V., Straße am Westbahnhof, 06556 Artern/Thüringen, Germany
Telephone: + 49 (0)3466 3256-14
Fax: + 49 (0)3466 3256-20

Zeitschrift für Arznei- und Gewürzpflanzen

Addresss: Agrimedia GmbH, Spithal 4, D- 29468 Bergen/Dumme, Germany
Telephone: + 49 (0)5845 9881-0
Fax: + 49 (0)5845 9881-11
E-mail: mail@agrimedia.com
Internet: www.agrimedia.com

ITALY

AGROfoodINDUSTRY

Addresss: Teknoscienze, Via Aurelio Saffi 23, 20123 Milan, Italy
Telephone: + 39 02 4818011
Fax: + 39 02 4818070
E-mail: mickycar@tin.it
Internet: www.teknoscienze.com

Fitoterapia

Addresss: Indena S.p.A. - Viale Ortles, 12 - 20139 Milano, Italy
Telephone: + 39 02 5749 61
Fax: + 39 02 5740 4620
E-mail: indenami@tin.it
Internet: www.indena.it/fitotrp.htm

UNITED KINGDOM

European Journal of Herbal Medicine
National Institute of Medical Herbalists

Addresss: 56 Longbrook Street, Exeter, Devon EX4 6AH, United Kingdom
Telephone: + 44 (0)1392 426022
Fax: + 44 (0)1392 498963
E-mail: editor@ejhm.co.uk
Internet: www.ejhm.co.uk

Nutraceuticals International

Addresss: 54-55 Wilton Road, London SW1V 1DE, United Kingdom
Telephone: + 44 (0)20 7828 7272
Fax: + 44 (0)20 7828 0415
E-mail: editorial@marketletter.com

Review of Aromatic and Medicinal Plants

Address: CAB International, Wallingford Oxfordshire, OX10 8DE, United Kingdom
Telephone: + 44 (0)1491 832111
Fax: + 44 (0)1491 833508
E-mail: cabi@cabi.org
Internet: http://hort.cabweb.org/Aromatic/ramphome.htm

INTERNATIONAL

Herbalgram American Botanical Council

Addresss: P.O.Box 144 345, Austin, TX 78714-4345, USA
Telephone: 1-512-926-4900
Fax: 1-512-926-2345
Internet: www.herbalgram.org

Journal of Herbs, Spices & Medicinal Plants

Address: The Haworth Herbal Press, 10 Alice Street, Binghamton, New York 13904-1580, USA
Telephone: + 1 607 722 5857
Fax: + 1 607 722 6362
E-mail: getinfo@haworthpressinc.com
Internet: www.haworthpressinc.com

Nutrition Business Journal

Address: P.O. Box 371769, San Diego, CA 92116-1769, USA
Telephone: + 1 619 295 7685
Fax: + 1 619 295 5743
E-mail: info@nutritionbusiness.com
Internet: www. nutritionbusiness.com

An interesting source of magazines in the field of medicinal herbs is www.herbnet.com/press_p5.htm

APPENDIX 7 BUSINESS SUPPORT ORGANISATIONS

INTERNATIONAL
International Trade Centre (ITC)
Address: Palais des Nations, P. O. Box 10, 1211 Geneva 10, Switzerland
Telephone: + 41 (0)22 7300111
Fax: + 41 (0)22 7334439
E-mail: itcreg@intracen.org
Internet: www.intracen.org

AUSTRIA
Austrian Federal Economic Chamber
Address: P.O. Box 150, A-1045 Vienna, Austria
Telephone: + 43 (0)1 501050
Fax: + 43 (0)1 50105-150
E-mail: aw-online@aw.wk.or.at
Internet: www.wk.or.at

DENMARK
DIPO, Danish Import Promotion Office for Products from Developing Countries
Address: Danish Chamber of Commerce, Børsen, 1217 Copenhagen K, Denmark
Telephone: + 45 (0)33 950541
Fax: + 45 (0)33 120525
E-mail: dipo@commerce.dk
Internet: www.dipo.dk

Germany
BfAI, Federal Office of Foreign Trade Information
Address: Agrippastrasse 87-93, P. O. Box 100522, 50455 Cologne, Germany
Telephone: + 49 (0)221 2057-0
Fax: + 49 (0)221 2057-212
E-mail: bfai@geod.geonet.de
Internet: www.bfai.com/home_b3.htm

ITALY
ICE, National Institute for Foreign Trade
Address: Via Liszt 21, P.O. Box 10057, 00144 Rome, Italy
Telephone: + 39 06 59921
Fax: + 39 06 5964 7438
E-mail: coopint@ice.it
Internet: www.ice.it

THE NETHERLANDS
CBI, Centre for the Promotion of Imports from developing countries
Address: P. O. Box 30009, 3001 DA Rotterdam, The Netherlands
Telephone: + 31 (0)10 2013434
Fax: + 31 (0)10 4114081
E-mail: cbi@cbi.nl
Internet: www.cbi.nl

NORWAY
Norad, Norwegian Agency for Development Co-operation
Address: Ruseløkkveien 26, P. O. Box 8034 Dep., 0030 Oslo, Norway
Telephone: + 41 (0)22 314400
Fax: + 41 (0)22 314403
Internet: www.norad.no

SWEDEN
SIDA, Swedish International Development Co-operation Agency - Department for Infrastructure & Economic Co-operation
Address: Sveavägen 20, S-105 25 Stockholm, Sweden
Telephone: + 46 (0)8 6985000
Fax: + 46 (0)8 6208864
E-mail: sida@sida.org.se
Internet: www.sida.se

SWITZERLAND
SIPPO, Swiss Import Promotion Programme
Address: Stampfenbachstrasse 85, CH-8035 Zurich, Switzerland
Telephone: + 41 (0)1 365 5200
Fax: + 41 (0)1 365 5202
E-mail: info@sippo.ch
Internet: www.sippo.ch

APPENDIX 8 OTHER USEFUL ADDRESSES

CBI/Accesguide
(CBI's database on European non-tariff trade barriers)
Address: P.O. Box 30009, 3001 DA Rotterdam, The Netherlands
Telephone: + 31 (0)10 2013434
Fax: + 31 (0)10 4114081
Email: cbi@accessguide.nl
Internet: www.cbi.nl/accessguide

Committee for the Assessment of Phytomedicines
Address: Van Hoornestraat 2, 2581 VG Den Haag, The Netherlands
Telephone: + 31 (0)70 3587528
Fax: + 31 (0)70 3587528
Internet: www.ctf.nl

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
Address: International Environment House, 15, chemin des Anémones, CH-1219 Châtelaine-Geneva, Switzerland.
Telephone: + 41 (0)22 917 8139/40
Fax: + 41 (0)22 797 3417
E-mail: cites@unep.ch
Internet: www.cites.org

FI Data Services (www.ingridnet.com)
Address: MK Distribution Centre, Bradbourne Drive, Tilbrook, Milton Keynes MK7 8BN, United Kingdom
Telephone: + 44 (0)1908 365200
Fax: + 44 (0)1908 265252
E-mail: fids@btinternet.com
Internet: www.ingridnet.com

Earthscan Publication Ltd.
Address: 120 Pentonville Road, London, N1 9 JN, United Kingdom
Telephone: + 44 (0)20 7278 0433
Fax: + 44 (0)20 7278 1142
E-mail: earthinfo@earthscan.co.uk
Internet: www.earthscan.co.uk

European Advisory Services (EAS)
Avisory company specialising in European and international food and nutrition policy (incl. herbal supplements).
Address: 50, Rue de l'Association, B-1000 Brussels, Belgium
Telephone: + 32 (0)2 218 1470
Fax: + 32 (0)2 219 7342
E-mail: info@icmap.org
Internet: www.eas.be

European Directorate for the Quality of Medicine
Address: Council of Europe, B.P. 907, F-67029 Strasbourg, France
Telephone: + 33 (0)3 88 41 28 83
Fax: + 33 (0)3 88 41 27 71
E-mail: info@pheur.org
Internet: www.pheur.org

Forest Stewardship Council (FSC)
Address: Ac Avenida Hidalgo 502, 68000 Oaxaca, Mexico
Telephone: + 52 (0)951 46905
Fax: + 52 (0)951 62110
Email: fscoax@fscoax.org
Internet: www.fscoax.org

GTZ Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
Address: Dag-Hammarskjöld-Weg 1-5, 65760 Eschborn, Germany
Telephone: + 49 (0)6196 79-0
Fax: + 49 (0)6196 79-1115
E-mail: postmaster@gtz.de
Internet: www.gtz.de

International Chamber of Commerce
Address: 38, Cours Albert 1er, 75008 Paris, France
Telephone: + 33 (0)1 4953 2828
Fax: + 33 (0)1 4953 2942
E-mail: icc@iccwbo.org
Internet: www.iccwbo.org

Netherlands Association for Phytotherapy
Address: Rijksstraatweg 158, 6573 DG Beek-Ubbergen, The Netherlands
Telephone: + 31 (0)24 6844301
Fax: + 31 (0)24 6844301
Email: nvf@fyto.nl
Internet: www.fyto.nl

Skal *(internationally operating organisation, inspecting and certifying sustainable agricultural production methods and products)*
Address: P.O. Box 384, 8000 AJ Zwolle, The Netherlands
Telephone: + 31 (0)38 4268181
Fax: + 31 (0)38 4213063
E-mail: info@skal.com
Internet: www.skal.com

Traffic Europe *(joint wildlife trade monitoring programme of WWF and IUCN)*

Address: Waterloosteenweg 608, 1050 Brussels, Belgium
Telephone: + 32 (0)2 343 8258
Fax: + 32 (0)2 343 2565
E-mail: traffic_europe@compuserve.com
Internet: www.traffic.org

International Council for Medicinal And Aromatic Plants

Address: 51 Boulevard de Montmorency, F-75016 Paris, France
E-mail: info@icmap.org
Internet: www.icmap.org

APPENDIX 9 LIST OF DEVELOPING COUNTRIES

The list of developing countries as applied in this market survey, is the OECD DAC list of countries receiving Official Development Assistance (Part I). The list used is the one as at 1/1/2000.

Afghanistan
Albania
Algeria
Angola
Anguilla
Antigua and Barbuda
Argentina
Armenia
Azerbaijan
Bahrain
Bangladesh
Barbados
Belize
Benin
Bhutan
Bolivia
Bosnia & Herzegovina
Botswana
Brazil
Burkina Faso
Burundi
Cambodia
Cameroon
Cape Verde
Central African rep.
Chad
Chile
China
Colombia
Comoros
Congo, Dem. Rep
Congo, Rep.
Cook Islands
Costa Rica
Côte d'Ivoire
Croatia
Cuba
Djibouti
Dominica
Dominican republic
Ecuador
Egypt
El Salvador
Equatorial Guinea
Eritrea
Ethiopia
Fiji
Gabon
Gambia
Georgia
Ghana
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
India
Indonesia
Iran
Iraq
Jamaica
Jordan
Kazakstan
Kenya
Kiribati
Korea, Rep. of
Kyrghyz Rep.
Laos
Lebanon
Lesotho
Liberia
Macedonia
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Marshall Islands
Mauritania
Mauritius
Mayotte
Mexico
Micronesia, Fed. States
Moldova
Mongolia
Montserrat
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Nicaragua
Niger
Nigeria
Niue
Oman
Pakistan
Palau Islands
Palestinian Admin. Areas
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Rwanda
São Tomé & Principe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Slovenia
Solomon Islands
Somalia
South Africa
Sri Lanka
St. Helena
St. Kitts-Nevis
St. Lucia
St. Vincent and Grenadines
Sudan
Surinam
Swaziland
Syria
Tajikistan
Tanzania
Thailand
Timor
Togo
Tokelau
Tonga
Trinidad & Tobago
Tunisia
Turkey
Turkmenistan
Turks & Caicos Islands
Tuvalu
Uganda
Uruguay
Uzbekistan
Vanuatu
Venezuela
Vietnam
Wallis & Futuna
Western Samoa
Yemen
Yugoslavia, Fed. Rep.
Zambia
Zimbabwe

Note: Eurostat figures do not include figures for Cook Islands, Niue, St. Kitts-Nevis, Timor and Tokelau

APPENDIX 10 LIST OF NETHERLANDS IMPORTERS AND MOST IMPORTANT EU IMPORTERS

NETHERLANDS

American Sport

Manufacturer of food supplements, interest in plant extracts.

Address: P.O. Box 2783, 1000 CT Amsterdam, The Netherlands
Telephone: + 31 (0)20 4350010
Fax: + 31 (0)20 4350018
E-mail: info@vitamins.nl
Internet: www.vitamins.nl

Arnold Suhr Nederland International B.V.

Medicinal and aromatic plants, powdered extracts, natural colours.

Address: P.O. Box 6024, 3600 HA Maarssen, The Netherlands
Telephone: + 31 (0)30 2481010
Fax: + 31 (0)30 2414636
E-mail: sales.dept.purchase@arnoldsuhr.nl
Internet: www.arnoldsuhr.nl

Banner Pharmacaps Europe B.V.

Manufacturer of food supplements, imports raw materials via agents.

Address: P.O. Box 5037, 5004 EA Tilburg, The Netherlands
Telephone: + 31 (0)13 4624100
Fax: + 31 (0)13 4624124
E-mail: info@banpharm.com
Internet: www.banpharm.com

Biohorma

Raw plant material and plant extracts.

Address: P.O. Box, 8080 AA Elburg, The Netherlands
Telephone: + 31 (0)525 687200
Fax: + 31 (0)525 683932
E-mail: info@biohorma.nl
Internet: www.biohorma.nl

Caldic Chemie B.V.

Works via partnerships and representation, the natural products part of their business is modest, plant extracts (ginseng, ginkgo biloba).

Address: P.O. Box 21122, 3001 AC Rotterdam, The Netherlands
Telephone: + 31 (0)10 4136420
Fax: + 31 (0)10 4047458
E-mail: verkoop@caldic.nl
Internet: www.caldic.nl

Jan Dekker International B.V.

Plant extracts.

Address: P.O. Box 10, 1520 AA Wormerveer, The Netherlands
Telephone: + 31 (0)75 6479999
Fax: + 31 (0)75 6403830
E-mail: jandekkernl@jandekker.com
Internet: www.jandekker.com

BELGIUM

ORFFA Belgium Pharma B.V.

Provide a range of value-added specialist products to the feed industry.

Address: Industriepark, Ambachtsstraat 6, B-1840 Londerzeel, Belgium
Telephone: + 32 (0)52319519
Fax: + 32 (0)52304275
Internet: www.orffa.be

FRANCE

Arkopharma

Health care with plants.

Address: Laboratories Pharmaceutiques, BP 28, F-06511 Carros Cedex, France
Telephone: + 33 (0)4 9329 1128
E-mail: info@arkopharma.com
Internet: www.arkopharma.com

Berkem

Pure chemistry and vegetable extraction for pharmaceutical. cosmetical and food industry.

Address: “Le Marais Quest”, F-24680 Gardonne, France
Telephone: + 33 (0)5 5363 8106
Fax: + 33 (0)5 5327 0345
E-mail: berkem@berkem.com
Internet: www.berkem.com

Guayapi tropical

Raw material importation, formulations in France, worldwide trade and exclusive distributions.

Address: 55, Rue Traversière, 75012 Paris, France
Telephone: + 33 (0)1 4346 5243
Fax: + 33 (0)1 4346 1898
E-mail: info@ guayapi.com
Internet: www.guayapi.com

GERMANY

Alfred Galke
Address: Postfach 1120, 37535 Gittelde, Germany
Telephone: + 49 (0)5327 86810
Fax: + 49 (0)5327 5420
E-mail: info@galke.com
Internet : www.galke.com

Bionorica Arzneimittel GmbH
Phytotherapy.
Address: Kerschensteinerstr. 11-15, D-92318 Neumarkt, Germany
Telephone: + 49 (0)9181 23190
Fax: + 49 (0)9181 231265
E-mail: info@bionorica.de
Internet: www.bionorica.de

Buchler GmbH
Trading house for quinine
Address: Harxbütteler Straße 3, D-38110 Braunschweig, Germany
Telephone: + 49 (0)5307 93121
Fax: + 49 (0)5307 93131
E-mail: reineche@buchler-gmbh.com
Internet: www.quinine-buchler.com

Cealo (Caesar & Lorentz)
Address: Herderstrasse 31, 40721 Hilden, Germany
Telephone: + 49 (0)2103 49940
Fax: + 49 (0)228 4220593
E-mail: info@cealo.de

DHU
Homeopathy
Address: Postfach 410280, 76202 Karlsruhe, Germany
Telephone: + 49 (0)721 409301
Fax: + 49 (0)721 4093263
E-mail: info@dhu.de
Internet: www.dhu.de

Finzelberg
Bio-extracts for the pharmaceutical industry.
Address: Koblenzer Str. 48-56, Andernach, 56626, Germany
Telephone: + 49 (0)2632 9240
Fax: + 49 (0)2632 924040
E-mail: welcome@finzelberg.de
Internet: www.finzelberg.de

Gehrlicher
Produce all galeric forms of phyto-extracts from more than 400 medicinal and useful plants for the pharmaceutical cosmetic and food industry.
Address: Robert-Koch Str. 5, Eurasburg, 82547, Germany
Telephone: + 49 (0)8179 8015
Fax: + 49 (0)8179 778
E-mail: gehrlicher.extracts@t-online.de
Internet : www.gehrlicher.de

General Extract Products
Manufactures and sells botanical extracts utilised as ingredients in the production of food, health and pharmaceutical products.
Address: Brauereiweg 19, Flensburg, 24939, Germany
Telephone: + 49 (0)461 4902076
Fax: + 49 (0)461 4902077
E-mail: generalextractproducts@t-online.de
Internet: www.generalextractproducts.com

Kaden Biochemicals GmbH
Botanical substances, rare sugars and special extracts.
Address: Porgesring 50, D-22113 Hamburg, Germany
Telephone: + 49 (0)40 736045-0
Fax: + 49 (0)40 736045-45
E-mail: kaden.bio@t-online.de
Internet: www.kaden.de

Henry Lamotte GmbH
Trading house for quinine.
Address: P.O. Box 103849, D-28038 Bremen, Germany
Telephone: + 49 (0)421 5239-0
Fax: + 49 (0)421 5239-199
E-mail: info@lamotte.de
Internet: www.lamotte.de

Lichtwer Pharma AG
Pharmaceutical producer, specialising in plant remedies-phytopharmaceuticals.
Address: Wallenroder Str. 8-10, 13435 Berlin, Germany
Telephone: + 49 (0)30 40370-0
Fax: + 49 (0)30 40370103
Internet: www.lichtwer.de

Madaus AG
Development and manufacture of modern phytopharmaceuticals.
Address: Ostmerheimer Str. 198, 51109 Köln, Germany
Telephone: + 49 (0)221 8998-0
Fax: + 49 (0)221 8998-701
E-mail: info@madaus.de
Internet: www.madaus.de

Martin Bauer GmbH & Co. KG
Bio-extracts for the pharmaceutical industry.
Address: Dutendorfer Str. 5-7,
D-91487 Vestenbergsgreuth, Germany
Telephone: + 49 (0) 9163-88-0
Fax: + 49 (0) 9163-88-312
E-mail: welcome@martin-bauer.de
Internet: www.martin-bauer.de

Ratiopharm GmbH
Medicins.
Address: Graf-Arco-Str. 3, 89079 Ulm, Germany
Telephone: + 49 (0)731 40202
Fax: + 49 (0)731 402532
E-mail: info@ratiopharm.de
Internet: www.ratiopharm.de

Salus-Haus
Address: Bahnhofstrasse 24, D-83052 Bruckmühl, Germany
Telephone: + 49 (0)8062 9010
Fax: + 49 (0)8062 9147
E-mail: info@salus.de
Internet: www.salus.de

Spreewald-Pharma GmbH
Phytopharmaceuticals.
Address: Kuschkower Straße 9, D-15910 Gröditsch, Germany
Telephone: + 49 (0)761 4909161
Fax: + 49 (0)761 4909125
E-mail: info@spreewald-pharma.de
Internet: www.spreewald-pharma.de

Weleda AG
Medicins and skincare products.
Address: Postfach 1320, 73503 Schwäbisch Gmünd, Germany
Telephone: + 49 (0)7171 919-414
Fax: + 49 (0)7171 919-424
E-mail : dialog@weleda.de
Internet: www.weleda.de

ITALY
Aboca di V. Mercati s.s. Az. Agraria
Address: Loc. Aboca 20, I-52037 Sansepolcro (AR), Italy
Telephone: + 39 0575 7461
Fax: + 39 0575 749130
E-mail: info@aboca.it
Internet: www.aboca.it

Bonomelli Srl
Address: Via Mattei 6, 40069 Zola Predosa (Bologna), Italy
Telephone: + 39 051 6170 411
Fax: + 39 051 750 571
E-Mail: info@bonomelli.it
Internet : www.bonomelli.it

Hammer Pharma
Herbal extracts.
Address: Via Galileo Ferraris 44, Caronno Pertusella, 21042, Italy
Telephone: + 39 02 9665121
Fax: + 39 02 96651250
E-mail: hammer@hammerpharma.it
Internet: www.hammerpharma.it

Indena
Address: Viale Ortles No. 12, Milan 20139, Italy
Telephone: + 39 02 574961
Fax: + 39 02 57496290
Internet: www.indena.it

SPAIN
Extractos Natra
Producer of plant extracts, imports raw material mainly from West Africa.
Address: Camino de los Hornillos s/n,
46930 Quart de Poblet, Valencia, Spain
Telephone: + 34 (0)96 1920851/52
Fax: + 34 (0)96 1920445
Internet: www.natra-group.com

Laboratorios Dr. Vinyals S.A.
Address: C/Granada, 21-25, ES-08740 Sant Andreu de la Barca, Spain
Telephone: + 34 (0)93 682 06 68
Fax: + 34 (0)93 682 16 47
E-mail: lab@vinyals.com
Internet: www.vinyals.com

UNITED KINGDOM
de Blac and Associates
Interest in trading with primary producers and refiners of any natural products.
Address: West Wing, Flint Hill House, Winwick, Northants NN6 7PA, United Kingdom
Telephone: + 44 (0)1788 510058
Fax: + 44 (0)1788 510057
E-mail: sales@deblac.com
Internet: www.deblac.com

Buckton Scott Group (B.S.G.)
Multi-national organisation active in manufacturing.
Address: Black Horse House, Bentalls,
Pipps Hill Estate, Basildon, Essex, SS14 3BX,
United Kingdom
Telephone: + 44-(0)1702 560600
Fax: + 44 (0) 1702 560606
E-mail: info@buckton.co.uk
Internet: www.buckton.com

StanChem International
Trading house for quinine.
Address: 4, Kings Road, Reading, RG1 3AA,
United Kingdom
Telephone: + 44 (0)118 958 0247
Fax: + 44 (0)118 958 9580
E-mail: info@stanchem.co.uk
Internet: www.stanchem.co.uk

Vitabiotics Ltd.
Interest in plant extracts.
Address: Beresford Avenue, Wembley,
Middlesex HA0 1NU, United Kingdom
Telephone: + 44 (0)20 8902 4455
Fax: + 44 (0)20 8902 4466
E-mail: enquiries@vitabiotics.com
Internet: www.vitabiotics.com

APPENDIX 11 USEFUL INTERNET SITES

www.cites.org
CITES has a membership of 152 countries. These countries act by banning commercial international trade in an agreed list (Appendix I) of endangered species (including plants) and by regulating and monitoring trade in others (Appendix II) which might become endangered. Around 200 medicinal plants species have been added to CITES appendices. At this site, one can find an up-to-date overview of the Appendices I and II.

www.wisia.de
WISIA-online helps identify the protection status of a given plant or animal species. The site presents a general view of the diverse field of species conservation legislation.

http://dg3.eudra.org
This site is operated by the European Commission -DG III-E-3 on Pharmaceuticals and Cosmetics. The site includes information on the rules governing pharmaceuticals in the European Union, addresses of those involved in the EU pharmaceutical sectors and documents released for consultation or for information. At the site, you can find the comparative study "Herbal medicinal products in the European Union". (http://dg3.eudra.org/pharmacos/comdoc_doc.htm).

www.europages.com
This site includes contact details of companies in the sector Chemicals and Pharmaceuticals. Interesting subcategories include: Herbs for medicines and cosmetics, and Import-export – chemicals and pharmaceuticals.

www.nfm.healthwell.com
Provides access to a broad range of information on the natural product industry.

www.herbalgram.org
This site contains information about herbal education research, literature (e.g. The Herbal Education Catalog containing some 400 items available with additional titles added on a regular basis), and German Commission E Monographs.

www.herbs.org
A comprehensive site for herb information, featuring the latest scientific, political, business and international news from the world of herbs. You can browse to recommended links, view herbs in the photo gallery, speak out on herbal topics and ask herb questions online. Herb "Greenpapers" highlight specific herbs and their medicinal uses.

www.herbnet.com
The home page of the Herb Growing and Marketing Network. The site includes a herb crop shop, which is a message board where growers and buyers of botanicals can come together (www.herbworld.com/cropshop/).

www.escop.com/phytonet.htm
The site provides an information resource (e.g. legislative issues and useful contacts) for those involved in the development, manufacture, regulation and surveillance of phytomedicines and herbal drugs.

www.fao.org/forestry/fop/fopw/nwfp/nwfp-e.stm
This site is operated by FAO's Forest Products Division and includes information about Non-wood Forest Products (NWFP), a database with organisations active in the field of NWFPs, information about relevant publications and projects. At the site, one can read the Non-wood News, which is an annual newsletter.

www.inaro.de
This site contains information in German and French on raw materials, including Medicinal and aromatic plants. It includes a detailed overview of 'Good Agricultural Practice of Medicinal and Aromatic Plants' and a marketplace where buyers and sellers of raw material can meet.

www.mca.gov.uk
The site of the UK Medicine Control Agency includes information on the policy on herbal medicine. A version of a preliminary version by The European Commission of a possible directive on traditional medicinal products of April 2001 is available.

APPENDIX 12 ITC LIST OF PLANTS

INDICATIVE LIST OF PLANTS CONTAINING BIOLOGICALLY ACTIVE CONSTITUENTS THAT ARE PROCESSED INDUSTRIALLY FOR LOCAL AND INTERNATIONAL MARKETS

Name of plant	Part of the plant used	Product	Availability	Region				Method of production a/	Market potential	
			Cultivated	Wild	Africa	Latin America &Caribbean	Asia		Local	Export
Acacia arabica) Acacia senegal)	Stem	Gum		+	+	.	+	.	+	++
Aconitum spp.	Root	Total extract		+	.	.	+	AE	+	+
Acorus calamus	Rhizome	Essential oil and crude drug		+	.	.	+	SD	+	++
Aesculus hippocastanum	Seeds	Aescin and total extract	+	+	.	.	+	AE	+	++
Agave sisalana	Juice	Hecogenin	+	.	+	+	+	SE	+	++
Aloe spp.	Leaf juice	Aloin	+	+	+	+	.	.	+	++
Ammi majus	Seeds	Xanthotoxin	+	+	+	.	+	SE	+	++
Ammi visnaga	Fruits	Visnagin,khellin	.	+	+	+	.	AE	+	++
Anonum subolatum	Fruits	Essential oil	+	+	+	.	+	SD	+	++
Anonum xanthioides	Fruits	Essential oil	+	+	+	.	+	SD	+	++
Andira araroba	Stem wood	Total extract	.	+	+	+	.	AE	.	+
Anethum spp.	Fruit	Essential oil	+	.	.	+	+	SD	+	+
Artemisia annua	Whole plant	Artemisinine	+	+	.	.	+	SE	+	++
Artemisia maritima	Flowering tops	Santonin	.	+	+	.	+	SE	+	+
Asclepias curassavica	Whole plant	Cardenolides	+	+	+	+	.	SE	+	++
Atropa belladonna) A.acuminata)	Leaf and roots	Tropane alkaloids	+	.	.	.	+	AE	++	++
Berberis aristata	Root,stem-bark	Berberine	.	+	.	.	+	WE	+	++
B.asiatica	Root,stem-bark	Berberine	.	+	.	.	+	WE	+	++
B.lycium	Root,stem-bark	Berberine	.	+	.	.	+	WE	+	++
Brivia almoides	Stem-bark	Crude drug	.	+	.	.	+	.	+	+
Boerharia diffusa	Whole plant,root	Boerhavic acid	+	+	+	.	.	AE	+	+
Capsicum annum	Fruits	Capsaicin,oleoresin	+	.	+	+	+	SE	+	+
Carica papaya	Fruit latex	Papain	+	.	+	+	+	WE,AE	+	+
Carum carvi	Fruit	Essential oil	+	.	+	.	+	SD	+	++
Cassia acutifolia	Leaves ,pods	Sennosides	.	+	+	+	+	AE	+	++
C.angustifolia	Leaves,pods	Sennosides	+	.	.	.	+	AE	+	++
C.italica	Leaves, pods	Sennosides	.	+	+	.	.	AE	+	
Catharanthus roseus	Leaves,roots	Vinblastine,vincristine taubasine	+	+	+	+	+	SE	+	++
Centella asiatica	Whole plant	Asiaticoside	+	+	+	.	+	AE	+	++
Cephaelis ipecacuanha)Roots C.acuminata)		Emetine	+	.	.	+	+	SE	+	++
Ceratonia silique	Fruit	Total extract	+	+	+	.	.	AE	+	++
Chenopodium ambrosioides	Flowering top and whole plant	Essential oil	+	+	+	+	+	SD	+	
Cinchona spp. and others	Stem and root bark	Quinine,quinidine	+	+	+	+	+	SE	++	++
Coriandrum sativum	Seeds	Essential oil,oleoresin	+	+	.	.	+	SD,SE		
Claviceps purpurea		Ergocamine,ergotoxine, ergometrine	+	.	.	+	+	SE	++	++
Cola nitida	Seeds	Total extract	+	+	+	+	.	WE	++	++
Colchicum autumnale	Rhizome	Colchicine	+	+	+	+	.	SE		
Combretum micranthum	Leaves	Total extract	.	+	+	.	+	AE	.	++
C.mucronatum	Leaves	Flavanoids	.	+	+	.	+	AE		

a/SD= steam distillation;WE= water extraction; AE= Alcohol extraction;SE= extraction with other solvents

INDICATIVE LIST OF PLANTS CONTAINING BIOLOGICALLY ACTIVE CONSTITUENTS THAT ARE PROCESSED INDUSTRIALLY FOR LOCAL AND INTERNATIONAL MARKETS

ame of plant	Part of the plant used	Product	Availability		Region			Method of production a/	Market potential	
			Cultivated	Wild	Africa	Latin America &Caribbean	Asia		Local	Export
Commiphora mukul	Resin	Gum	.	+	.	.	+	SE	++	-
Coscinium fenestratum	Stem,root	Berberine, Total alkaloids	+	+	.	.	+	WE,AE		
Costus speciosus) Costus citratus)	Rhizome	Diosgenin	.	+	.	+	+	SE		
Cuminum cyminum	Seeds	Essential oil	+	+	.	.	+	SD		
Curcuma aromatica	Rhizome	Total extract,curcumin Essential oil	+	+	.	.	+	SE,SD		
Cymbopogon flexuosus	Leaves	Essential oil,citral	+	.	+	+	+	SD	+	++
Datura spp.	Leaves	Atropine,Hyos-cyamine,Hyoscine	+	+	+	+	+	SE	+	+
Derris ellipcica	Root	Rotenone	+	+	+	.	+	SE	+	++
Dipteryx odorata	Seeds	Total extract, Coumarin	+	+	.	+	.	SE		
Digitalis lanata	Leaves	Digoxin and lanato-sides	+	.	+	.	.	AE,SE	++	++
Dioscorea spp.	Tubers	Diosgenin	+	+	+	+	+	SE	++	++
Duboisia myoporoides and other species	Stem	Hyoscyamine, hyoscine	+	+	+	+	+	SE	++	++
Ephedra gerardiana) E.vulgaris) E.nebrodensis) E.sinica)	Whole plant	l-Ephedrine	.	+	.	.	+	SE	++	++
Eucalyptus spp.	Leaves	Essential oil	+	.	+	+	+	SD	++	++
Foeniculum vulgare	Seeds	Essential oil	+	+	.	.	+	SE		
Glaucium flavum	Leaves	Glaucine	.	+	+	.	+	AE	++	++
G.simplex	Rhizome	Colchicine	.	+	+	.	+	SE	++	
Gloriosa superba	Rhizome	Colchicine	.	+	+	.	+	SE	++	+
Glycyrrhiza glabra	Rhizome	Total extract and compounds	.	+	.	.	+	WE	++	++
Heracleum candicans	Roots	Xanthotoxin	.	+	+	.	+	SE	+	++
Hibiscus sabdariffa	Flower	Dried flowers	+	.	+	+	+		+	++
Holarrhena floribunda	Stem,bark	Conessine and total alkaloids	+	+	.	.	+	SE	+	
H.antidysenterica and others	Stem , Bark	Conessine and total alkaloids	+	+	.	.	+	SE	+	
Hydnocarpus kurzii	Seeds	Fixed oil,hydno-carpic acid	.	+	.	.	+		+	
Hydnocarpus wightiana	Seeds	Chaulmoogric acid								
Hyoscyamus spp.	Root	Hyoscyamine and other alkaloids	.	+	+	.	.	.	+	
Lippia chevalieri and others	Whole plant	Camphor and essen-cial oil	.	+	+	.	.	SD	+	+
Lobelia pyramidalis	Leaf,flowering top	Lobeline and total extract	.	+	.	.	+	SE	+	
Mentha spp.) (Japanese mint) Mentha piperita)	Whole plant	Essential oil	+	.	+	+	+	SD	++	++
Mucuna pruriens	Beans	l-Dopa	+	+	+	+	+	WE	+	+

a/ SD= steam distillation; WE=water extraction; AE=Alcohol extraction; SE=Extraction with other solvents

INDICATIVE LIST OF PLANTS CONTAINING BIOLOGICALLY ACTIVE CONSTITUENTS THAT ARE PROCESSED INDUSTRIALLY FOR LOCAL AND INTERNATIONAL MARKETS

Name of plant	Part of the plant used	Product	Availability		Region			Method of production a/	Market potencial	
			Cultivated	Wild	Africa	Latin America &Caribbean	Asia		Local	Export
Oncoba echinata	Seeds	Fixed oil	-	-	+	-	-	-	+	-
Passiflora spp.	Whole plant	Total extract	+	+	+	+	+	AE	+	+
Pausinystalia yohimba	Stem bark	Yohimbine and total extract	-	+	+	-	-	SE	+	+
Physostigma venenosum	Seeds	Physostigmine, stigmasterol	-	+	+	-	-	SE	+	++
Physochlaina prealta								AE,SE		
Pilocarpus spp.	Leaves	Pilocarpine	-	+	-	+	-	SE	+	+
Pimpinella anisum	Seeds	Essencial oil	+	-	+	-	+	SD	++	++
Piper cubeba	Seeds/ Oleoresin	Essential oil	+	+	-	-	+	SD,DE	++	++
Plantago ovata	Seeds,husks	Ispaghula,psyllium	+	-	-	-	+	-	++	++
Podophyllum hexandrum (P.emodi)	Tubers	Podophyllin,podo-phyllotoxin	-	+	-	-	+	SE	+	++
Polygala senega	Roots	Resin	-	+	+	-	-		+	++
Prunus africana	Stem,bark	Total extract	-	+	+	-	-	AE	+	++
Psoralea corylifolia										
Rauvolfia heterophylla) R. serpentina) R. vomitoria)	Roots	Reserpine,ajmaline, deserpidine, rescinnamine, reserpiline	-	+	+	-	-	SE	+	+
Rhamnus spp.	Bark	Crude extract	-	+	+	-	-	AE	+	+
Rheum emodi	Rhizome	Total extract	+	+	+	-	+	AE	+	+
R.palmatum	Rhizome	Total extract	+	+	+	-	+	AE	+	+
Ricinus communis	Seeds	Fixed oil	+	+	+	+	+		+	++
Solanum spp.	Berries	Solasodine & other alkaloids	+	+	+	+	+	SE	+	+
Sterculia setigera	Bark,exudate	Gum	-	+	+	-	+		+	+
Strophanthus gratus	Seeds	Strophanthine strophanthidine	-	+	+	-	-	SE	+	+
Strophanthus kombe										
Strychnos nux vomica	Seeds	Strychnine	-	+	+	-	+	SE	+	+
Styrax benzoin	Whole plant	Benzoin	+	+	-	-	+	SE	+	+
S.tokinensis	Whole plant									
Tabernanth iboga	Stem bark	Ibogaine	-	+	+	-	+	SE	+	+
Taraxacum officinale	Root	Resin and total extract	-	+	-	+	+	SE	+	+
Thevetia neriifolia	Seeds	Peruvoside	+	-	+	+	+	SE	+	+
Urginea indica) U.scilla) U.maritima)	Bulbs	Proscillaridine	-	+	+	-	+	AE	-	+
Valeriana officinalis) V.wallichii)	Rhizome	Total extract Valepotriates	+	+	-	+	+	AE	+	+
Voacanga thoursii) V. africana)	Seed	Tabersonine	-	+	+	-	-	SE		+
Vinca minor	Leaves	Vincamine	+	+	+	+	+	SE	+	+
Zanthoxylum	Root bark	Total extract	-	+	+	-	-	SE		
Zanthoxyloides		Fagaramide	-	+	+	-	-	SE		

a/ SD=Steam distillation; WE=Water extraction; AE=Alcohol extraction; SE=Extraction with other solvents

APPENDIX 13 REFERENCES

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- Expro: seven-day seminar in Rotterdam on export marketing and management for selected exporters participating in a CBI export promotion programme;
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