Market Insider

ESSENTIAL OILS AND OLEORESINS
MARKET INSIDER

Pilot still with multi-tube condenser

October 2015 Report
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Index

Price Information ......................................................................................................................... 15
Conventional essential oils ........................................................................................................ 15
  Spice Oils ............................................................................................................................... 15
  Spice Seed Oils ...................................................................................................................... 15
  Citrus Oils .............................................................................................................................. 16
  Herb Oils ............................................................................................................................... 16
  Perfumery Oils ....................................................................................................................... 17
Price Information ......................................................................................................................... 19
Organic essential oils .................................................................................................................. 19
  Spice Oils ............................................................................................................................... 19
  Spice Seed Oils ...................................................................................................................... 19
  Citrus Oils .............................................................................................................................. 19
  Herb Oils ............................................................................................................................... 20
  Perfumery Oils ....................................................................................................................... 20
Suppliers of Equipment .............................................................................................................. 22
Events Calendar ......................................................................................................................... 29
Asian markets showing strong growth in beauty products

Beauty products are an important user of essential oils, and growth in this sector remains strong in Asia. Recent reports give 7% annual average growth rate for Vietnam, 10% for Indonesia, 3% for Malaysia, and % for Uzbekistan. The cosmetics market in Russia is expected to reach over US$15 billion in 2015. These markets are important drivers for essential oil demand. Populations are large – 90 million in Vietnam, over 250 million in Indonesia – and incomes are increasing.

First results out from IFEAT/RIFM project on safety of essential oils

IFEAT is working with the Research Institute for Fragrance Materials (RIFM) on evaluation the safety of essential oils. The programme focuses on testing the whole (complete) oil, in contract to most previous testing regimes which looked at individual constituents and isolates as sources of toxicity. The programme intends to assess the potential carcinogenic, mutagenic and reproductive toxicity of around 200 naturals, chosen on the basis of their relative production volume, REACH compliance and other industry-relevant criteria. IFEAT has provided the funding for the testing of the first 15 essential oils within the project.

The assessment for each oil involves a battery of tests designed to determine whether the material can cause mutations or cellular toxicity in a living system. If an essential oil produces a positive result in any test, it will be evaluated in greater detail. The initial battery of tests are:

- BlueScreen™ HC, conducted by Getronix Laboratories, is an assay composed of mammalian cells that measures the genotoxicity and cytotoxicity of a mixture or compound;
- Bacterial Reverse Mutation Assay (OECD 471) – the Ames Test – that determines the incidence of mutations in a bacterial cell culture that has been exposed to an essential oil or other material; and
- In vitro Micronucleus Assay (OECD 487) that evaluates the cytogenecity of the essential oil in in vitro human peripheral blood tissue. The test provides information on whether a material interferes with cell reproduction during the process of cell division.

The first 5 essential oils to be tested were:

- *Eucalyptus citriodora* oil
- Fir needle oil (Siberian)
- Geranium oil (African)
- Petitgrain oil (Paraguay)
- Rose oil (Bulgarian)

All the oils tested negative for evidence of genotoxicity in each of the 3 assays.
Source: IFEAT

Grapefruit oil in short supply

The trade reports that grapefruit oil remains in short supply, and prices for cold pressed oils have more than doubled in less than a year. As more buyers start to run into supply problems prices could rise strongly
Source: Treatts

Strong price rises for Chamomile oils

Prices for both Roman Chamomile (*Anthemis nobilis*) and German Chamomile (*Matricaria chamomilla*) have risen strongly in recent months as strong increases in demand have clashed with declining availability. Poor growing season conditions in Europe for Roman Chamomile have depressed yields; while a change in cropping patterns in Nepal have results in food crops replacing German Chamomile plantings.
Results of Anuga 2015 – press release

In addition to a record number of exhibitors, growth in attendance. Around 160,000 trade visitors from 192 countries. Quality of the visitors convinces the exhibitors across the board. Anuga in Cologne unparalleled as a business and information platform. Partner country Greece demonstrates the diversity of its food industry. After a record number of exhibitors, Anuga 2015 also increased its attendance figures. Around 160,000 trade visitors from 192 countries attended Anuga in Cologne from 10 to 14 October 2015. “Anuga is unparalleled as a business and information platform for the global food industry,” said Gerald Böse, President and Chief Executive Officer of Koelnmesse. “Once again this year, it has clearly underlined its position as the leading international trade fair.” Anuga 2015 presented over 7,000 exhibitors from 108 countries. The share of foreign exhibitors was 89 percent and the share of foreign visitors was 68 percent. The exhibitors were particularly impressed by the quality of the visitors. Decision-making buyers from the trade and from the food service sector ensured that the trade fair took a dynamic course.

The 33rd Anuga was opened on Saturday, 10 October 2015 by Christian Schmidt, the German Minister for Food and Agriculture, and Evangelos Apostolou, the Greek Minister for Agricultural Development and Food. Greece was the partner country of Anuga 2015 and the country was successfully represented by over 200 Greek exhibitors, who presented the entire variety and quality of Greece’s food industry. The international significance of Anuga for the food sector was also an occasion for numerous high-ranking political delegations from Germany and abroad to visit Anuga. “Anuga 2015 exceeded our expectations. The high interest shown by exhibitors and visitors from Germany and abroad is impressive and underlines the significance of Anuga as the world’s most important trade fair for food and drinks,” observed Friedhelm Dornseifer, President of the Association of the German Retail Grocery Trade (BVLH), highly satisfied. “Once again this year the trade visitors were able to test thousands of high-quality and innovative products.” The huge diversity clearly reflects the food trends that have been accompanying us for some time already. Good taste and fresh goods have always been important for the consumers. Furthermore, the theme convenience gains ever-increasing relevance. Today, our food has to be easy to consume and easy to cook. Those companies that succeed in linking these characteristics with healthy and sustainable aspects have good prospects of achieving high sales.” “Anuga is the global marketplace and trendsetter for food and drinks every two years. Once again in 2015, we were able to impressively demonstrate which measures German companies take every day for the quality, safety and diversity of the “Made in Germany” seal and how food producers fulfill the wishes of consumers worldwide with a customised range of products, said Dr. Wolfgang Ingold, Chairman of the Federation of German Food and Drinks Industries (BVE). “Hence, we have reached our goals: Anuga offers fair participants the opportunity to experience the entire world of food and drinks in all its extraordinary diversity, like no other trade fair.”

Ingrid Hartges, Chief Executive of the DEHOGA Federal Association, drew a positive balance for the trade fair: “Anuga 2015 was an impressive exhibition. Trends, products and service solutions from over 100 nations were our guests here in Cologne. Eating and drinking - that connects the world. The trade fair was a source of inspiration and an important stimulus for many food service professionals. For five days, our food service marketplace was a well-attended, communicative, innovative and international platform and central point of contact for food service trends, business contacts and manifold taste experiences.”

The Anuga exhibitors used the trade fair intensely to present new products and concepts to the thoroughly interested trade audience that was keen to place orders. A wide spectrum of innovative convenience and ready-to-cook products as well as vegan and health products provided numerous impulses. Many of the exhibitors targeted the growing out-of-home or to-go market. Both the visitors and the exhibitors were highly interested in learning information about trends and developments on the international food and drinks market. According to surveys, in addition to vegan food, vegetarian offers are also in high demand as well as organic and fair trade products. Also “free-from” concepts - for example lactose-free and gluten-free products are extremely trendy. Halal products had their own platform at Anuga. Themes such as the appreciation of food, the reduction of food waste primarily in the industrial countries, traceability, animal welfare and sustainability will continue to shape the discussions about food and drinks in the future.

Anuga in figures: 7,063 companies from 108 countries took part in Anuga 2015 on exhibition space covering 284,000 m². These included 769 exhibitors from Germany and 6,294 exhibitors from abroad. The share of foreign exhibitors was 89 percent. Around 160,000 trade visitors from 192 countries attended Anuga 2015, the foreign share was 68 percent. The next Anuga will take place from 7 to 11 October 2017.

Source: Anuga

Market Insider
Essential Oils & Oleoresins – October 2015
Citrus Trend Lends Itself to Beverage Industry

Due to consumer's growing health perceptions in the beverage and flavor industry, the demand for citrus flavors is growing, according to Beverage Industry magazine. "Forward Thinking: It's Citrus," which appeared in the March 2011 issue of Perfumer & Flavorist magazine, also explored citrus flavor and fragrance trends, strengthening its presence in the industry. Two years later, citrus' refreshing effervescence continued to appeal to palettes, according to "Forward Thinking: Citrus in the Limelight" published in the April 2013 issue of Perfumer & Flavorist magazine. Topics included lemon, lime and orange flavors as well as grapefruit—the emerging en vogue citrus ingredient.

Fast forward to 2014, lemon was predicted to be one of the top three best-selling flavors in 2014, according to respondents of Beverage Industry's 2013 New Product Development Survey.

Popularity Not Fading in 2015. Beverage Industry also reports that Dolf DeRovira, president of Flavor Dynamics Inc., South Plainfield, New Jersey, says orange, lemon and lime flavors are the most popular, especially in soft drinks.

Other Trends Influencing the Citrus Craze. Health and wellness has been a cross-industry movement, so it's not surprising that it has extended to the beverage industry. Last year, Wixon Inc launched a programme featuring flavor modifiers for health and wellness beverages that enhance product satiety while reducing sugar in low-calorie beverages. According to Beverage Industry, since 2011, 23% of citrus beverage launches carried the claim "No additives/preservatives," making it the second most prominent claim on beverage packages, according to Minerva Calatayud, strategic marketing director of beverage and sweet flavors at Kerry Inc., Beloit, Wisconsin. The article also cites citrus as a leading flavor in the health-and-wellness trend as it is known to be a good source of Vitamin C and many other essential nutrients. Back in 2013, Innova Market Insights predicted that healthy flavours and new generation superfruits were to be the next big hit in the global beverage market.

As an authentic natural flavour, Citrus flavors have capitalized on the growth of premium beverages. Industry experts have reported premium beverages increasing in sales, despite a weak economy. This occurs because “consumers are always looking for an indulgence or way to feel special," says Calatayud in the article. At the beginning of the year, Bell Flavors & Fragrances Europe revealed its flavour trends for 2015: the flavor comfort zone and the flavor innovation zone. Citrus landed in the flavor comfort zone: "The differentiation of citrus profiles is a global trend for 2015 whether it is for sweets, drinks or aromatic foods ... Examples include the dominating role of orange and lemon flavors in soft drinks and sweets such as fruit gums, ice cream and chocolate candy. Flavor innovations can be found in blood orange, tangerine and grapefruit," according to the report.

The Millennial Mindset: Integrating Exotic Fruits. "A growing sophistication of consumers and the desire for more exotic flavor profiles — especially driven by millennials — is changing the flavor profiles and innovation within the alcoholic and non-alcoholic beverage categories and increasing the need for more sophisticated citrus fruit profiles,” Calatayud notes. Although millennials are driving the growth of exotic citrus varietals, they're also causing beverage-makers to innovate with new product launches more often, she notes. Millennials are also the driving force of the health foods trend, where manufacturers are creating flavors that offer essential vitamins and minerals.

Blending Flavors. The article continues to dive into flavor mixing, citing Dave Bowen, manager of citrus creation for Firmenich, Geneva, Switzerland, who adds that as beverages embrace fusion trends, citrus blends will continue to emerge.

Going Retro: Lemonade With a Twist: “As consumers are moving away from sugary carbonated beverages, we are seeing a significant and growing interest in lemonades, which are considered perceptibly healthy, retro-comforting and all-American,” explains Anton Angelich, group vice president of marketing for Virginia Dare, New York, from the article.

The Future of Citrus. In the future, great-tasting citrus flavors and ingredients will fit consumers’ demands for clean-label, simple and environmentally friendly flavors, Calatayud reports.

Source: www.bevindustry.com
Kerry Group Acquires Three US Companies

Irish flavor company, Kerry Group continues its expansion through the recent acquisition of three US companies: Red Arrow Products, Island Oasis and Biothera Wellmune. According to the company's press release, the $735 million acquisition is expected to expand Kerry's taste and nutrition portfolio for worldwide food, beverage and pharmaceutical applications. Though the breakdown of the purchase has not been disclosed, Kerry's existing facilities were able to fund the acquisition.

Maine-based Red Arrow Products serves the global meat, culinary and food industry creating natural and authentic natural savory, smoked and grilled flavors. Serving the US restaurant, leisure and hospitality markets "on-premise," Island Oasis supplies all-natural cocktail mixes and customized beverage combinations. Biothera Wellmune produces and markets its own branded natural food, beverage and supplement ingredients designed to strengthen the immune system, using yeast strains. Yeast strains have quickly become an increasingly viable option for sustainable ingredient production.

Stan McCarthy, CEO Kerry Group, commented that the acquisitions will "significantly expand [our] taste and nutritional solutions portfolio [and] bring a number of important innovative technology platforms to Kerry." He added that the purchase will provide "tremendous growth opportunities throughout Kerry's global developed and developing markets."

Source: Kerry

Givaudan opens perfumery hub and school in Singapore

Givaudan has invested CHF 70 million in a perfumery school, creative center and production hub in Singapore. This adds to other investments made in the region earlier this year – a manufacturing facility in China and a technical center in Japan – illustrating the growth potential seen in the region and the need to have facilities based in the region. This will be Givaudan's first perfumery school outside France, and will be using the same curriculum to train future perfumers from Asia.

The location of the creative center and production hub will facilitate increased flexible research and development, while production and delivery are expected to produce up to 10,000 tonnes annually. When fully operational, the creative center will employ 170 people.

Source: Givaudan

More Kerry - Official Opening of Kerry Global Technology & Innovation Centre

Taoiseach Enda Kenny T.D. officially opened Kerry Group’s €100m Global Technology & Innovation Centre in Ireland. The project was supported by Department of Jobs through Enterprise Ireland. Kerry Group, the global taste & nutrition and consumer foods group, has opened a new Global Technology & Innovation Centre to serve the Group’s global and regional customers in the EMEA [Europe, Middle East and Africa] region. Located on a 28 acre site, in the Millennium Business Park, Naas, the new Global Centre was officially opened by An Taoiseach Enda Kenny in the presence of Minister Richard Bruton, Minister Simon Coveney and the Kerry Group Board of Directors.

Kerry Group has invested €100m in establishment of the new Technology & Innovation Centre which today accommodates 800 research, product commercialisation, business development and business support positions, and which will accommodate a further 100 positions by the end of 2016. Speaking at the Official Opening Ceremony, Stan McCarthy, Kerry Group Chief Executive said, “Our new Global Technology & Innovation Centre will serve as a focal point for Kerry's customer engagement activities providing key customers with access to the Group’s complete breadth and depth of technologies, scientific research, innovation and applications expertise, across food, beverage and pharmaceutical markets. In addition it will serve as the Group’s Global Centre of Excellence for Nutrition and will optimise product differentiation in the marketplace while providing unrivalled speed to market”. He said, “Today’s consumer markets, and changing food and beverage consumption trends, call for renewed vigour in product innovation and development of nutritious product solutions and menu offerings. Kerry’s approach to innovation capitalises on our total Taste & Nutrition technology offering and unique end-use-market applications capability.” Mr McCarthy added that Kerry Group is extremely proud of the new world-class Technology & Innovation Centre which received tremendous support from the Irish Government, State Agencies and Kildare County Council. He also said that the Centre would support functional and business leadership development and scalable sustainable growth in Kerry well into the future.
Taoiseach Enda Kenny TD who officially opened the new Kerry Centre said, “This €100 million investment by Kerry Group is a welcome vote of confidence in Ireland and a great boost for the local economy in Naas. Kerry is a world leader in the food sector and the new Global Technology & Innovation Centre will further enhance Ireland’s reputation for excellence in research, development and innovation in the food and beverage industry. This Government has been a strong supporter of Ireland’s agri-food industry in securing the recovery. Through the Food Wise 2025 strategy we plan to increase agri-food exports to €19 billion and support another 23,000 new jobs.” Minister for Jobs, Enterprise and Innovation Richard Bruton TD, whose Department provided support for this project, said, “At the heart of our jobs strategy is creating a powerful engine of Irish enterprise. Today’s announcement by Kerry is a brilliant example of what we are trying to achieve. Here is a strong Irish multinational company, making world-leading products in products in the most modern global facility producing world.

Leatherhead Food International Ltd, a subsidiary of Leatherhead International Limited, today announces a major investment by Science Group plc (AIM: SAG.L), a global science and technology advisory and product development organisation. In future, the business will operate as Leatherhead Research Ltd and will continue to provide technical consultancy services, including scientific research, regulatory advice, market insights, and testing services to the food and drink industry. “Leatherhead has strong history of operating in the global food & drinks marketplace dating back almost a century,” says Dr Geoff Spriegel, Chief Executive, Leatherhead. “The last 12-18 months have been challenging for our business, particularly due to a legacy pension deficit, but with the investment from Science Group supported by the obvious synergies, our position is strengthened, both financially and technically. Working with like-minded scientists will undoubtedly lead to innovative solutions in the food industry, particularly at this time when the industry faces tough challenges and innovation is a vital part of the solution.” Founded in 1919, Leatherhead Food Research is a trusted partner to the food industry and has developed a worldwide reputation for expertise in regulatory.

Fair Trade and Organic Ethanol available from Earthoil

Earthoil has responded to increased global demand for sustainably-sourced ingredients with the launch of an organic, fair trade (Fair For Life), sugar cane-derived alternative to petro-ethanol. The latest addition to Earthoil’s portfolio is produced sustainably from organic sugar cane at a family-owned facility in the San Antonio region of Brazil. Using technology designed to maintain the ecological and social harmony of the surrounding environment, the ethanol is grown, harvested and processed according to a tightly controlled, holistic system.

A crucial part of this approach is the elimination of crop burning prior to harvesting. By replacing this traditional - but environmentally damaging - step with biological pest controls, soil rotation and conservation techniques, the biodiversity in the region benefits and manufacturing advantages are gained. Sugar yields are also over 20% higher on average compared to the local non-organic alternative. The recovered sugar is then fermented into ethanol, triple distilled and filtered.

Equally important to the ethical platform of Earthoil’s ethanol is its support for the local economy and community. A potential drop in employment due to mechanisation of the sugar cane harvest is addressed with a training programme designed to lead to a recognised qualification, which enables manual workers to be redeployed within the company. The social and educational needs of children are also met through a local weaving project set up to build citizenship and develop professional skills.

“Denatured ethanol is an essential and trusted component of a huge number of fragrance compositions,” comments Richard Eyles, senior business development manager at Earthoil. “It is used as a fresh, clean, neutral base to create scents across personal care categories, as well as build complex fine fragrances. So with consumers continuing to favour organic and natural products in these sectors, it makes commercial sense to offer formulators a way to respond to this trend using a quality ingredient.”

Source: Earthoil

Leatherhead Food International acquired by Science Group

Leatherhead Food International Ltd, a subsidiary of Leatherhead International Limited, today announces a major investment by Science Group plc (AIM: SAG.L), a global science and technology advisory and product development organisation. In future, the business will operate as Leatherhead Research Ltd and will continue to provide technical consultancy services, including scientific research, regulatory advice, market insights, and testing services to the food and drink industry. “Leatherhead has strong history of operating in the global food & drinks marketplace dating back almost a century,” says Dr Geoff Spriegel, Chief Executive, Leatherhead. “The last 12-18 months have been challenging for our business, particularly due to a legacy pension deficit, but with the investment from Science Group supported by the obvious synergies, our position is strengthened, both financially and technically. Working with like-minded scientists will undoubtedly lead to innovative solutions in the food industry, particularly at this time when the industry faces tough challenges and innovation is a vital part of the solution.” Founded in 1919, Leatherhead Food Research is a trusted partner to the food industry and has developed a worldwide reputation for expertise in regulatory.

Market Insider
Essential Oils & Oleoresins – October 2015
consultancy, product development, consumer research, nutrition science, food safety, information services and training. The Science Group offers independent advisory and leading-edge product development focused on science and technology initiatives. Its specialist companies, Sagentia, Oakland Innovation and OTM Consulting, collaborate closely with their clients in key vertical markets to deliver clear returns on technology and R&D investments. “The global food and beverage marketplace is an exciting and growing sector. We view the acquisition of Leatherhead, a very well established brand with a strong client base and staff, as strengthening the Science Group’s position in this market, supplementing our existing Sagentia and Oakland Innovation operations,” remarks Martyn Ratcliffe, Chairman, Science Group plc. “The combined businesses form a substantial UK player in this global industry. “

Further details of the acquisition can be found at [http://www.sciencegroup.com/news/](http://www.sciencegroup.com/news/)

Source: Leatherhead Food International

**Givaudan lays foundation for new flavours manufacturing facility in India**

Givaudan today laid the foundation for a new flavours manufacturing facility, in Ranjangaon, Pune, India. Mr. Bhushan Gagrani, IAS, Chief Executive Officer, Maharashtra Industrial Development corporation (MIDC), Maharashtra State joined Givaudan CEO Gilles Andrier, and Monila Kothari, Commercial Head APAC, Givaudan Flavours at the ceremony. Givaudan is demonstrating the importance of India, as one of its key high growth markets, to its growth strategy by investing CHF 55 million in this new world-class flavours manufacturing facility. This is Givaudan’s largest investment in India since 1998.

The new site, which is expected to open in 2018, will complement Givaudan’s existing flavour manufacturing facility in Daman. Givaudan Chief Executive Officer, Gilles Andrier said: “This major investment reflects India’s importance to Givaudan, and our overall 2020 strategy of investment in high growth markets. It shows our commitment to continue to collaborate closely with customers in Asia Pacific and provide differentiated solutions for local market needs.”

Expected to employ around 100 people, the Pune facility will boost Givaudan’s capabilities in liquids compounding, powder blending, emulsions, process flavours and spray drying in India. It also means customers from across the Indian sub-continent will benefit from faster access to Givaudan’s flavour solutions. Commenting on the opening of the new site Monila Kothari, Commercial Head APAC, Givaudan Flavours, said: “Givaudan has a 50 year heritage of operating in India and these are exciting times for us. The doubling of our flavour production capacity is testament to our commitment to India, and will help us continue to meet the dynamic needs of the Indian market for innovative products and great taste experiences.”

Source: Givaudan

**Earthoil’s fairtrade argan oil brings medical care to Moroccan women**

An all-female co-operative in the Souss Valley area of Morocco has gained better access to healthcare, thanks to its partnership with Earthoil to produce the only Fairtrade argan oil in the world. A full check-up was completed for each of the 60-strong group of women and a medical record created, with the majority having never previously seen a doctor. The initiative was funded by fair trade premiums, which have been paid as a result of Earthoil providing the co-operative members with a direct route to the global cosmetics market.

With proven nourishing properties, argan oil is ideal for use as a skin moisturiser and revitaliser. It also strengthens hair and nails, making it a popular ingredient in shampoos, conditioners and nail care products. The co-operative where Earthoil sources its argan oil was formed in 2007 to provide a way out of poverty. Traditional methods are used to extract the argan oil, and the women are involved at every stage in the production process meaning the oil has full traceability to its source.

Since it was established, the co-operative has had a very positive impact on the lives of its members and their families. The women now benefit from the security of a regular income, and healthcare knowledge and overall literacy have improved. The most recent fair trade premiums have been used to make working conditions more comfortable, as well as giving the access to medical professionals.

“Earthoil specialises in smallholder producer projects in remote areas of the world, and our work with argan oil is a great example of the benefits that ethical and sustainable practices can bring to local communities,” says Melissa Naish, Vegetable Oils Manager, Earthoil. “Demand for natural personal care products
continues to grow, and our argan oil – with its unique cosmetic properties and organic status – is perfectly positioned for cosmetics businesses looking to be part of this trend.”
Source: Earthoil
Product and Market Notes

Pesticide residues in essential oils

Pesticide residues in essential oils: current findings

Introduction

An essential oil is a composition of many substances, which is characteristic for each type of essential oil based on its origin: plant, production process or region where it comes from. But it is also possible to find substances that are not naturally occurring in the essential oil. Those substances are a result of the production process, starting from the cultivation of the plant material. Pesticide residues are not wanted in the essential oil but seem to be unavoidable under the conditions they are produced. They are present and can be detected.

What are pesticides?

Worldwide 90 – 95% of the agricultural area is cultivated conventionally. That means that besides fertilisers, which are mostly of mineral origin, pesticides are used for plant production. Pesticides are chemical compounds applied to:

- kill, control or prevent pests, diseases, weeds
- protect crops after harvest, in storage or during transport
- regulate the growth of plants

Pesticides can be used “from seed to storage”, i.e. the whole life cycle of the product.

The pesticides are grouped and categorised according to their intended purpose:

- insecticides (against lice, caterpillars…)
- acaricides (against spider mites e.g. in fruit production)
- herbicides (against weeds which are competing plants)
- fungicides (against fungi including those causing rot, decay)
- plant growth regulators (e.g. cereals with little straw)
- rodenticides (against rats, mice)

Each pesticide needs a legal approval. The EU, for example, requires the proof of:

- harmlessness to people’s health
- acceptability to the environment
- effectiveness against pests

The active substances and the commercial products are approved separately. The EU pesticide database covers 1,312 active substances. In Germany 1,427 products containing one or several active substances are allowed. For medicinal plants 292 products can be used. Some of them are very specific to one plant species or to a certain pest so the 292 products cannot all be used on each crop species.

As the governmental regulation is, in general, not harmonised between countries, when importing essential oils it is important to analyse pesticide residues of substances that are not allowed in your own country. Additionally it is necessary to take the persistency of substances like DDT into consideration and analyse for it, even though it might not have been applied to the current crop.

In organic agriculture no pesticides are allowed other than naturally occurring compounds or extracts. Between 5 – 10% of the total cultivated land is cultivated under organic conditions. Outside of this organic area, pesticides are involved in the cultivation of most crops to a greater or lesser extent.

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1 This article is based on a paper given to the IFEAT conference in Rome, 2014, by Dr Jasmin Peschke, of Weleda AG, Switzerland.
What are residues?
Residues are harmful substances that are applied and can still be found in the product.

What are contaminants?
Contaminants are also harmful substances but they have not necessarily been applied deliberately. Sometimes you can trace contaminants in products that have not been treated because of pollution or cross contamination, among others. Examples of contaminants are pesticides, heavy metals, aflatoxins, plasticisers, to name the main ones. Even in organic cultivated products contaminants can sometimes be found. They are not residues coming from a direct application but they can occur by wind drift from a neighbouring area that has been treated or from the land if the substance is persistent and has been used before conversion into organic agriculture.

Pesticide residue regulation
As the use of pesticides is quite common, residues can easily be found and therefore they have to be regulated by defining maximum residue levels (MRLs). An MRL is the upper legal level of concentration of a substance that can be tolerated with respect to the health and safety of consumers.

For medicinal products the European Pharmacopoeia describes, in chapter 2.8.13, a list of substances with limits that are considered to be acceptable for herbal drugs and medicinal herbal products.

For substances that are not listed, the maximum residue levels given in the European regulation EC No 396/2005 are relevant. This regulation defines the MRLs for food and feed.

For substances that are neither in the PhEur nor in the EC regulation, a calculation formula is given, taking the ADI (acceptable daily intake), the MDD (maximum daily dose) and the body mass into account.

Note: for essential oils there is no specific regulation.

Contaminants in essential oils
The plants for the production of essential oils come either from wild collection, if they are indigenous like rosemary in Spain or sage in Albania, or they are cultivated like roses, oranges, peppermint, etc. Either the plants are treated with various pesticides or, if not treated directly, contamination can occur at any stage of the production process (like by wind drift, cross contamination, or during transport and/or storage).

Literature
There is a substantial literature on pesticide residues in essential oils. The key conclusions from this are that citrus oils produced by cold pressing can be found to contain actionable levels of pesticides. In distilled oils there were some cases of pesticide residues found, but in general they were very low.

Transfer from the plant into the essential oil
Distilled oils
Only pesticide residues that are hydrophilic, thermostable and volatile can be carried over into the essential oil during distillation. As there are not so many pesticides with these characteristics, the pesticide levels found in the distilled oils are usually low.

Cold pressed oils
The essential oil of citrus fruit is located in the pericarp, the peel. Due to the cold pressing process and the lipophilicity of the majority of the pesticides, the residues sticking on the peel will most likely be transferred into the essential oil. Due to this, cold pressed citrus oils can be found to contain actionable levels of pesticide residues.
Pesticide analysis data base evaluation

The working group on contaminants of the German Medicines Manufacturers’ Association (BAH) maintains a data base on results of pesticide analysis performed since 2000. This data is evaluated regularly. The samples were taken from routine quality controls of the participating companies and represent the current situation of pesticide contamination of essential oils. The results of these pesticide analysis from the years 2006 to 2013 (8 years) are:

- Altogether, 589 samples of 28 different essential oils were analysed.
- On average, each sample was tested for 217 substances, i.e. a total number of 127,517 analytical results.
- 314 samples had no pesticide residues found, which represents 53% of all samples.
- 275 samples (47%) had at least one positive analytical result. As pesticides were detected in 1,150 cases, there were samples with more than one residue. The pesticide findings represent 0.90% of all results.

Distilled essential oils

376 samples of 25 different distilled essential oils were tested, corresponding to 73,541 analytical results.

In 242 samples no pesticide residues were detected at all, which represents 64% of the distilled oil samples. There were 402 positive findings which represents 0.55% of the test results. In 128 cases the pesticide levels were above the MRL for herbal drugs, which represents 0.17% of all tests.

Neroli oil

In the 65 samples of neroli oil tested, there were 199 positive results (of about 14,000 results in total). 77 of them were above the MRL (39%), the most frequent substances found were biphenyl and chlorpyriphos-ethyl.

Rosemary oil

In total 49 samples were tested, 29 of them were tested for biphenyl. Half of them exceeded the MRL of 0.1ppm. The highest concentration was 0.5 ppm.

Eucalyptus oil, caraway oil and lavender oil

34 samples of eucalyptus oil and 25 samples of caraway oil were tested, each of them had 3 positive findings, which were below the MRL. In 19 samples of lavender oil tested, there was only 1 positive result, and this was below the limit.

Cold pressed essential oils

213 samples of 3 different citrus oils were tested. In 72 samples no pesticide residues were detected, which represents 34% of all samples. In total 53,976 analytical tests were performed, of which in 647 cases pesticides were detected, which represents 1.2% of all data. 264 results were higher than the MRL which is 0.5% of all findings.

Orange oil

On average 4% of the orange oil samples had results exceeding the MRL.

Lemon oil

The substances responsible for the most frequent exceeding of MRL were detected in about a quarter of the total number of lemon oil samples. For the other substances that were analysed on average 2% of the samples had levels above the MRL.
Mandarin oil

For Chlorpyriphos-ethyl over half of the samples tested exceeded the MRL. For the other substances about a third of the samples exceeded the MRL.

Conclusions

- the majority of essential oils, both distilled ones and cold pressed ones, do not contain any pesticide residues
- Distilled oils in general are less contaminated than cold pressed oils – this corresponds to findings in the published literature.
- The MRL set for herbal drugs is exceeded only in a few cases (0.31% of all results).
- In case of a pesticide residue exceeding the MRL, the potential risk with oral intake can be calculated on the basis of the ADI (acceptable daily intake).
- It is reasonable to apply a risk based approach in testing essential oils for pesticide residues in routine quality control.

How to proceed in quality control

The database evaluation contributes to the discussion of the European Pharmacopoeia expert group on contaminants in essential oils and whether a separate regulation is needed. The findings justify a differentiated approach: test cold pressed oils regularly and test distilled oils according to a risk assessment.

The recommendation of the working group is that the current chapter in PhEur (2.8.13) is a reasonable basis for the assessment of pesticide residues in essential oils. It represents a “worst case scenario” because the limits are set for herbal products. Essential oils, in contrast, are very concentrated and are never used or ingested in quantities like the ones for herbs. Therefore the limits are even safer. And, as they are exceeded only in a few cases, a new regulation within the European Pharmacopoeia is not needed.

Strategy for the future

In the analysis and evaluation of results, no differentiation was made between conventional and organic cultivation systems. As in organic agriculture pesticides are not applied, residues most likely don’t occur at all or in much lower levels. Absolutes, concretes and other extracts were not considered but need to be assessed. Many essential oils are used in cosmetics. Consumers do not expect a cocktail of pesticides to be found in the products. In fact there is a strong and continuing trend to green, organic, sustainable, bio, pure and natural qualities in the market. While it is necessary to define and regulate residue levels, the key strategy must be to avoid the use of pesticides, and to take positive precautions against cross contamination from other sources.
**Price Information**

PLEASE REMEMBER THAT THESE ARE ONLY PRICE INDICATIONS.

Price indications collected from the markets are given for a range of essential oils, below. The oils are grouped *for convenience only* into Spice Oils, Seed Oils, Citrus Oils, Herb Oils and Perfumery Oils. Prices are wholesale for quantities of 25kg or more unless otherwise stated.

### Spice Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clove bud</td>
<td>Indonesian</td>
<td>$21/kg 200kg lots</td>
</tr>
<tr>
<td></td>
<td>Indian</td>
<td>$84/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Madagascan</td>
<td>$75/kg 1 kg lots</td>
</tr>
<tr>
<td>Clove stem</td>
<td>Indonesian</td>
<td>$15/kg container</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>$50/kg</td>
</tr>
<tr>
<td></td>
<td>Madagascar</td>
<td>$36/kg 200 kg lots</td>
</tr>
<tr>
<td>Clove leaf</td>
<td>Indonesian min. 73%</td>
<td>$11.00/kg, container</td>
</tr>
<tr>
<td></td>
<td>Indonesian min. 80%</td>
<td>$12.50/kg</td>
</tr>
<tr>
<td></td>
<td>Indonesian min. 82%</td>
<td>$13/kg</td>
</tr>
<tr>
<td></td>
<td>Madagascan</td>
<td>$17/kg</td>
</tr>
<tr>
<td></td>
<td>Indonesian</td>
<td>$46/kg</td>
</tr>
<tr>
<td></td>
<td>Indonesia</td>
<td>$18/kg container</td>
</tr>
<tr>
<td>Cinnamon bark</td>
<td>Sri Lankan 60/65%</td>
<td>n/a</td>
</tr>
<tr>
<td>Cinnamon leaf</td>
<td>Sri Lankan</td>
<td>$70/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>$20/kg</td>
</tr>
<tr>
<td>Cassia bark</td>
<td>China</td>
<td>$35/kg; $70 1 kg lots</td>
</tr>
<tr>
<td>Black pepper</td>
<td>Sri Lankan</td>
<td>$218/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Indian</td>
<td>$125/kg; $195 1 kg lots</td>
</tr>
<tr>
<td>Nutmeg</td>
<td>Indonesian (myristicin 7%)</td>
<td>$30/kg</td>
</tr>
<tr>
<td></td>
<td>Indonesian (myristicin 2%)</td>
<td>$27/kg</td>
</tr>
<tr>
<td></td>
<td>Indonesian (safrrole free)</td>
<td>$62/kg</td>
</tr>
<tr>
<td>Ginger</td>
<td>Chinese</td>
<td>$105/kg</td>
</tr>
<tr>
<td></td>
<td>Indonesia</td>
<td>$95/kg</td>
</tr>
<tr>
<td></td>
<td>Indian</td>
<td>$80/kg</td>
</tr>
<tr>
<td></td>
<td>Indonesia (red)</td>
<td>$98/kg</td>
</tr>
<tr>
<td>Pimento leaf</td>
<td>Jamaican</td>
<td>$140/kg</td>
</tr>
<tr>
<td>Pimento berry</td>
<td>Jamaican</td>
<td>$90 container</td>
</tr>
<tr>
<td></td>
<td>Jamaican</td>
<td>€210/kg</td>
</tr>
<tr>
<td>Cardamom</td>
<td>Guatemala</td>
<td>$185/kg container</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$210/kg spot</td>
</tr>
</tbody>
</table>

### Spice Seed Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aniseed</td>
<td>China</td>
<td>$13-16 CIF NW Europe; $75/1 kg lots</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>$25/kg</td>
</tr>
<tr>
<td>Star Anise</td>
<td>India</td>
<td>$120/kg</td>
</tr>
<tr>
<td>Coriander seed</td>
<td>Russian</td>
<td>$200/kg</td>
</tr>
<tr>
<td>Coriander herb</td>
<td>Russian</td>
<td>$100/kg drum</td>
</tr>
<tr>
<td>Cumin seed</td>
<td>Egypt</td>
<td>$285/kg 1 kg lots</td>
</tr>
</tbody>
</table>
## Citrus Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange (sweet)</td>
<td>Brazilian</td>
<td>$16/kg; $30/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Italy (b/orange c/pressed)</td>
<td>$33/kg</td>
</tr>
<tr>
<td></td>
<td>Brazil (pera)</td>
<td>$7/kg container</td>
</tr>
<tr>
<td>Orange (bitter)</td>
<td>Italian (c/pressed)</td>
<td>$45/kg</td>
</tr>
<tr>
<td>Bergamot oil</td>
<td>Ivory Coast/Italy</td>
<td>$80/kg; $135/kg 1 kg lots</td>
</tr>
<tr>
<td>Lemon</td>
<td>Italian</td>
<td>$58/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Italian (c/pressed)</td>
<td>$35</td>
</tr>
<tr>
<td></td>
<td>Argentina</td>
<td>$55-$58/kg container</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>$55/kg</td>
</tr>
<tr>
<td>Lime (distilled)</td>
<td>Italian</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Mexico/Peru</td>
<td>$46/kg container; $62/kg</td>
</tr>
<tr>
<td>Lime (cold pressed)</td>
<td></td>
<td>$25/kg</td>
</tr>
<tr>
<td>Mandarin (red)</td>
<td>Italy</td>
<td>$80/kg</td>
</tr>
<tr>
<td>Grapefruit (pink)</td>
<td>Argentina</td>
<td>$42/kg; $50/kg 1 kg lots</td>
</tr>
<tr>
<td>Grapefruit (white)</td>
<td>France</td>
<td>$40/kg</td>
</tr>
</tbody>
</table>

## Herb Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basil</td>
<td>Comores</td>
<td>$125/kg</td>
</tr>
<tr>
<td></td>
<td>Egypt</td>
<td>$82/kg; $150/kg 1 kg lots</td>
</tr>
<tr>
<td>Lavender</td>
<td>Bulgaria</td>
<td>$96/kg</td>
</tr>
<tr>
<td></td>
<td>French</td>
<td>$250/kg</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>$200/kg</td>
</tr>
<tr>
<td></td>
<td>Russia</td>
<td>$95/kg drum</td>
</tr>
<tr>
<td>Lavendin</td>
<td>French Grosso</td>
<td>$30/kg</td>
</tr>
<tr>
<td>Spike Lavender</td>
<td>Spain</td>
<td>$110/kg</td>
</tr>
<tr>
<td>Mints</td>
<td>Indian piperita</td>
<td>$27/kg</td>
</tr>
<tr>
<td></td>
<td>India, mentha arvensis crude, L-menthol 72%</td>
<td>$13/kg</td>
</tr>
<tr>
<td>Menthol</td>
<td>Indian, bold crystals</td>
<td>$19/kg</td>
</tr>
<tr>
<td></td>
<td>Indian, medium crystals</td>
<td>$15/kg</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>$18/kg</td>
</tr>
<tr>
<td>Peppermint menthofuran 3%</td>
<td>China</td>
<td>$23.50/kg</td>
</tr>
<tr>
<td>Peppermint</td>
<td>China</td>
<td>$15/kg container</td>
</tr>
<tr>
<td>Peppermint dementholised</td>
<td>Indian</td>
<td>$13/kg</td>
</tr>
<tr>
<td>Menthone 80/20</td>
<td>Indian</td>
<td>$16/kg</td>
</tr>
<tr>
<td>Menthone 90/10</td>
<td>Indian</td>
<td>$19/kg</td>
</tr>
<tr>
<td>Spearmint 60% carvone</td>
<td>China</td>
<td>$23/kg</td>
</tr>
<tr>
<td>Chamomile (German)</td>
<td>German blue</td>
<td>$670/kg</td>
</tr>
<tr>
<td></td>
<td>Morocco (wild)</td>
<td>$450/kg</td>
</tr>
<tr>
<td></td>
<td>Egypt (blue)</td>
<td>$1,000/kg</td>
</tr>
<tr>
<td>Chamomile (Roman)</td>
<td>UK</td>
<td>$1000/kg</td>
</tr>
<tr>
<td>Sage</td>
<td>Croatia</td>
<td>$130/kg</td>
</tr>
<tr>
<td>Rosemary</td>
<td>Portugal/Spain/Tunisia</td>
<td>$55</td>
</tr>
<tr>
<td></td>
<td>Spain</td>
<td>$68/kg drum</td>
</tr>
<tr>
<td></td>
<td>France</td>
<td>$78</td>
</tr>
<tr>
<td>Marjoram</td>
<td>Spain (wild)</td>
<td>$210/kg 1 kg lots</td>
</tr>
<tr>
<td>Thyme</td>
<td>Spain</td>
<td>$677/kg; $85 1 kg lots</td>
</tr>
</tbody>
</table>
## Perfumery Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eucalyptus globulus &amp; other high cineole types</td>
<td>China</td>
<td>$13/kg container; $35/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Australian</td>
<td>$44/kg</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>$38/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Madagascar</td>
<td>$31/kg</td>
</tr>
<tr>
<td>Eucalyptus citriodora</td>
<td>China</td>
<td>$49/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Madagascar</td>
<td>$25/kg</td>
</tr>
<tr>
<td>Litsea cubeba</td>
<td>Spain</td>
<td>$22/kg</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>$21/kg container</td>
</tr>
<tr>
<td>Ylang ylang</td>
<td>Comores: Extra S</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Comores : Première</td>
<td>$225/kg</td>
</tr>
<tr>
<td></td>
<td>Comores : Deuxième</td>
<td>$180/kg</td>
</tr>
<tr>
<td></td>
<td>Comores : Troisième</td>
<td>$95/kg</td>
</tr>
<tr>
<td></td>
<td>Comores: Complet</td>
<td>$150/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Madagascar (grade II)</td>
<td>$80/kg</td>
</tr>
<tr>
<td>Ylang (cananga)</td>
<td>Indonesia</td>
<td>$61/kg 1 ton lots</td>
</tr>
<tr>
<td>Patchouli - Indonesia</td>
<td>Sulawesi min 26% pa</td>
<td>$48/kg</td>
</tr>
<tr>
<td></td>
<td>Sulawesi min 30% pa</td>
<td>$51/kg</td>
</tr>
<tr>
<td></td>
<td>Sulawesi min 30% pa, light</td>
<td>$52/kg</td>
</tr>
<tr>
<td></td>
<td>Sumatra min 30% pa</td>
<td>$62/kg</td>
</tr>
<tr>
<td></td>
<td>Sumatra min 32% pa</td>
<td>$67/kg</td>
</tr>
<tr>
<td></td>
<td>Sumatra min 34% pa</td>
<td>$72/kg</td>
</tr>
<tr>
<td></td>
<td>Sumatra min 30% pa, light</td>
<td>$64/kg</td>
</tr>
<tr>
<td>Rose</td>
<td>Bulgaria</td>
<td>$5,750/kg</td>
</tr>
<tr>
<td>Geranium</td>
<td>Egypt</td>
<td>$125/kg</td>
</tr>
<tr>
<td></td>
<td>Egypt</td>
<td>$120/kg</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>$155/kg</td>
</tr>
<tr>
<td></td>
<td>Madagascar</td>
<td>$310/kg</td>
</tr>
<tr>
<td>Rose Geranium</td>
<td>Madagascar/France</td>
<td>$225/kg</td>
</tr>
<tr>
<td>Niaouli (Cineole 1,8) (Malaleuca quinquenervia type I)</td>
<td>Madagascar</td>
<td>$16/kg; $60/kg 1 kg lots</td>
</tr>
<tr>
<td>Niaouli Viridiflora (Malaleuca viridiflora type II)</td>
<td>Madagascar</td>
<td>$20/kg</td>
</tr>
<tr>
<td>Petitgrain</td>
<td>Paraguay</td>
<td>$58/kg drum; $98/kg 1 kg lots</td>
</tr>
<tr>
<td>Sandalwood</td>
<td>India</td>
<td>$2,900/kg</td>
</tr>
<tr>
<td></td>
<td>East Indies</td>
<td>$2,500/kg</td>
</tr>
<tr>
<td></td>
<td>Australian</td>
<td>$2,025/kg</td>
</tr>
<tr>
<td>Cedarwood</td>
<td>USA</td>
<td>$52/kg</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>$13/kg container; $50/kg 1 kg lots</td>
</tr>
<tr>
<td>Frankincense</td>
<td>Somalia/France</td>
<td>$270/kg</td>
</tr>
<tr>
<td>Citronella</td>
<td>Chinese</td>
<td>$18/kg container; $23/kg; $53 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Sri Lanka</td>
<td>$40/kg container</td>
</tr>
<tr>
<td></td>
<td>Indonesia</td>
<td>$16/kg</td>
</tr>
<tr>
<td></td>
<td>Indian</td>
<td>$18/kg</td>
</tr>
<tr>
<td>Lemongrass</td>
<td>Indian</td>
<td>$16/kg container; $37/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Madagascar (C. giganteus)</td>
<td>$55/kg</td>
</tr>
<tr>
<td>Palmarosa</td>
<td>Indian</td>
<td>$38/kg; $130/kg 1 kg lots</td>
</tr>
<tr>
<td>Vetiver</td>
<td>Indonesian</td>
<td>$180/kg; $380/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Indonesian</td>
<td>$190 rectified</td>
</tr>
<tr>
<td>Product</td>
<td>Origin/Grade</td>
<td>Prices per KG</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Indonesian</td>
<td>molecular dist.</td>
<td>$225/kg</td>
</tr>
<tr>
<td>Tea Tree</td>
<td>Australia</td>
<td>$44/kg; $90/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Australia, lemon scented</td>
<td>$140/kg</td>
</tr>
<tr>
<td>Guaiacwood</td>
<td>Paraguay</td>
<td>$25/kg drum</td>
</tr>
<tr>
<td>Fennel, bitter</td>
<td>Spain</td>
<td>$97/kg</td>
</tr>
<tr>
<td>Juniperberry</td>
<td>India</td>
<td>$120/kg; $260/kg 1 kg lots</td>
</tr>
<tr>
<td>Myrrh</td>
<td>India (extract)</td>
<td>$133/kg</td>
</tr>
<tr>
<td></td>
<td>India (distilled)</td>
<td>$270/kg; $395/kg 1 kg lots</td>
</tr>
</tbody>
</table>
**Price Information**

Organic essential oils

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Price indications collected from the markets are given for a range of essential oils, below. The oils are grouped *for convenience only* into Spice Oils, Seed Oils, Citrus Oils, Herb Oils and Perfumery Oils. Prices are wholesale for quantities of 25kg or more unless otherwise stated.

### Spice Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clove bud</td>
<td>Indian</td>
<td>$150/kg</td>
</tr>
<tr>
<td>Clove leaf</td>
<td>Indian</td>
<td>$75/kg</td>
</tr>
<tr>
<td>Cinnamon bark</td>
<td>Sri Lankan</td>
<td>$420/kg</td>
</tr>
<tr>
<td>Cinnamon leaf</td>
<td>Sri Lankan</td>
<td>$110/kg</td>
</tr>
<tr>
<td>Nutmeg</td>
<td>Indonesian</td>
<td>$172/kg</td>
</tr>
<tr>
<td>Ginger</td>
<td>India</td>
<td>$270/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$170/kg drum</td>
</tr>
</tbody>
</table>

### Spice Seed Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star Anise</td>
<td>China</td>
<td>$180/kg</td>
</tr>
<tr>
<td>Cumin seed</td>
<td>Egypt</td>
<td>$90/kg</td>
</tr>
</tbody>
</table>

### Citrus Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange (sweet)</td>
<td>Italian (c/pressed)</td>
<td>$36/kg</td>
</tr>
<tr>
<td>Orange (bitter)</td>
<td>Italian (c/pressed)</td>
<td>$135/kg</td>
</tr>
<tr>
<td>Bergamot</td>
<td>Italy (c/pressed)</td>
<td>$195/kg</td>
</tr>
<tr>
<td>Lemon</td>
<td>Italian (c/pressed)</td>
<td>$60/kg</td>
</tr>
<tr>
<td></td>
<td>Italian (c/pressed)</td>
<td>$71/kg</td>
</tr>
<tr>
<td></td>
<td>Argentina</td>
<td>$75</td>
</tr>
<tr>
<td>Mandarin (red)</td>
<td>Italy</td>
<td>$225/kg</td>
</tr>
<tr>
<td>Mandarin (green)</td>
<td>Italy</td>
<td>$187/kg</td>
</tr>
<tr>
<td>Clementine</td>
<td>Italy</td>
<td>$120/kg</td>
</tr>
<tr>
<td>Petitgrain (C. aurantium)</td>
<td>Paraguay</td>
<td>$110/kg</td>
</tr>
</tbody>
</table>
### Herb Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basil</td>
<td>Egypt</td>
<td>$187/kg</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>n/a</td>
</tr>
<tr>
<td>Lavender</td>
<td>France</td>
<td>$210/kg</td>
</tr>
<tr>
<td>Lavendin</td>
<td>French Grosso</td>
<td>$555/kg</td>
</tr>
<tr>
<td>Mint, peppermint</td>
<td>USA</td>
<td>$90/kg</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>$65/kg drum</td>
</tr>
<tr>
<td>Mint, Cornmint</td>
<td>India, mentha arvensis</td>
<td>$52/kg</td>
</tr>
<tr>
<td>Mint, spearmint, M. spicata</td>
<td>USA</td>
<td>$112/kg</td>
</tr>
<tr>
<td>Chamomile (German)</td>
<td>Nepal</td>
<td>$780/kg</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>$1,250/kg</td>
</tr>
<tr>
<td>Chamomile (Roman)</td>
<td>Hungary</td>
<td>$1,500/kg</td>
</tr>
<tr>
<td>Sage</td>
<td>Croatia</td>
<td>$240/kg</td>
</tr>
<tr>
<td>Rosemary</td>
<td>Spain</td>
<td>$42/kg</td>
</tr>
<tr>
<td></td>
<td>Tunisia</td>
<td>$25/kg</td>
</tr>
<tr>
<td>Marjoram</td>
<td>Spain</td>
<td>$330/kg</td>
</tr>
<tr>
<td>Thyme</td>
<td>Hungary</td>
<td>$300/kg</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>$65/kg</td>
</tr>
<tr>
<td>Fennel</td>
<td>India</td>
<td>$130/kg</td>
</tr>
</tbody>
</table>

### Perfumery Oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin/Grade</th>
<th>Prices per KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eucalyptus radiata &amp; other high cineole types</td>
<td>China</td>
<td>$64/kg</td>
</tr>
<tr>
<td>E. globulus</td>
<td>India</td>
<td>$45/kg (60%)</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>$50/kg (80%)</td>
</tr>
<tr>
<td>E. polybractea</td>
<td>Australian</td>
<td>$135/kg</td>
</tr>
<tr>
<td>E. smithii</td>
<td>South Africa</td>
<td>$75/kg</td>
</tr>
<tr>
<td>Eucalyptus citriodora</td>
<td>Brazil</td>
<td>$52/kg</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>46/kg</td>
</tr>
<tr>
<td>Litsea cubeba</td>
<td>Spain</td>
<td>$35/kg</td>
</tr>
<tr>
<td>Ylang ylang</td>
<td>Comores: I</td>
<td>$225/kg</td>
</tr>
<tr>
<td></td>
<td>Comores : II</td>
<td>$180/kg</td>
</tr>
<tr>
<td></td>
<td>Comores : III</td>
<td>$210/kg</td>
</tr>
<tr>
<td></td>
<td>Comores: Complet</td>
<td>$330/kg</td>
</tr>
<tr>
<td>Patchouli</td>
<td>Indonesia</td>
<td>$175/kg;</td>
</tr>
<tr>
<td>Geranium</td>
<td>Egypt</td>
<td>$375/kg 1 kg lots</td>
</tr>
<tr>
<td>Sandalwood</td>
<td>Sri Lanka</td>
<td>$1,950/kg 1 kg lots</td>
</tr>
<tr>
<td>Cedarwood</td>
<td>USA</td>
<td>$63/kg</td>
</tr>
<tr>
<td>Naouli</td>
<td></td>
<td>$97/kg</td>
</tr>
<tr>
<td>Ravinsara</td>
<td>Madagascar</td>
<td>$275/kg 10 kg lots</td>
</tr>
<tr>
<td>Frankincense</td>
<td>Somalia/France</td>
<td>$525/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>India (B. serrata)</td>
<td>$78/kg drum</td>
</tr>
<tr>
<td>Pine (P. silvestris)</td>
<td>Hungary</td>
<td>$190/kg</td>
</tr>
<tr>
<td>Citronella</td>
<td>Sri Lanka</td>
<td>$100/kg</td>
</tr>
<tr>
<td>Product</td>
<td>Origin/Grade</td>
<td>Prices per KG</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>India</td>
<td>India</td>
<td>$63/kg</td>
</tr>
<tr>
<td>Lemongrass</td>
<td>Nepal</td>
<td>$75/kg</td>
</tr>
<tr>
<td>Palmarosa</td>
<td>India</td>
<td>$80/kg</td>
</tr>
<tr>
<td>Vetiver</td>
<td>Indonesian</td>
<td>$450/kg 1 kg lots</td>
</tr>
<tr>
<td></td>
<td>Indian</td>
<td>$350/kg</td>
</tr>
<tr>
<td>Tea Tree</td>
<td>Australia</td>
<td>$90/kg;</td>
</tr>
<tr>
<td></td>
<td>Australia, lemon scented</td>
<td>$225/kg</td>
</tr>
<tr>
<td>Fennel, sweet</td>
<td>Bulgaria</td>
<td>$150/kg</td>
</tr>
<tr>
<td>Juniperberry</td>
<td>India</td>
<td>$225/kg</td>
</tr>
<tr>
<td>Myrrh</td>
<td>Africa</td>
<td>$1,800/kg</td>
</tr>
</tbody>
</table>
Suppliers of Equipment

Suppliers to the African market

The distillation and extraction industry in Africa is relatively small and localised outside of the North African centers of Egypt and Morocco, and Southern Africa (South Africa, Swaziland). New entrants to the industry can find it hard to identify suppliers of equipment (stills, condensers, extractor vessels etc) in stainless steel, steam boilers, and other necessary materials (drums, jugs, filter papers etc).

The development of the industry in Africa would benefit greatly if there was greater sharing of information on the location of suppliers. New entrants would find it easier to identify necessary suppliers, and the concentration of orders on particular suppliers would encourage the development of skills and expertise – this is particularly necessary in the areas of fabrication of stainless steel vessels and condensers.

Some contacts of companies involved in the manufacture of distillation/extraction equipment or the capability to do so (primarily the capability to work with stainless steel) or supply of materials based in East Africa are given below.

_The Newsletter would welcome information from Readers on other suppliers of relevant equipment and materials from all regions of Africa, so that the listing can be expanded._ Please send any information to marketinsider@intracen.org

The contacts are provided as a service only. NO RECOMMENDATION IS IMPLIED.

1. **MANUFACTURE OF STAINLESS STEEL DISTILLATION EQUIPMENT:**

**KENYA**

ASL – Heavy Fabrication Division
Ramco Industrial Park
Mombassa Road
PO Box 18639-00500
Nairobi. Kenya
Tel: +254 20 821567/820296/820394
Fax: +254 20 820169/651893
bm@heavyfab.co.ke
Attn: Mr Ve Balamurali, General Manager

Warren Enterprises Ltd
PO Box 8251
Nairobi. Kenya
Tel: +254 20 8561 932/3/4
Fax: +254 20 8561 013
Attn: Mr S Ramaswamy, Managing Director

Morris Steel & Company
Mogadishu Road
PO Box 18310
Nairobi. Kenya
Tel: +254 20 533 627
Attn: General Manager

**UGANDA**

Specialised Welding Services (previously Kasise Kleinsmedie Uganda Ltd)
Jinja Road, Plot 96
PO Box 40115
Nakawa Vocational Training Center
Kampala
Uganda
Tel: +256 (776) 405060/405070/405080
+256 (772) 227 003 (Samantha Moray)
sam.moray@sws.co.ug
Attn: Samantha Moray, General Manager
www.sws.co.ug

MADAGASCAR

Societe Aris Trading
Lot VB 81X Ambatoroka
101-Antananarivo. Madagascar
Tel: +261 20 24 264 96
Fax: +261 20 22 290 24
aristrading@freenet.mg
Attn: Mr James Davidson

ATICOM
Lot IT 91A Itaosy
102 Antananarivo – Atsimondrano. Madagascar
Tel: +261 32 07 744 34
morasatajosoa@yahoo.fr
Attn: Josoa Andriamorasata

SOUTH AFRICA

EDESA (Essential Distillation Equipment)
PO Box 123
Riebeek Kasteel 7306
Western Cape. South Africa
Tel: +27 (82) 334 3324
fax: 0866 088508
info@edesa.co.za
werner.ede@vodamail.co.za
www.edesa.co.za
www.stillpure.co.za
Skype: werner.bester2
Attn: Werner Bester
Manufacture of distillation equipment and sales of used equipment.

BENCO PLANT & ENGINEERING (PTY) Ltd
159 Van Eeden Crescent, Rosslyn, Karin Park
P O Box 59. Pretoria, Gauteng. South Africa
Tel: +27 (12) 541-0398
Fax: +27 (12) 541-0399
Attn: Sloam Durbach
Manufacturer of distillation equipment and steam boilers

POWERSAVE
PO Box 699
Hilton 3245. South Africa
Tel (cell): +27 82 493 8670
Fax: +27 33 34 33 755
Attn: Greg Rowe
gregrowe@telcomsa.net
Manufacture of steam distillation plants
Manufacture of stainless steel distillation and processing equipment. Also sales of secondhand equipment.

THE PROCESS TEAM CC
37 Nelson Road, Amanzimtoti
Kwa-Zulu Natal 4126. South Africa
Attn: Peter Myburg

Design and manufacture of stainless steel distillation equipment.

2. SUPPLIERS OF STEAM BOILERS

MADAGASCAR

ARTICOM
Lot IT 91A Itaosy
102 Antananarivo – Atsimondrano. Madagascar
Tel: +261 32 07 744 34
morasatajosoa@yahoo.fr
Attn: Josoa Andriamorasata

ARTICOM make a simple, low pressure, wood fired steam boiler.

KENYA

Industrial Boiler Products Co. Ltd.
Kampala Road, Industrial Area
Nairobi, Kenya.
+254 733 700175
mail@industrialboilerproducts.co.ke
peter.fernandes@industrialboilerproducts.co.ke
Peter Fernandes
www.ibp.co.ke
Indian manufactured steam boilers; biomass fired.

Boiler Consortium Africa (BCA) Ltd
PO Box 60780. Nairobi. Kenya
Tel: +254 20 557837/ 536793/ 4349310
Tel: +254 722 750131/ 703511/
Fax: +254 20 735 33177
Barry Corlines
info@boilersafrica.com
www.boilersafrica.com

BCA design, manufacture and commission boilers, included wood fired steam boilers, and are agents for Riello in East Africa.
SOUTH AFRICA

Combustion Technology South Africa
PO Box 30047. Tokai, 7966 Cape Town, South Africa
Tel: +27 21 715 3171
Fax: +27 21 715 6297
www.combustiontechnology.co.za

Combustion Technology are the exclusive Southern African distributors of Riello burners and Garioni Naval Boilers.

BENCO PLANT & ENGINEERING (PTY) Ltd
159 Van Eeden Crescent, Rosslyn, Karin Park
P O Box 59. Pretoria, Gauteng. South Africa
Tel: +27 (12) 541-0398
Fax: +27 (12) 541-0399
Attn: Sloam Durbach
Manufacturer of distillation equipment and steam boilers

CAPE BOILER
16 Natal Street, Parden Island, Cape Town, South Africa
Tel: +27 21 511 6652
Fax: +27 511 4415
Attn: Mr Nic Kellerman

INDIA

Firetech Boilers Pvt Ltd
FIRETECH HOUSE, No.211, 2nd Cross, 38th Main,
B.T.M Layout, 2nd Stage, Bangalore 560 068. India
Tel: +91-80-6683686; Fax: +91-80-6683921
Email: firetech@vsnl.net
Manufacture of wood fired steam boilers. Indian manufacturer, but has supplied boilers to Africa.

AUSTRIA

Binder GMBH
Mitterdorferstr. 5
8572 Barnbach
Austria
Email: office@binder-gmbh.at
Tel: +43 3142 22544-0
Fax: +43 3142 22544-16
www.binder-gmbh.at

Binder Agents in UK:
Wood Energy Ltd, Severn House, 1-4 Fountain Court, Bradley Stoke, Bristol. BS32 4LA
www.woodenergyltd.co.uk

Kohlbach Group
Grazer Strabe 23
A-9400 Wolfsberg
Austria
Email: office@kohlbach.at
Tel: +43 4352 2157-0
Fax: +43 4352 2157-290
www.kohlbach.at
3. SUPPLIERS OF MATERIALS AND EQUIPMENT

(a) Forklift trucks/pallet trucks

Forktruck Solutions
16 Kiewiet Close, Okavango Park, Brackenfell 7560, Cape Town. South Africa
Postal address: PO Box 3221, Durbanville 7551. South Africa
Tel: +27 21 982 1142 and +27 21 981 2649;
Cell: +27 83 2848 557
Fax: +27 21 982 1141
Attn: Dirk van der Westhuizen
dirk@forktrucksolutions.co.za
www.forktrucksolutions.co.za

Sales and rental of new and used forklift trucks. Also pallet jacks/stackers and range of other warehouse equipment.

(b) Hoists and lifting equipment

Blue Cranes,
Crane House, 10 Mansell Road, Killarney Gardens, Minerton, Cape Town, South Africa
Postal address: PO Box 702, Melkbosstrand 7437. South Africa
Tel: +27 21 556 0498/9
Fax: +27 21 556 0486
Attn: Mr Kobus Steyn
joseph@bluecranes.co.za
www.bluecranes.co.za

Manufactures full range of hoists, beam girder cranes and lifting equipment. Sole supplier of Liftket electric chain hoists and wire rope hoist units. Repairs and spare parts supply service. Supply of associated slings, chains, blocks etc.

(c) Essential oil drums:

Greif supply a range of steel and coated drums, and are present in 45 countries around the world.

Greif Kenya Ltd
Box 9036 - Unga Street
Shimanzi – Mombasa. Kenya
Tel: +254 41 2495591
Fax: +254 41 2494038
pascal.wanyonyi@greif.co.ke
Attn: Pascal Wanyonyi

Greif Nigeria Ltd
Apapa, Nigeria
Phone +234 (01) 587 0866
Fax +234 (01) 587 3084
vanleer@linkserve.com.ng
Attn: Olukunle Obadina,

Greif South Africa Ltd
Vanderbijlpark, South Africa
Phone +27 (0) 16 930 1100
Fax +27 (0) 16 930 1106
carl.williams@grief.com
Attn: Carl Williams
Website: www.greif.co.za

Greif Mozambique
Maputo, Mozambique
Phone +258 21 720153
Fax +258 21 720724
vanleer@vironn.com

Greif Egypt
Cairo, Egypt
Phone +20 2588 1110
Fax +20 2593 3889
E-mail: koracons@link.com.eg
Attn: Ayman Korra

Greif Algeria
Arzew, Algeria
Phone + 213 41473723 / + 213 41473724
Fax + 213 41473730
Mohamed.Gherbi@Greif.com
Attn: Mohamed Gherbi

CHINA

Guangzhou New Jinrong Coopery Co. Ltd.
No.7 Huancui xi road
Cuishanhu new district
Kaiping
Guangdong, China
Ms. Lucinda Lux
Tel: +86 159 14338971, +86 18620468156, 0750-2889978
Fax: +86 7502889978
Email: newjinrong@163.com; paul_chew@163.com
SKYPE: xpyllj74

INDIA

Al-Can Exports Pvt Ltd
Sheetal Industrial Estate, Kashimira Road,
Bhayander East District,
Thane 401 105
India.
Tel: +91 22 2819 3122
Fax: +91 22 2814 2477
Email: info@alcanexports.com
Large range of aluminium flasks and bottles.

FRANCE

Tournaire SA
70, Route de la Paoute
Le Plan.
BP 71004
06131 Grasse Cedex

Market Insider
Essential Oils & Oleoresins – October 2015
France
Tel: +33 493 09 34 34
Fax: +33 493 09 34 00
Email: tournaire@tournaire.fr
Tournaire do a very wide range of aluminium bottles.

(d) Secondhand/used equipment
Secondhand equipment, particularly stills and condensers, can represent very good value. Details are given for 2 companies which have experience of shipping worldwide, and sometimes have distillation equipment in stock.

Perry Process Equipment Ltd
Station Road
Aycliffe Business Park
Newton Aycliffe
County Durham. DL5 6EQ. UK
Phone: +44 1325 315111
Fax: +44 1325 301496
info@perryprocess.co.uk
Website: www.perryprocess.co.uk
Perry Process Equipment is the European headquarters of the Perry Group of companies, which has operations around the world and is one of the worlds largest dealers in secondhand process equipment.

Centriplant Ltd
Littlemead Industrial Estate
Alfold Road
Cranleigh
Surrey. GU6 8ND
UK
Phone: +44 (01483) 271507
Fax: +44 (01483) 278183
Contact: Mark Williams markw@centriplant.co.uk
Website: www.centriplant.co.uk
Centriplant has distillation plants on an occasional basis, but always have a range of stainless steel tanks, and bottling/packing lines that could also be of interest to producers.
Events Calendar

Flavorcon 2015
15-17 November 2015. Atlantic City, USA
www.flavorcon.com

Perfumes & Cosmetics Congress – Regulatory Affairs
18-19 November 2015. Chartres, France
www.congres-parfumscosmetiques.com/en

From Flowers to Fragrances: challenges and innovations
26 November 2015. Grasse, France
www.pole-pass.fr

Fl Europe & Ni 2015
1-3 December 2015. Paris, France
www.foodingredientsglobal.com/en/europe/home

7th Annual Bio-Based & Sustainable Products Summit
13-14 January 2016. San Diego, USA
www.infocastinc.com/events/biobased-chemicals

Cosme Tokyo 2016
20-22 January 2016. Tokyo, Japan
www.cosmetokyo.jp/en/ex

Cosme Tech 2016
20-22 January 2016. Tokyo, Japan
www.cosme-i.jp/en

International Spice Conference
21-24 January 2016. Goa, India
www.internationalspiceconference.com

American Spice Trade Association Annual Meeting
10-13 April 2016. Scottsdale, AZ, USA
www.astaspice.org

Beauty Eurasia 2016
21-23 April 2016. Istanbul, Turkey
www.beauty-events.com/Beauty-Eurasia

Cosmobeaute Vietnam
21-23 April 2016. Saigon, Vietnam
www.beauty-events.com/Cosmobeaute-Vietnam

World Perfumery Congress 2016
13-15 June 2016. Florida, USA
http://wpc.perfumerflavorist.com

Cosmobeaute Asia
18-21 July 2016. Kuala Lumpur, Malaysia
www.beauty-events.com/Cosmobeaute-Asia

BiobasedWorld Tradeshow
15-16 February 2017. Cologne, Germany
www.boibiobasedworld.de/en/home.html