



PURE NATURAL EXTRACTS AND OILS



FLAVEKO Trade spol. s r.o.
Prumyslova 381, 533 01 Pardubice
Czech Republic, Europe

tel: +420 466 670 725

fax: +420 466 670 166

mail: info@flavekotrade.cz

www.flavekotrade.cz

www.supercriticalextraction.eu



www.extractionsupercritical.com



SUPERCritical EXTRACTION
BY CARBON DIOXIDE



FLAVEKO Trade spol. s r.o.

Pure natural extracts and oils – Supercritical extraction since 1993

We would like to introduce FLAVEKO Trade, a company based in Europe, Czech Republic. We are based 100km east of Prague in the city of Pardubice.

Main business of FLAVEKO Trade consists of extracts production from natural materials and the subsequent sale of these extracts mostly to manufacturers of pharmaceutical, food and cosmetic products. Production is carried out by a unique method of supercritical fluid extraction (SCE) on a custom designed and built extraction plant.

This technology helps us to clearly differentiate from the competitors, whose extracts are produced by conventional dissolving methods using organic solvents or pressing. We are offering interesting and individual extraction conditions thanks to the characteristics of our custom built extraction plant developed by our own team of experts. We are also able to offer flexible implementation of relatively smaller volumes of extracted materials.

All our products are 100% natural and all BIO characteristics are preserved during extraction. These characteristics are much desired today and will be even more in the upcoming future.



Basic characteristics of the product

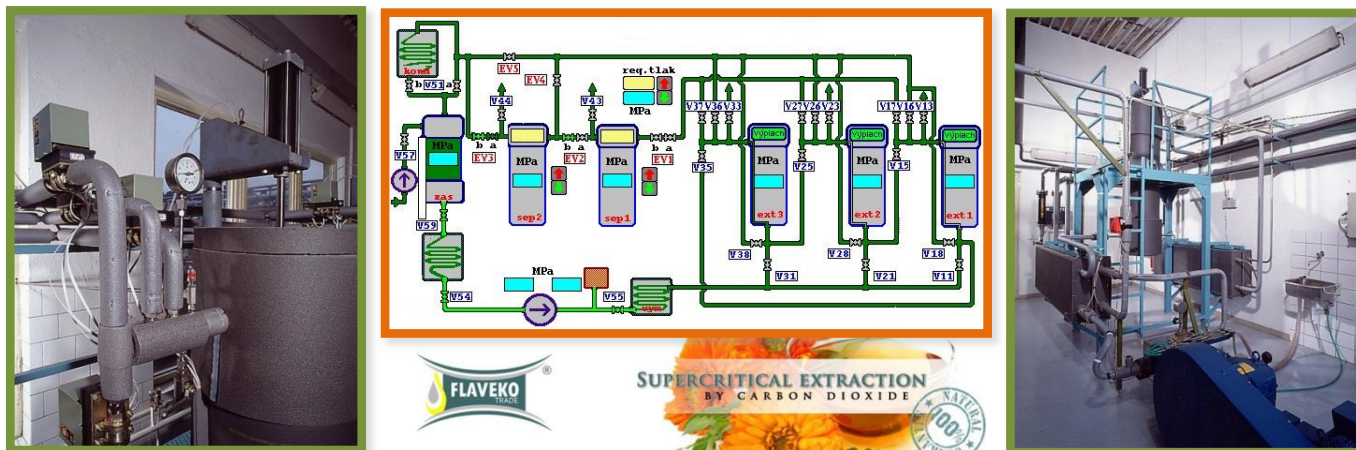


The company produces pure natural extracts using supercritical extraction by carbon dioxide (SCE). Extracts produced by this method are absolutely pure without any traces of toxic organic solvents and are very suitable for use in the food and pharmaceutical industry.

Our most common products are evening primrose oil, borage oil, hop extract, amaranth oil, saw palmetto oil etc.

FLAVEKO Trade

The firm FLAVEKO was established in 1993. We immediately started working on the design and construction of a laboratory and commercial extraction unit. The custom design and construction of our own plant was essential for the whole economy of the future production. In 1994 we started our laboratory extraction unit which made it possible for us to develop in advance a range of extracts that were expected to be commercially exploitable in large volumes. In 1995 we started testing our commercial extraction unit. The equipment met expected requirements and achieved claimed parameters. The plant is currently fully functional and produces various vegetal extracts.



Typically, two variants can be characterized as our basic production models – first is to provide extraction services, extracted raw materials are then delivered to the customer who provided it. The second is the sale of final extracts from raw materials we buy ourselves.

Prices vary depending on product characteristics. For raw materials processing, we call it design extraction or toll extraction, reaching values from \$2 to \$250 per 1 kg of raw material processed through our unit (this price includes all support services linked with extraction). In case of a final extract sale, prices are from \$50 to \$1000+ per 1 kg of 100% extract.

Our main competitors are companies involved in producing extract by the same supercritical technology and firms using chemical solvents. The foreign competition is mostly using high capacity extraction plants specialized on a specific type of extract and that is the reason for its different target customers. The flexibility and medium volume capacity is our advantage (we can offer better extraction conditions for smaller volumes and more individual approach to satisfy our customers).

FLAVEKO Trade offers



FLAVEKO Trade offers extraction or extracts from various vegetal materials. The extracts are produced on our supercritical extraction unit and they do not contain additives of any kind or harmful solvent residues.

We offer following options for cooperation:

- 1) Toll extraction:** In this case the customer delivers its own raw material for the extraction. We then process it and deliver the final extract.
- 2) Sale of extracts:** Extracts are produced from our raw materials.
- 3) Provision of know-how:** in the field of supercritical extraction.

Our main products are the following botanical materials:

- **Evening primrose** (*Oenothera biennis*) - Extraction of seeds
- **Borage seed** (*Borago officinalis*) - Extraction of seeds
- **Hemp** (*Cannabis sativa*) - Extraction of seeds and foliages
- **Saw palmetto** (*Serenoa repens*) - Extraction of fruits
- **Marigold** (*Calendula officinalis*) - Extraction of flowers
- **Amaranth** (*Amaranthus*) - Extraction of seeds

And many others like **Sea buckthorn** (*Hippophae rhamnoides*) or **Hops** (*Humulus lupulus*) etc.



List of extractable material

A: Angelica root, Arnika **B:** Bay leaves, Bitter almonds, Black current seed, Borage **C:** Calendula, Cardamom, Carrot-Jojoba, Caraway, Cassia, Celery seed, Chamomile, Citronell, Cloves, Cinnamon, Coriander, Curcuma, Cypress **D:** Dill **E:** Elder flower, Evening primrose, Eukalyptus **F:** Fennel **G:** Garlic, Geranium, Ginger, Goldenseal, Grape seed **H:** Hops **I:** Iris **K:** Kola nut **L:** Lavender **M:** Marjoran, Muskat **N:** Nutmeg **O:** Onion **P:** Sweet Paprika, Peach leaves, Peppermint, Pine needles, Pumpkin seed **R:** Red currents seed, Rosehip, Rosemary **S:** Sage, Saw palmetto (*Serenoa repens*), Sea buckhorn **T:** Tea, Tea Tree, Thyme **V:** Vanilla, Valerian **W:** Wormwood

This list is by no means complete to illustrate the potential of the supercritical extraction by carbon dioxide. Supercritical carbon dioxide acts like a non-polar solvent and its power can be varied by changes of pressure and temperature.

Areas of SCE utilization

Food industry

- Extraction of vegetal and animal fats and oils
- Spices and flavourings from vegetables
- Natural vitamins
- Hop extract
- Decaffeination of coffee



Cosmetic industry

- Oils and extracts from seed, blossoms, leaves and roots
- Vegetal essences and aromas
- e.g. extracts from Borage, Evening primrose, Marigold, Hemp

Pharmaceutical industry

- Food supplements and medicines
- e.g. extracts from Saw palmetto, Borage, Evening primrose, Marigold, Hemp



Chemical industry

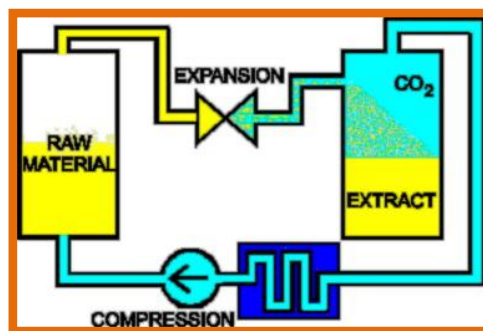
- Regeneration of catalysts and adsorbents
- Extraction of organic compounds from aqueous solutions
- Crystallization of heat-sensitive substances

Advantages of Supercritical extraction are the following:

- gentle processing of thermally unstable substances
- no harmful residues of toxic solvents in the extract (plus no ecologically harmful waste)
- absolute purity of the extract, no loss taste
- possibility of selective separation
- solution characteristics of SC carbon dioxide can be varied by changes of pressure and temperature
- Carbon dioxide is non-flammable, inexpensive, physiologically safe (widely used in food industry).

PRINCIPLES OF CO₂ EXTRACTION (SCE)

Extraction by supercritical carbon dioxide is an advanced separation process meeting the strictest ecological and hygienic requirements. Compressed gas passes in an extractor through a bed of extracted material. The gas laden with extract is then fed to a separator via an expansion valve. By reducing the pressure in the expansion valve the solvent power of carbon dioxide is also reduced and the extract precipitates in the separator. The gaseous extract-free carbon dioxide is then liquified in an condenser, compressed in an circulating pump, heated and fed back to the extractor. This



completes the process that operates in a closed circuit consisting of intake-compression-extraction-expansion-condensation-intake. All process side parts are made of stainless steel.

Commercial unit

This unit includes three extractors for a semicontinuous operation and two separators for a complete separation. The volume of one extraction cartridge is 100 l. Maximum operating pressure is 300 bar, operating temperature 40-60 °C (max. 70 °C). The capacity depends on the type of extracted raw material. It varies from 100 to 500 tons of processed material per year.



Laboratory unit

We have our R&D Laboratory unit for research and development of new products. The unit makes it possible to produce small amounts of extracts for tests and for assessing operating and economic feasibility of the process. This compact unit consists of one extractor (extraction cartridge 0.5 l), two separators, circulating pump, heating and cooling circuits. Max. operating pressure is 300 bar, operating temperature 40-60 °C (max. 70 °C).



FLAVEKO Trade is active in the development of new products and technologies in the field of supercritical extraction by carbon dioxide.

Please note that you can find more detailed information on our English website at

www.supercriticalextraction.eu - Feel free to contact us anytime.

www.supercriticalextraction.eu

Thank you

