

# Using CO<sub>2</sub> extracts in cosmetics

Application of subcritical CO<sub>2</sub>-extracts when producing cosmetic products raises advantages of the latter ones giving cosmetic bases various valuable properties. CO<sub>2</sub>-extracts increase regenerating properties of creams, develop nutritious, protective, humidifying creams, eliminate vitamin insufficiency, lower asteatosis state of skin; the extracts also enrich the cream with biologically active substances.

In practice, it is possible to transfer a huge variance of natural substances to a cosmetic product as a CO<sub>2</sub>-extract or a combination of the extracts. In addition to a healthy influence on one's skin, CO<sub>2</sub>-extracts also provide stability of a cream in relation to oxidizing exposures, as well as regarding the action of micro-organisms.

The lipophilia of CO<sub>2</sub>-extracts ensures superior skin action deeply penetrating the hypodermic capillaries at molecular level.

The subcritical CO<sub>2</sub>-extracts giving the creams all of the above properties are listed in *Table 1*

overleaf together with their recommended use ratios (in percent to the total mass).

The combinations of CO<sub>2</sub>-extracts should also be of special interest for cosmetic products development. These extracts distinguish from simple mixtures of extracts by the fact that several kinds of vegetative raw materials are extracted simultaneously at a specially selected ratio, forming complex and at the same time valuable systems (blends). The matter is that during subcritical extraction the adjustment, balancing and forming of the composition occurs at molecular level. As a result, synergistically compatible and balanced product is received containing aromatic, biologically active, pharmacological and other valuable components.

These blends facilitate the work of cosmeticians on creating a wide range of biocosmetic products with targeted action, tailored for various types of skin or for different parts of human body. We may offer a number of combinations of CO<sub>2</sub>-extracts. The examples are given in *Table 3* overleaf with the fillings rates given in percentage of the total mass.

## General recommendations on use of subcritical CO<sub>2</sub>-extracts in cosmetic products by age groups of costumers

### Infants and Young children

Child's skin is rich with blood capillaries thus it shows increased ability for absorption. Compared to the adults, the dosage of bioadditives should be reduced down to 10%.

Practically, only anti-inflammatory, antibacterial, antiallergic and drying remedies are used.

### Children (7 to 14 years old)

Dosages of the bioadditives are approximately 50% compared to adults.

### Teenagers and Youth (up to 25 years old)

The dosages are to be increased up to 65%.

Teenage skin is especially sensitive to any infection due to metabolism imbalance and because host defences of an organism are weak. The following actions are especially recommended: additional nutrition of skin with vitamins and sedatives containing anti-inflammatory, antiallergic, bactericidal and bacteriostatic components.

### Adults (25 to 45 years old)

Bioadditives consumption is assumed to be equal to 100%.

Biocosmetics is used mostly preventively. Vitamin additives and bactericidal substances are introduced.

### Mature Age (over 45)

Ageing of skin is an individual process, so additives amount sometimes can be reduced, but more often it should be increased up to 1.5 times. Devastation of intercellular spaces results in connective tissue losing its elasticity flabbiness of skin and nutrition disorder due to sclerosis changes in capillaries. The addition of such bioactive substances as vitamins, hormones, trace elements, pharmacologically active substances (anti-inflammatory, antiallergic, bactericidal, etc.) is important.

**Table 1. Filling rates of subcritical extracts in % to the total mass of the final product**

Subcritical CO <sub>2</sub> -extracts	Filling Rates
barley sprouts	0.03 - 0.07%
wheaten bran	0.1 - 0.3%
wild camomile	0.1 - 0.2%
seeds of carrots	0.15 - 0.25%
yeasty residuum of grape wines	0.5 - 1.2%
coniferous boughs of Siberian fir	0.1- 0.3%
sea-buckthorn berries	0.2 - 1.5%
seeds of grapes	1.5 - 3%
coniferous boughs of Caucasian fir	0.1- 3%
dioecious nettle	up to 0.3%
milfoil	0.02 - 0.3%
extracts of pomegranates	0.1 - 1.0%
mint	0.04 - 0.05%
hop	0.01 - 0.06%
fennel	0.04 - 0.20%
parsley	0.025 - 0.1%
bur-marigold	0.05 - 0.5%

**Table 2. Examples of some of the extracts and their positive effects on the skin**

Subcritical CO <sub>2</sub> -extracts	Positive Effects
barley sprouts wheaten bran wild camomile (combination)	nutrition action for any skin type, eliminates vitamin insufficiency and improves skin's regenerating properties
yeasty residuum of wines	improves metabolic processes of skin, accelerates epithelization of wounded places, and promotes skin regeneration
coniferous boughs of Siberian fir	stimulates fermental activity of skin, has anti-inflammatory effect and reduces permeability of skin vessels contain ether oil, bornylacetate as a basic component. Vitamins E and C show antibacterial properties, especially regarding staphylococcus.
sea-buckthorn berries	anti-inflammatory effect, increases permeability of skin vessels, prevents skin peeling, free of irritative and allergenic actions
grape seeds	has tonic and hydrotant properties, protects skin against premature withering, saves skin's elasticity, promotes favourable metabolism

**Table 3. Various combinations of CO<sub>2</sub>-extracts for use in cosmetics manufacturing**

Blends of CO <sub>2</sub> -extracts	Filling Rates	Effects
parsley seeds grape seeds pomegranate marcs	0.1 – 1.5%	It has biogenic-stimulus properties, improves exchange processes, accelerates epithelization, adjusts fatty exchange of epithelium cells, and gives antispasmodic and bactericidal effect; may be used in biocream for fat skin
calamus bur-marigold hop	0.1 – 1.0%	biostimulation, bactericidal effect, skin vitaminization
hop milfoil red capsicum pepper	0.07 – 0.2%	Anti-inflammatory, antiseptic, bactericidal, bleaching effect, local-irritating effect causing blood rush; limits discharge of sebaceous glands; intensifies metabolism, raises skin tonus
waste products of lavender camomile parsley	0.05 - 0.2%	Bleaching effect.
grape seeds pomegranates marcs seeds of fennel seeds of parsley	0.06 - 0.15%	Bleaching, anti-inflammatory, tonic, regenerating effects and bactericidal action.
milfoil hop fennel seeds	0.1 – 0.6%	Antiallergic, antipruritic, soothing action. Smooths fine wrinkles, promotes formation of new cells. Tonic, antiseptic and anti-inflammatory effect. Smoothens hands skin.

medicinal sage carnation seeds of carrots	0.1 – 0.6%	Anti-inflammatory, styptic, disinfectant and antiseptic, plasticizing, softening effect. Used for feet skin
wild camomile nettle mint	0.04 – 0.2%	Regenerating, antiallergic action with stimulating, freshening, calming effect; effective when reddening skin