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## Ribes nigrum berries (use in phytotherapy)

### Phytotherapy

#### SYNONYMS

black currant, blackcurrant.

#### DESCRIPTION

*Ribes nigrum*, known as the blackcurrant or black currant, belongs to the family of the Grossulariaceae and originates from Central and Eastern Europe plus parts of Asia. This bush has been cultivated since the 17th century and it is now only rarely found in the wild.

The thornless variety of the blackcurrant bush grows up to 2 metres in height and it flowers in April and May.

The plant produces multiseeded black berries up to 1 cm in size, which ripen in July and August.

In the 18th century, the abbot Bailly from Montaren, who was a Professor at the University of Paris (La Sorbonne), described *Ribes nigrum* as the “bush of a thousand virtues”. Cassis liqueur is still a famous specialty, especially in Burgundy. Crème de cassis is, of course, also a well-known liqueur that is added to the aperitif kir.

In the Second World War, the consumption of blackcurrants was recommended by the British government because of the high levels of vitamin C. Blackcurrant syrup was given out freely, especially to children, to make up for the lack of vitamin C from other fruit.

It is not only these berries that are used in food; because of the health-promoting characteristics, the buds, seeds and leaves also contain many active ingredients. This monography discusses the berries and buds that are used in phytotherapy and gemmotherapy.

#### EFFECT

##### ACTIVE INGREDIENTS

The buds of *Ribes nigrum* contain the following active ingredients:

- proanthocyanidins: dimer and trimer prodelphinidins
- flavonoids: especially flavonols: including quercetin, kaempferol
- phenolic acids: including gallic acid
- vitamin C: 100 mg/g in fresh buds
- amino acids: including arginine, proline, glycine and alanine
- enzymes
- essential oil:
  - monoterpenes: particularly sabinene, delta-3-carene, terpinolene, cis- $\beta$ -ocimene and trans- $\beta$ -ocimene
  - sesquiterpenes: including  $\beta$ -caryophyllene
  - monoterpenols: including terpinen-4-ol

The berry contains the following active ingredients:

- anthocyanins: 135 to 250 mg/100g, more than 10 glycosides and rhamnosides of the anthocyanidins (aglycons from the anthocyanins) cyanidin, delphinidin, myricetin, peonidin, petunidin, malvidin-3: mainly delphinidin-3-O-rutinoside, cyanidin-3-O-rutinoside, delphinidin-3-O-glucoside and cyanidin-3-O-glucoside
- other flavonoids:
  - flavonols: including quercetin, kaempferol, rutin, quercitroside, isoquercitroside
  - flavanones: including hesperidin
  - plus flavanols: including epigallocatechin and epicatechin
- vitamin C: 200 mg/100 g, approximately twice as much as in oranges.
- carotenoids: beta-carotene, lutein and zeaxanthin
- phenol acids: for example m- and p-coumarinic acid, salicylic acid, caffeic acid, sinapinic acid, p-hydroxybenzoic acid, cinnamic acid
- polysaccharides: including cassis polysaccharide (CAPS)
- tanning substances
- fibres
- minerals

#### PROPERTIES AND EFFECTS

##### ANTIOXIDATIVE PROPERTIES

The buds of *Ribes nigrum* have antioxidant properties. A study in 2008 investigated the effect of the method of extraction on free radicals. Especially the water extracts were active, acetone and methanol extracts were less active. In a different study, blackcurrants (*Ribes nigrum*) scored top marks for their ferric-reducing ability; they scored better marks than bilberries, raspberries, redcurrants and

cranberries. As we know, iron is a strong pro-oxidant.

### **ANTI-INFLAMMATORY PROPERTIES**

Proanthocyanidins from *Ribes nigrum* lower the secretion of pro-inflammatory chemokines stimulated by IL-4 and IL-13. IL-4 and IL-13 are known inflammatory factors in, among others, atopic asthma. A Canadian study published in June 2012 established that anthocyanins from *Ribes nigrum* and specifically cyanidin-3-O-glucoside inhibited the secretion of IL-6 by human macrophages. IL-6 is a cytokine that plays a role in pro-inflammatory responses.

### **ANTIVIRAL PROPERTIES**

*Ribes nigrum* is also active against the herpes simplex virus: a Japanese study established an inhibition of the attachment of the virus on the cell membrane, as well as suppression of the plaque formation through inhibition of protein synthesis. This prevented the herpes simplex virus from multiplying. Blackcurrants have also been found to be active against type A and B influenza viruses, where an inhibition of plaque formation has also been established.

### **RIBES NIGRUM IN GEMMOTHERAPY**

In gemmotherapy, *Ribes nigrum* is the main ingredient. The description of the uses of *Ribes nigrum* below is mainly based on gemmotherapeutic literature and experience-based knowledge, because the gemmotherapeutic aspects of *Ribes nigrum* have not undergone significant scientific research.

The primary effect is on the adrenal cortex. It has a cortisone-like effect because it directly stimulates the secretion of the adrenal cortex hormones; it is also a fast-acting anti-inflammatory substance (cortisone-like effect), with no iatrogenic consequences. *Ribes nigrum* mainly acts on the primary inflammatory phase of inflammation, but is effective in all stages of inflammation of the mucous membranes, such as in the airways, in the digestive tract and in the urinary tract. *Ribes nigrum* boosts the anti-inflammatory effect of the gemmotherapy agent *Sequoia gigantea*.

Some scientific research has been performed on the buds of *Ribes nigrum* at the Faculty of Pharmacy at Lyon, where the anti-inflammatory properties of the buds of *Ribes nigrum* were investigated. The buds significantly reduced the number of inflammatory cells in rats, which demonstrates the anti-inflammatory properties.

Another test performed in Lyon using the buds of *Ribes nigrum* was the arthritis test. Administration of the buds normalised the elevated alpha-1-acid-glycoprotein and gamma-globulins within 7 and 10 days respectively. Alpha-1-acid-glycoprotein is an acute-phase protein, the plasma concentrations of which rise significantly in the event of inflammation.

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### **INDICATIONS**

#### **ANTIOXIDANT**

A randomised crossover study investigated the effects of the intake of a mixture of blackcurrant juice with apple juice (1:1) in five adults. The study subjects drank 750 ml, 1000 ml or 1500 ml a day. At a dose of 1500 ml, a significant fall in plasma malondialdehyde was seen, a marker of lipid oxidation.

The level of glutathione peroxidase, an important enzyme in our antioxidative defence system, rose after each dose, but was also the highest in the 1500-ml group.

The researchers concluded that these effects could not result from the quercetin level alone, but were on account of various ingredients in the juices.

#### **ANTI-INFLAMMATORY AGENT**

At a daily dose of 300 mg, anthocyanins from blackcurrants and bilberries have an anti-inflammatory effect. This was proven in a placebo-controlled study involving 120 men and women aged between 40 and 74 years. Anthocyanins inhibit the activation of NF-κB and therefore also the inflammatory response. The plasma concentrations of the pro-inflammatory chemokines IL-8 and IFN-alpha both fell by 25% in comparison to the placebo group. Cytokines IL-4 and IL-13 were also inhibited by 56 and 32% respectively in comparison to the placebo group.

The researchers came to the conclusion that supplementation with anthocyanins can play a role in the prevention and treatment of chronic inflammatory diseases, by inhibition of NF-κB and a fall in various inflammatory mediators.

Anthocyanidins from blackcurrants reduce oxidative stress on exertion: including fewer carbonyl proteins in the plasma. Researchers have also established a decline in the pro-inflammatory cytokines TNF-alpha and IL-6 in plasma collected after exertion.

#### **CARDIOVASCULAR DISORDERS**

In a randomised crossover study, the effect of blackcurrant juice and orange juice in 144 people was investigated in comparison to a placebo drink. For a period of 28 days, the participants drank 250 ml of the fruit juice with breakfast and 250 ml with the evening meal. Ultimately 48 participants remained at the end of the study.

The main results were a fall in C-reactive protein (CRP) by 11% and in fibrinogen by 3% whilst the reference drink increased the CRP and the fibrinogen level by 13% and 2% respectively. Increased levels of CRP and fibrinogen are associated with an increased risk of myocardial infarction, peripheral arterial diseases, strokes and cardiovascular death.

## TO IMPROVE VISUAL ACUITY

The berries of *Ribes nigrum* contain a variety of active substances that can be beneficial to our eyes. The carotenoids lutein and zeaxanthin are known antioxidants for the retina. Beta carotene is a precursor of rhodopsin, a pigment in the retina that is important in light perception. And, of course, the bioflavonoids anthocyanins and vitamin C, which protect the small blood vessels and increase blood flow, also play a role.

Oral intake of *Ribes nigrum* anthocyanins improves the blood flow in the optic nerve head and the retina. This was established in a two-year placebo-controlled study involving 38 people with open-angle glaucoma, the most common form of glaucoma. The participants in the study took one 25-mg capsule of anthocyanins twice a day - 50 mg a day. The researchers came to the conclusion that the anthocyanins from *Ribes nigrum* can be a safe and promising supplement as a supplementation to antiglaucoma drugs.

Blackcurrant anthocyanins at a dose of 50 mg a day reduce the time that the eye needs to adjust to darkness. Oral intake also helped to maintain the refraction values of the dominant eye following a visual test, whilst in the placebo group the refraction values reduced significantly.

## REDUCED MUSCLE STIFFNESS

Oral intake of *Ribes nigrum* anthocyanins at a dose of 7.7 mg/kg can combat muscle stiffness. In Japan, this was investigated in 11 people who were asked to type a text for 30 minutes. Supplementation with anthocyanins did not lead to a decline in oxyhaemoglobin and less shoulder muscle stiffness was established. By increasing the peripheral blood flow *Ribes nigrum* can reduce muscle fatigue and muscle stiffness.

## OTHER USES

Because of the cortisol-increasing effect and the anti-inflammatory properties, *Ribes nigrum* is used as a gemmotherapeutic agent for the following uses (among others):

- Asthma, bronchitis, rhinitis, emphysema, lung fibrosis.
- Allergies, hay fever, eczema, urticaria
- Chronic fatigue: *Quercus pedunculata* is a good synergist for this.
- Auto-immune diseases:
- Arthritis, arthrosis, rheumatism
- Recovery following illness
- General drainage therapy

## CONTRA-INDICATIONS

- In known allergy or hypersensitivity to blackcurrants or to one of the ingredients.
- In oedema caused by cardiac or renal disease.
- Blackcurrants or the juice of blackcurrants is advised against for children under 4 years of age due to the level of colouring agents and salicylic acid.

## SIDE EFFECTS

When the recommended daily amount is taken, usually no adverse effects are expected. In clinical studies, adverse effects are rarely reported after oral consumption of the berries and buds of blackcurrants.

Various studies have shown that *Ribes nigrum* berries are well tolerated up to a dose of 1000 mg three times a day.

## INTERACTIONS

- Caution should be exercised when used simultaneously with antihypertensive agents.
- The buds of *Ribes nigrum* have a diuretic effect and can bring about changes in the electrolytic balance. Therefore caution is advised if one of the following medicines is used: antiarrhythmics, cardiac glycosides, theophylline, diuretics and lithium.

## DOSAGE

- *Ribes nigrum* glycerine macerate: 50 drops 3 times a day.
- *Ribes nigrum* berries extract, standardised at 25% anthocyanins: 2 to 3 times a day 200 to 300 mg based on the type of disorder, the seriousness of the disorder and the patient's weight.

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