Butcher's broom

**BOTANY**

*Ruscus aculeatus* L. Spanish common name, *brusco* or *rusco*; English common name, butcher’s broom and others. This perennial shrub is a member of the Liliaceae family. It grows about 25-100cm tall. The butcher’s broom plant has male and female flowers. Both types are born on smooth, cylindrical, dark-green stems. The true leaves are minute. However, the plant has structures called cladodes, which look like ovate-lanceolate leaves, but are actually flattened stem extensions, each terminated in a small spine. The flowers are greenish, rather small; the female flowers are deeply six-cleft; the male flowers have welded stamens. The fruits are scarlet berries, which contain only 1-2 seeds and resemble small cherries when ripe. Butcher’s broom is native to the Azores islands, the Mediterranean area and the northwestern regions of Europe until Iran. It has been introduced into other continents. This plant grows at 600-1000m altitude, on abrupt soils, in forests, thickets and mountain areas, often together with holm-oaks and cork-oaks.

Butcher’s broom extract is produced from the rhizomes of *Ruscus aculeatus*.

**CHEMISTRY**

**Steroidal saponins**

The actions of butcher’s broom are mainly due to its spirostane-derived hexacyclic compounds. By means of hydrolysis, the aglycones ruscogenin (19-hydroxydiosgenin) and neoruscogenin are released.

**Flavonoids**

Rutin and hesperidin methyl-chalcone.

*Lato sensu* flavonoids are pigments almost universally present in plants. They are almost always water-soluble. These pigments give their color to flowers and fruits, sometimes also to leaves.

**Other active principles**

Essential oil (rich in terpene compounds and aliphatic hydrocarbons, such as heneicosane and pentacosane), tannins, phytosterols, sugar, potassium salts and resin.
TRADITIONAL USES

The name Ruscus comes from the Greek word for “myrtle” because of its similarities with that plant. The English name butcher's broom comes from Mediterranean butchers, who used to sweep away meat rests from their tables with a bunch of this plant’s stems and “leaves”. Butcher’s broom has been first mentioned in book IV, chapter 147 of the Dioscorides treatise, where infusions prepared with its leaves and fruits, mixed with wine is recommended to induce menstruation, to treat urinary obstructions and as a diuretic. Dioscorides also stated that drinking roots decoction with wine produced the same effects. Between centuries XVI and XIX, this plant was habitually used as a repellent for parasites. In 1950, the French researchers H. Lapin and C. Sannié isolated ruscogenin, the main saponin in the roots and rhizomes of this plant.

Decoction of Butcher’s broom roots and rhizomes is popularly used to prevent and to treat venous insufficiency, urinary infections, gout and dysmenorrhea.

COSMETIC PROPERTIES

Phlebotonic activity
Because of the synergic actions of its main components (saponins and flavonoids), butcher’s broom is considered a major venotonic in modern phlebology. Ruscogenin exerts its venotonic actions through an adrenergic mechanism at two levels: on the one hand, it exerts direct agonistic effects on α-1 and α-2 post-synaptic adrenergic receptors on smooth cells of the blood-vessels walls: on the other hand, it exerts indirect effects by inducing noradrenalin release from pre-synaptic neuronal storing sites. The intensity of the later effect is temperature-dependant because heat reduces receptors’ affinity for noradrenalin, thus producing vein-dilatation and characteristic symptoms, such as tired legs (Alonso J, 2004).

In regards to capillary permeability, the action of ruscogenin was found to be better than that of escin. An 80mg dose significantly reduced capillary permeability, as measured by the Trypan blue method (Alonso J, 2004).

Different assays showed that the ruscogenin and flavonoids present in butcher’s broom reduce capillary permeability and increase vascular resistance, thus producing a vitamin P-effect, which is characteristic of phlebotonic compounds. In a multicenter study with 2359 patients suffering very evident symptoms of varicose veins, administration of 600-900mg Ruscus aculeatus dry extract for 8 weeks significantly improved classical symptoms such as burning sensation, painful and tired legs, edema and calf cramps (Alonso J, 2004).

The combination of Ruscus aculeatus extract with hesperidin methyl-chalcone was found to protect endothelial cells from hypoxia – which commonly occurs in chronic venous insufficiency – by reducing ATP and activating A2 phospholipase, and consequently increasing neutrophil adherence. Application of ruscogenin included in an ointment was tested on 100 patients, 16 of them showing primary varicose veins and phlebalgia, 14 showing spontaneous post-surgery edema, 14 showing superficial thrombophlebitis and 56 with indurated periuclerative dermatitis. After 2 months treatment with 2-3 daily applications on the affected areas, results showed an average improvement of 82%. A recent randomized, multicentric, double-blind, placebo-controlled study demonstrated high efficacy of a ruscogenin-containing cream (doses adjusted to the recommendations of the German Commission E) on 148 patients with chronic venous insufficiency grades I and II (Alonso J, 2004).

Therefore, butcher’s broom extract is very useful to formulate cosmetic products with general blood circulation-stimulating activity.
Anti-inflammatory activity
The anti-inflammatory effects of butcher’s broom have been known for years. Double-blind assays comparing ruscogenin effects with those of escin and phenylbutazone, showed stronger anti-inflammatory actions for ruscogenin than for the controls. This result was verified with mice by using the carrageenan-induced plantar edema test. *In vitro* studies showed a remarkable anti-elastase activity of ruscogenin, although anti-hyaluronidase activity was not found (Alonso J, 2004).

Thus, butcher’s broom extract is recommendable to formulate cosmetic products with anti-irritation activity.

Finally, we would like to mention that the publication *Plant preparations used as ingredients of cosmetic products. Vol. I* (Council of Europe, 1994) includes a monograph on the dry hydro-alcoholic and the glycolic extracts prepared with *Ruscus aculeatus* roots and rhizomes. This monograph mentions the following cosmetic effects and recommended concentrations:

- tonic, soothing, refreshing
  1-2% dry extract
  up to 10% glycolic extract for body-massage products, bath and shower gel, products for tired legs and feet, and sun-protection products

- other possible effects are: anti-irritation, astringent, vasoprotective and anti-edema

**COSMETIC APPLICATIONS**

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**RECOMMENDED DOSE**
The recommended dose is between 0.5% and 5.0%.

**BIBLIOGRAPHY**

Web sites: