

NEXT GENERATION BOTANICAL EXTRACTS

3.0 ecological approach with an added-value for your food supplements

TEUPOL 10P and 50P *Ajuga reptans* extracts

- ▶ Powerful antioxidant
- ▶ Inflammatory bowel diseases
- ▶ Hair loss
- ▶ Prostate well-being



/ ABR PRESENTATION

ABR stands for Active Botanicals Research. We are an Italian company, established in 2012, based in Brendola (North-East of Italy).

The decades-long solid background of ABR founder and the steady biotech experience of ABR researchers are employed to create unique ingredients devoted to the food supplements industry. With an open-innovation strategy, important collaborations with international research centres, accredited laboratories and customers are being carried out.

The revolutionary use of the plant cell cultures allows the production of high value and pure botanical extracts for the Nutraceuticals and the Nutricosmetics markets.

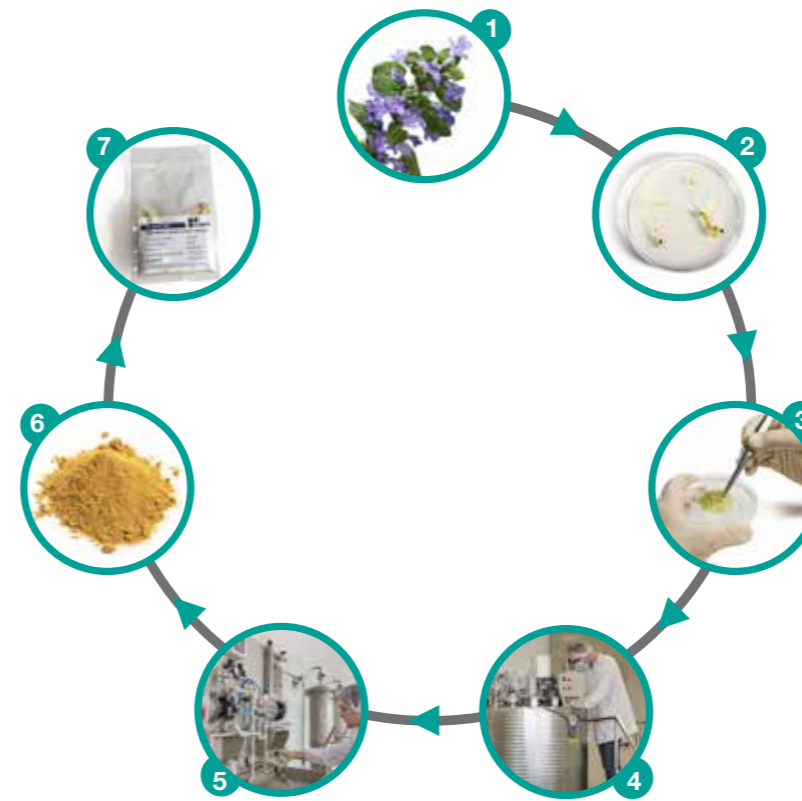
Food supplement manufacturers can now bring new benefits to the development of their products while respecting the regulatory requirements of Europe and USA, with a strong and relevant message for consumers: environmental protection, biodiversity of plants respect and health safety!

Our Mission

“ We are engaged with nature and entrust biotechnology to develop, manufacture and deliver top quality ingredients to support human health. ”



/ AJUGA REPTANS CONCEPT



- 1 / Identification of a plant recognized for its content of rare and effective active molecules
- 2 / Isolation of the plant parts where the active molecules are expressed
- 3 / Induction of cells proliferation and calli induction
- 4 / After the selection of the most efficient cell population, among calli, the production of the active molecules is amplified in high volume sterile and highly controlled bioreactors
- 5 / Biomass water extraction, purification and lyophilization of actives
- 6 / Ajuga reptans extract, titrated in Teupolioside
- 7 / Finished and packed ingredient, TEUPOL 10P and TEUPOL 50P

Plant cell culture

BENEFITS OF MEDICINAL PLANT CELL CULTURES

Ajuga reptans story

Ajuga reptans, commonly known as Bugle or Carpetweed, is part of the Lamiaceae family, found in temperate regions in grassy areas in Europe, West Asia and North Africa. It is a plant commonly used as food and to feed cattle.

The stalks are hairy with oval and carved leaves and the flowers are blue. *Ajuga reptans* is used since the Middle Ages as wound healing agent and to treat ulcerations but also for its antihemorrhagic and anti-inflammatory properties.

For manufacturers

- Strict control of the entire production chain parameters
- Secure and long-lasting supply of active ingredients / unlimited availability of ingredients all over the year
- No problem of harvesting nor seasonality
- Production of high-quality natural active ingredients
- Standardization of ingredients titre for an undiscussed repeatability of the manufacturing process

For the environment

- No impact on the environment nor on plant biodiversity
- Use of medicinal plants with no interference on the plants' ecosystem
- Possibility of using endangered or protected botanical species without putting them at risk
- No overexploitation of agricultural lands
- No use of fertilizer nor pesticide



/ ADVANTAGES FOR YOUR FINISHED PRODUCTS



Ajuga reptans extract is mixed with maltodextrins to meet standard titration at 10% or 50% Teupolioside in each production batch.

- TEUPOL 10P and TEUPOL 50P are supplied lyophilized and 100 % hydrosoluble
- TEUPOL 10P: Aw = 0,368 / TEUPOL 50P: Aw = 0,423



- Consistent physicochemical characteristics of the powder from batch to batch
- No supply scarcity
- Innovative ingredient
- Dosage in heavy metals: in compliance with European Commission n°629/2008
- Total absence of pesticides residues / environment-friendly
- Dosage in PAH (Polycyclic Aromatic Hydrocarbons): in compliance with the (EU) 2015/1933 decree

REGULATIONS: Novel Food Authorization in accordance with section 5 of Decree N°258/97. In compliance with European regulations.

/ ANTIOXIDANT PROPERTIES

ORAC INDEX OF TEUPOLIOSIDE

ORAC index (Oxygen Radical Absorbance Capacity) is a classification of foods according to their antioxidant power. Below is a short comparison of ORAC index of Teupolioside with some other plants and foods.

	ORAC VALUE (µM Trolox for 100 g food)
Clove	314 446
Turmeric	159 277
Acai berries	102 700
Ginger powder	28 811
Goji berries	25 300
Ginger roots	14 840

▶ **TEUPOL 50P: 511 336 µmol Trolox for 100 g food.**

▶ **TEUPOL 10P: 117 017 µmol Trolox for 100 g food.**

The whole clove obtained the highest ORAC index and the cucumber obtained the lowest compared to all the tested and analysed foods. **In comparison, TEUPOL 10P and 50P present impressive antioxidant properties.**

(Source: Nutrient Data Laboratory, Agriculture Research Service, US Department of Agriculture, Oxygen radical absorbance capacity (ORAC) of Selected Foods – 2007 – 2010).

TROLOX EQUIVALENT ANTIOXIDANT CAPACITY (TEAC) OF TEUPOLIOSIDE

Comparison of the antioxidant activity of Teupolioside with other recognized antioxidants.



Teupolioside is the most powerful antioxidant molecule compared to resveratrol, rutin and vitamin C.

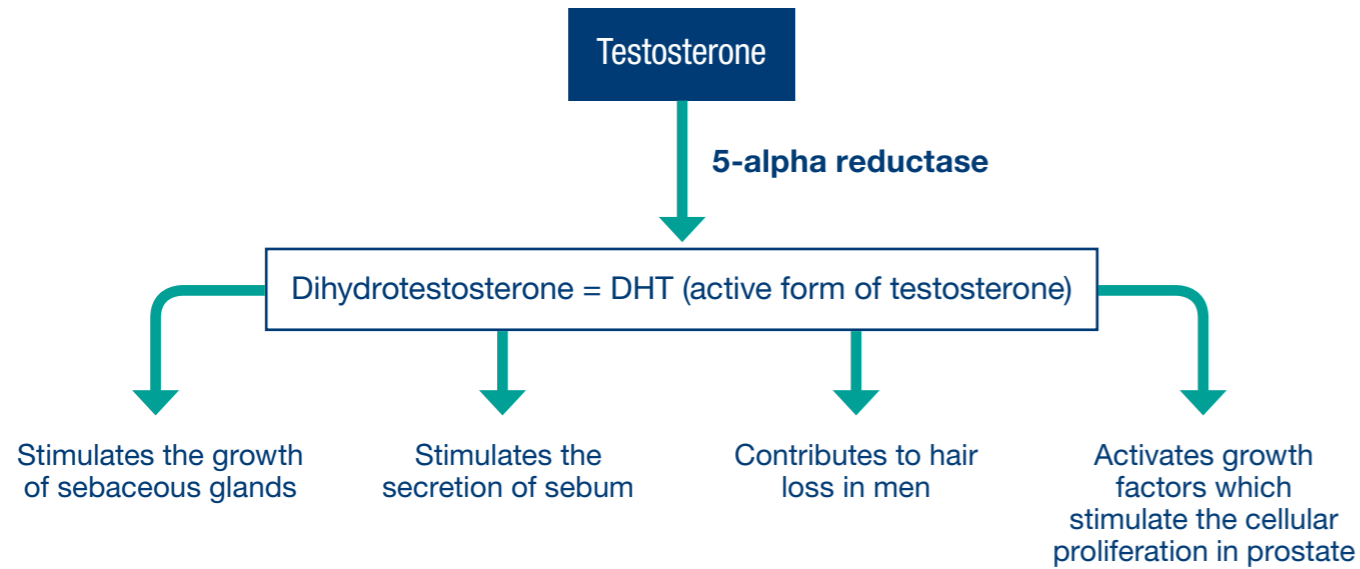
TEUPOL 10P and 50P, a natural solution for your food supplements to limit oxidative stress and reduce premature cell aging.

WHAT IS OXIDATIVE STRESS?

Oxygen is an essential element for life but under certain situations, it has deleterious physiological effects. The absorption of oxygen during respiration results in the production of free radicals which is a normal process in organism. These free radicals, also called ROS (Reactive Oxygen Species), are reactive and very toxic metabolites. The oxidative stress is due to an imbalance between pro-oxidant free radicals and antioxidants. When ROS accumulate in the body, they could promote the ageing of the cells and, in the long term, diseases as chronic inflammatory digestive diseases, atherosclerosis, skin diseases and neurodegenerative pathologies...

/ A NATURAL BLOCKER OF DIHYDROTESTOSTERONE (DHT)

WHAT ARE THE EFFECTS OF DHT?



More studies demonstrated that Teupolioside inhibits 5-alpha reductase activities.
A potential well-being for all the family!

Food supplements for skin and beauty



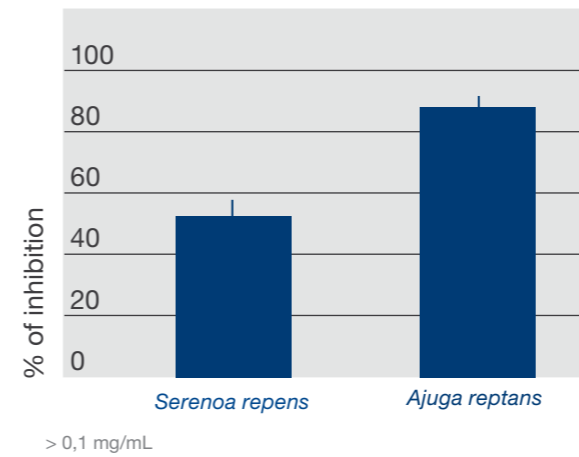
Food supplements for the prostate well-being in elderly men



FOR PROSTATE WELL-BEING

Daily dosage suggested between 65 to 75 mg/day TEUPOL 10P or 13 to 15 mg/day TEUPOL 50P

It has been shown that *Ajuga reptans* extract from cell culture, titrated at 10% or 50% in Teupolioside reduces the 5 alpha-reductase activity both *in vitro* and *in vivo*.



In vitro

Method: the effect of *Ajuga reptans* extract was studied on human cell lines (fibroblasts) in comparison with *Serenoa repens* which is a plant traditionally used for the treatment of the benign prostatic hyperplasia (BPH).

The results show that *Ajuga reptans* extract induces an inhibition of 85% on 5-alpha reductase versus 48% of a cells treated with *Serenoa repens*.

INHIBITORY EFFECT OF FINASTERIDE AND AJUGA REPTANS ON 5-ALPHA-REDUCTASE

In vivo

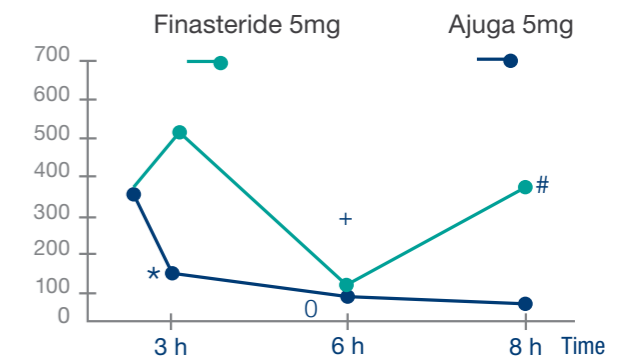
Method: the evaluation of inhibition of 5-alpha-reductase was demonstrated on rats according to an experimental protocol with 3 groups (8 rats / group):

- Control group
- A group supplemented with 5 mg *Ajuga reptans* titrated in Teupolioside (5 mg/rat)
- A group supplemented with 5 mg Finasteride* (5 mg/rat)

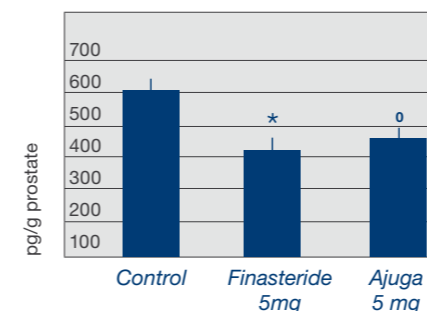
Blood samples (plasma) were collected and analyzed at 3, 6 and 8 hours after the treatment.

DHT concentration is strongly reduced at 3 h after ingestion of 5 mg of *Ajuga reptans* and the action is maintained over time, until h+8. On the contrary the supplementation of 5 mg of Finasteride acts between h+3 and h+8 with the lowest level in DHT at h+6.

*Finasteride was a very common drug used to block the activity of 5-alpha reductase.



*p<0,03 (*Ajuga r.* 3 h vs base)
 †p<0,003 (*Ajuga r.* 6 h vs base)
 #p<0,002 (*Ajuga r.* 8 h vs base)
 *p<0,003 (Finasteride 6 h vs base)



The results show that the reduction of DHT plasmatic levels in prostate of rats is similar between the treatment of Finasteride and *Ajuga reptans* extract. This reduction is statistically significant in comparison with the control.

*p<0,02 (Finasteride vs Control)
^op<0,01 (*Ajuga* vs Control)

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