

ABResearch

Inspired by nature... driven by biotechnology!

NEXT GENERATION BOTANICAL EXTRACTS

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

ACTEOS 10P

Lippia citriodora extract

- ▶ High antioxidant for smokers
- ▶ Balanced digestion
- ▶ Sedative properties



/ 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.

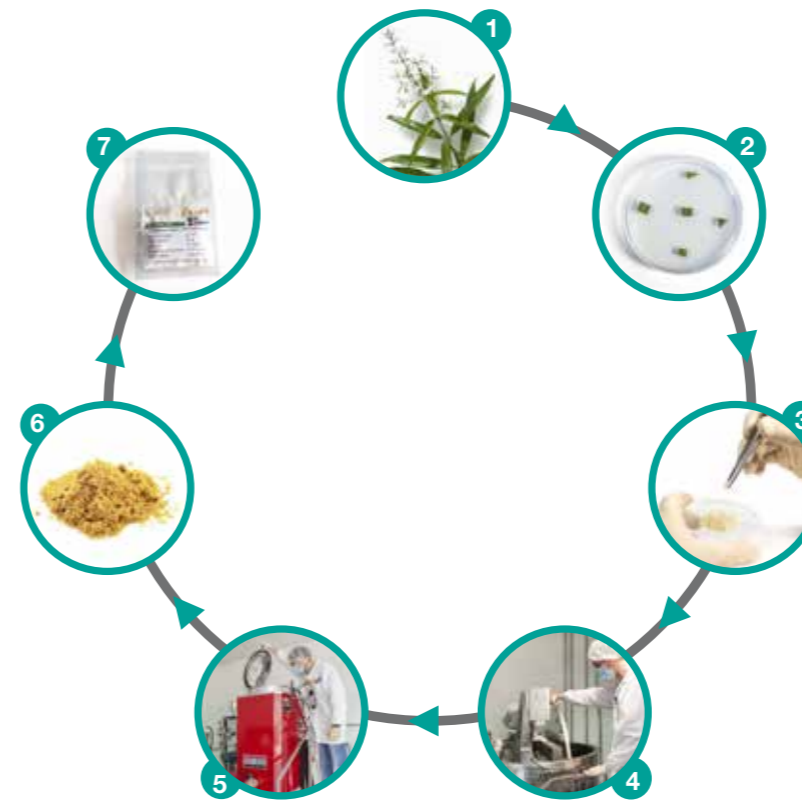
Food supplement manufacturers can now bring new benefits to the development of their products while respecting the regulatory requirements of Europe and USA, with a strong and relevant message for consumers: environmental protection, biodiversity of plants respect and health safety!

Our Mission

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



/ LIPPIA CITRIODORA 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 plant 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 / *Lippia citriodora* extract, titrated in Verbascoside
- 7 / Finished and packed ingredient, ACTEOS 10P

Plant cell culture

BENEFITS OF MEDICINAL PLANT CELL CULTURES

Lippia citriodora's story

Lippia citriodora, commonly known as Lemon Verbena or Lemon beebrush, is synonymous with *Aloysia triphylla*, *Verbena citriodora* and *Verbena triphylla*.

Plants of genus *Lippia* were and are still generally used by indigenous populations of South America and by the traditional Chinese medicine for respiratory diseases like as cold and flu, cough and bronchitis.

Additionally, *Lippia citriodora* leaves are used as seasoning for food preparations or flavoring for beverages.

Lippia is used in medicine as a relaxant and carminative herb that counteracts stress related conditions, especially those that affect the stomach.

Other medical uses regard the treatment of dyspepsia, headaches, neuralgic pain and vertigo. From cell culture of *Lippia citriodora*, ABR extracts the ingredient Verbascoside.

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



Lippia citriodora extract is mixed with maltodextrins to meet standard titration at 10% Verbascoside in each production batch

- Acteos 10P powder is supplied lyophilized and 100% hydrosoluble
- Aw = 0,385
- Odourless
- Essential oil-free



- Consistent physicochemical characteristics of the powder from batch to batch
- No supply scarcity
- Innovative ingredient
- Heavy metals: absence of cadmium, arsenic, iron and mercury
- 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.

/ CLINICAL STUDY

EFFECTS OF ACTEOS 10P IN SMOKERS

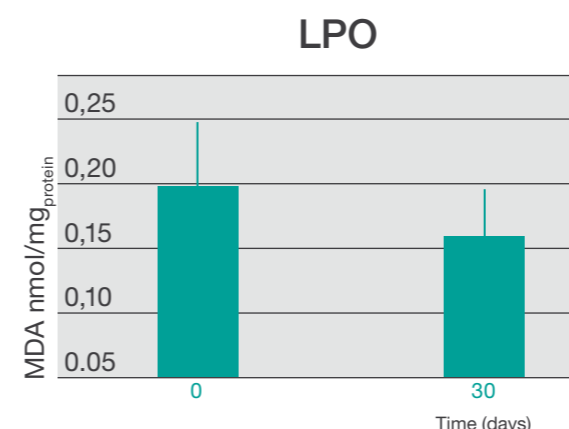
The open clinical study was performed to evaluate the antioxidant efficacy of Verbascoside in smokers; particularly the antioxidant effect on plasma and skin was demonstrated. The experimental group is constituted of 10 female and 10 male volunteers between age of 18 and 60 years (average is 46 years) in good health.

Method: one capsule daily, preferably far from meals, for 30 days. One capsule represents 25mg of ACTEOS 10P. To determine the efficacy of ACTEOS 10P the following parameters where evaluated:

- Cutaneous and plasmatic lipoperoxidation (LPO);
- IgA and IgG plasmatic levels.

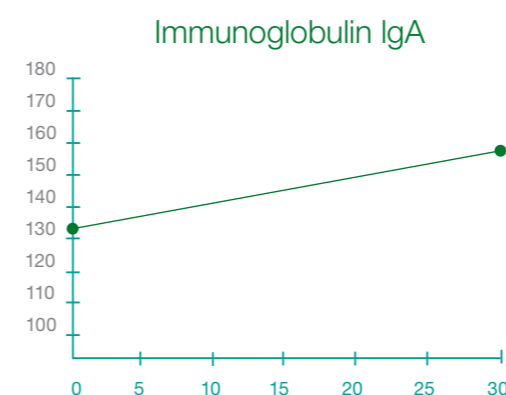
FEATURES IN SMOKERS

Oxydative stress is higher in smokers than in non-smokers. According to a study, a significant and positive correlation exists between the number of cigarettes smoked, expressed as pack years, and the levels of either FDPL (Fluorescent Damage Products of Lipid peroxidation).

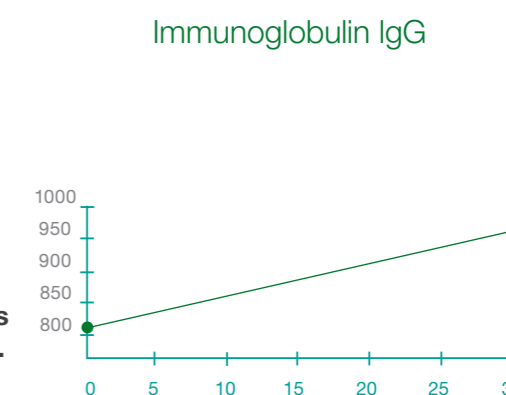


The lipoperoxidation degree is determined by the level of malondialdehyde (MDA) which is the main product of lipid oxidation.

A significant reduction (p<0.05) of the MDA quantity was observed in the skin corneum layer of about 23% after 30 days of Verbascoside intake.



A significant increase of the plasmatic level of IgA (+15%) and IgG (+19%) was observed after 30 days of ACTEOS 10P intake.



VERBASCOSIDE has a significant antioxidant capacity.

Domenico Lapenna, Andrea Mezzetti, Sergio De Gioia, Sante D. Pierdomenico, Franca Daniele, Franco Cucurullo. Plasma copper and lipid peroxidation in cigarette smokers. Free Radical Biology and Medicine. Volume 19, Issue 6, December 1995, Pages 849-852.

Jedrychowski W, Adamczyk B, Jaskólka D. IgG and IgA in saliva and blood serum in relation to smoking and respiratory symptoms. Rev Fr Mal Respir. 1979 Sep-Oct;7(5): 471-4.

A. Gonzalez-Quintela, R. Alende, F. Gude, J. Campos, J. Rey, L. M. Mejjide, C. Fernandez-Merino, C. Vidal. Serum levels of immunoglobulins (IgG, IgA, IgM) in a general adult population and their relationship with alcohol consumption, smoking and common metabolic abnormalities. Clinical and Experimental Immunology. 2008 January, volume 151, Issue 1, Pages 42-50. Gunsolley JC, Pandey JP, Quinn SM, Tew J, Schenkein HA. The effect of race, smoking and immunoglobulin allotypes on IgG subclass concentrations. Journal of Periodontal Research. 1997 May; 32(4): 381-7.

Quirantes-Piné R, Herranz-López M, Funes L, Borrás-Linares I, Micol V, Segura-Carretero A, Fernández-Gutiérrez A. Phenylpropanoids and their metabolites are the major compounds responsible for blood-cell protection against oxidative stress after administration of *Lippia citriodora* in rats. Phytomedicine. 2013 Sep 15; 20 (12): 1112-8.

/ ANTIOXIDANT PROPERTIES

ORAC INDEX OF VERBASCOSIDE

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 Verbascoside 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 |
| Cucumber | 114 |

▶ The ORAC value of Verbascoside is 179 145 µM 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. **ACTEOS 10P, just at 10% concentration of Verbascoside, showed impressive antioxidant properties.**

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

/ HEALTH CLAIMS

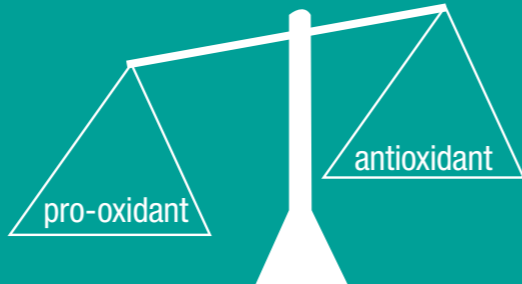
HEALTH CLAIMS

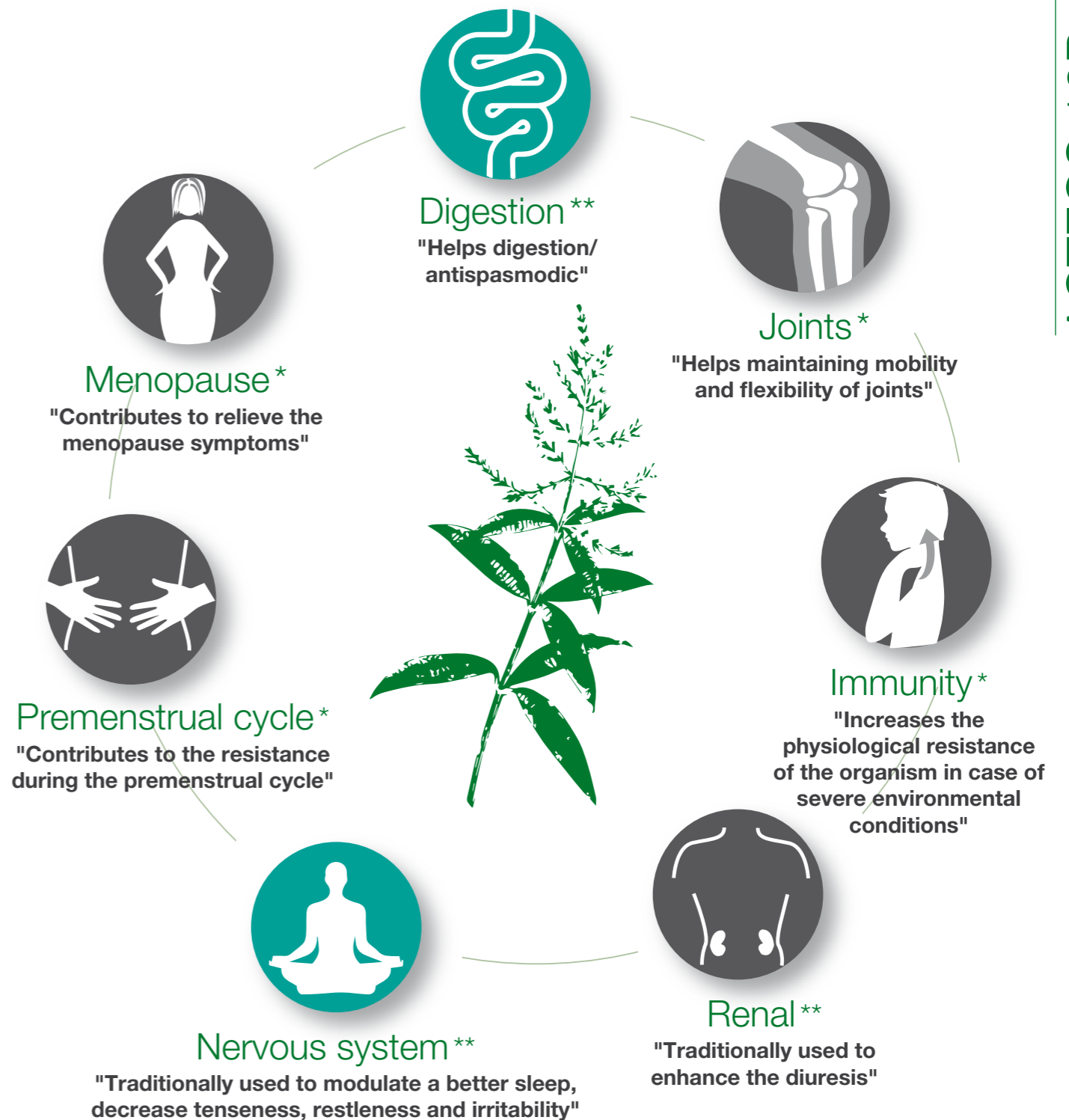
«Antioxidants protect from free radicals and help in case of food intake deficiency or increased amount of nutrients. Protection against the free radicals action due to stress, alcoholics, UV exposure or polluted environments.»



DOSE: 5G / DAILY PLANT

ACTEOS 10P controls your antioxidant / pro-oxidant balance!





DOSES

** Traditional use of leaf: 2.5 to 5g/day

*5g/ daily plant

HEALTH CLAIMS TOLERATED BY EFSA

● Traditional Use



ABResearch srl

Via dell'Impresa, 1
36040 Brendola (VI) Italia
P + 39 0444 401569
F + 39 0444 405228
info@abres.it
www.abres.it

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