

BOSWELLIN® PS : THE NEXT GENERATION *BOSWELLIA SERRATA* EXTRACT

by

Muhammed Majeed, Ph.D., Lakshmi Prakash, Ph.D.

INTRODUCTION:

The gum resin of *Boswellia serrata* (N.O. Burseraceae) known as “Dhup”, Indian Frankincense, or Indian olibanum, is valued as a source of healthful phytonutrients. Frankincense has a long history of use in religious ceremonies and in perfumery applications. The health applications of Indian frankincense, long known in the Ayurvedic tradition, have come into focus in the western world, over the last thirty years, resulting in expanded applications of standardized extracts. Such extracts are used as ingredients in dietary supplements and cosmetics, to support healthy aging. The most popular application in dietary supplements is in joint health support products, to support normal joint functions and mobility.



Boswellia serrata (Sallaki or Salai guggal) has a long history of use in the Ayurvedic tradition in managing inflammatory conditions. Recent scientific evidence increasingly supports the healthful effects of this plant. Typically the gum oleoresin exudates of *Boswellia serrata* is reported to contain sesquiterpenoid essential oils (8-12% w/w), polysaccharides (45-60%w/w), and higher terpenoids, (25–35% w/w). The biomarker constituents in the extract of the gum resin, are a group of pentacyclic triterpene compounds, known as boswellic acids.

Boswellic acids have been shown to inhibit 5-lipoxygenase, an enzyme that catalyzes the formation of pro-inflammatory leukotrienes from arachidonic acid. In addition to this mechanism, boswellic acids also decrease the activity of the enzyme, Human Leukocyte Elastase (HLE). This dual action is unique to boswellic acids. As leukotriene formation and HLE release are increased simultaneously in a number of inflammation and hypersensitivity-based human diseases, it is generally believed that the reported blockade of two pro-inflammatory enzymes by boswellic acids, in conjunction to their beneficial effects on complement proteins and mast cell stabilizing activity, could explain the healthful effects of *Boswellia* extracts, as documented in multiple preclinical and clinical studies.

Extracts of *Boswellia serrata* gum resin are generally resinous in nature, and the biomarker boswellic acids (lipophilic compounds) are insoluble in water.

Boswellin®¹ PS^{2*}

Boswellin® PS represents an improvement over existing conventional *Boswellia serrata* extracts, providing manufacturers with a more water soluble version with enhanced joint health support potential. Boswellin® PS offers a unique release profile for the active ingredients.

In addition to boswellic acids, (the active principles for which *Boswellia* extracts are conventionally standardized), the PS version contains Polysal™, a natural polysaccharide fraction from the gum resin of *Boswellia serrata*. The Polysal fraction is **water soluble, and enhances the healthful role of boswellic acids in the extract.**

EXPERIMENTAL EVIDENCE:

In *in vitro* studies, and in animal models of induced inflammation tested with Boswellin®, a conventional product standardized for boswellic acids, Boswellin® PS containing both boswellic acids and the polysaccharide fraction from *Boswellia serrata* gum resin, and Polysal™ the polysaccharides fraction, Boswellin® PS was found to be more effective.

represented by



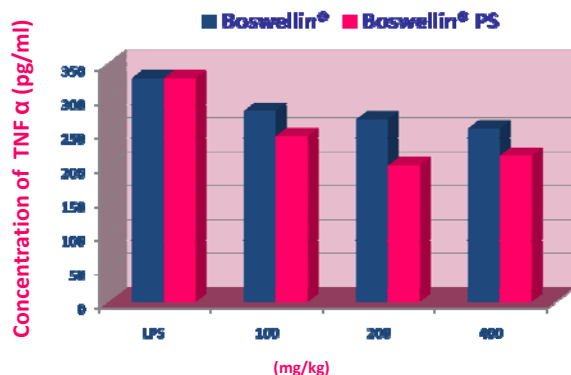
BECARRE Natural
149 rue d'Estienne d'Orves
F-92140 CLAMART
+33 [0]6 86 54 83 48
info@becarre-natural.com
www.becarre-natural.com

¹ A trademark of Sabinsa Corporation

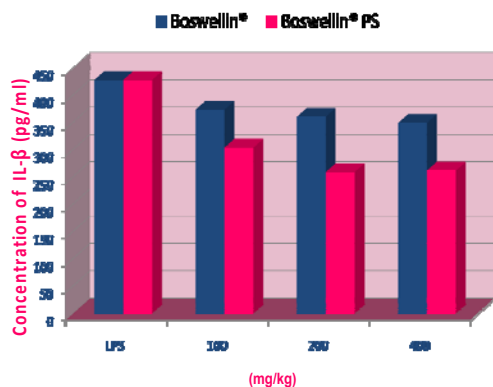
² PS : Polysal™ a trademark of Sabinsa Corporation

* Patent Pending

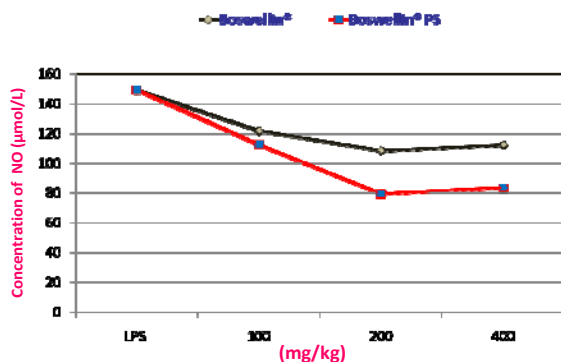
The results of these studies are summarized in the Figures³:



Extracellular *in vivo* TNF-α estimation in serum



Extracellular *in vivo* IL-β estimation in serum



Extracellular *in vivo* NO Free Radical Estimation in Serum

Effect of Boswellin® PS on the Markers of Inflammation: LPS (lipopolysaccharide) endotoxin triggers systemic inflammatory response. TNF-alpha (tumor necrosis factor, a cytokine) plays a very

³ Research Report, Sabinsa Corporation, 2009.

important role in the pathogenesis of septic shock induced by LPS. Dysregulation of TNF production has been implicated in a variety of human diseases, including cancer. IL-β (interleukin-beta, a cytokine) features in physiological immune responses and in the development of various immunopathological disorders. Nitric Oxide (NO) production is important in protecting vital organs against ischemic damage; however, uncontrolled production is associated with deleterious effects.

The anti-inflammatory potential of Boswellin® and Boswellin® PS* was evaluated by flow cytometric studies in mouse neutrophils, and in the levels of inflammatory mediators in the serum of mice that received the actives.

PROPOSED MECHANISM OF ACTION:

Boswellin® PS facilitates a two stage active constituents release profile, which in turn, enables longer lasting support than that provided by conventional *Boswellia serrata* extracts that are based on boswellic acids alone. Both boswellic acids (more specifically Acetyl 11-keto beta boswellic acid, AKBBA, the most effective of the boswellic acids, present in enriched concentrations in Boswellin® PS) and Polysal™ are effective in reducing the markers of inflammation, with benefits in managing the symptoms of discomfort associated with conditions such as arthritis. **Two stage action refers to the initial healthful effects of the water soluble Polysal™, that are later sustained by the more slowly absorbed lipophilic boswellic acids, AKBBA in particular.**

CONCLUSIONS:

Unlike non-steroidal anti-inflammatory drugs (NSAIDs), *Boswellia serrata* extract does not induce ulcers or gastrointestinal discomfort. Boswellin® PS provides a TOTAL extract of healthful constituents from *Boswellia serrata* gum resin. Boswellin® PS contains no added excipients or fillers, and offers safe and sustained natural support in managing discomfort associated with inflammation.

represented by
becarre
the natural sign

BECARRE Natural
149 rue d'Estienne d'Orves
F-92140 CLAMART
+33 [0]6 86 54 83 48
info@becarre-natural.com
www.becarre-natural.com

