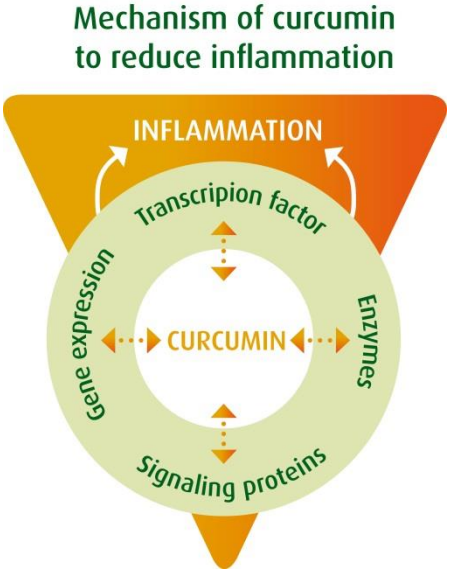
Synergetic effect of NovaSOL® Curcumin / Boswellia

Inflammation is one of the major causes for the development of different diseases like arthritis, cancer, cardiovascular disease, diabetes, obesity, osteoporosis, inflammatory bowel disease, asthma, and even central nervous system-related diseases such as depression and Parkinson's disease[1].
Reports in the literature suggest that almost 90% of synthetic anti-inflammatory drugs produce drug related toxicities and additional adverse effects[2,3].
Consequently, an immense interest has reemerged in herbs exerting anti-inflammatory activity as a potential alternative for the prevention of inflammation with much fewer side effects. The most promising and widely used herbs in this context are Curcuma longa and Boswellia serrata.

Curcumin

Curcuma, traditionally used in Ayurvedic medicine, is a well-studied compound known for its antioxidant and anti-inflammatory properties[4,7]. The three major curcuminoids isolated from Curcuma longa are curcumin, demethoxycurcumin, and bisdemethoxy-curcumin, with curcumin being the primary component. Numerous studies have demonstrated its activity and therapeutic effects for different health issues including joint, brain, cardiovascular and gastro-intestinal health.

Curcumin exerts its anti-inflammatory activity through multiple molecular targets and mechanisms of action. It mainly affects and modulates the presence of proinflammatory signaling molecules and enzymes. This is done by the down-regulation of pro-inflammatory signals (cyclooxygenase-2 [COX-2], 5-lipoxygenase [5-LO] prostaglandins, leukotrienes) and cytokines (TNF-a, interleukin-1 beta [IL-1β], interleukin-6 [IL-6], nuclear factor kappa B [NF–κB]) [7,8].



Although curcumin has exhibited much therapeutic promise, its use has been limited by its poor intestinal absorption, rapid metabolism, and limited systemic bioavailability[9].
While various techniques have been developed to increase the bioavailability of curcuminoids, with the aim to obtain pharmacologically relevant blood serum levels, many are not able to accommodate high loading of curcumin, thus limiting the bioactivity of the finished products.

The NovaSOL® micellation technology based on micellar solubilisation of curcumin, has been shown to result in the largest increase of curcumin bioavailability reported to date. In a human clinical trial, where up to 185-fold larger AUC and a 455-fold higher maximum total curcumin plasma concentration (Cmax)

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were observed for micellar curcumin compared to the native form[12].

NovaSOL® Curcumin offers a liquid, soluble form of curcumin extract which results in effective blood serum curcuminoid levels at a low daily dose.

Boswellia

In the last couple of years the use of Boswellia serrate extracts as a natural, herbal anti-inflammatory compound has gained popularity and the amount of scientific publications describing its activity has increased.
Boswellia extracts are shown to have positive effects in mainly joint, gastro-intestinal and respiratory health[13-18].

The mechanism of anti-inflammatory activity of the Boswellia extract is due to the boswellic acids (BA's) which are the active principals of frankincense. It was shown that a number of pivotal enzymes in the inflammation process (5-lipoxygenase [5-LO], cathepsin G [catG], and microsomal prostaglandin-E synthase [mPGES-1]) as well as nuclear transcription factor κB (NF-κB) and several pro-inflammatory cytokines (tumor necrosis factor [TNFa], interleukin [IL]-1β, IL-2, and IL-6) are inhibited by boswellic acids (BAs). Specifically 3-O-acetyl-11-keto-boswellic acid (AKBA) is the most active BA, modulating the lipoxygenase pathway of arachidonate metabolism[19-21].

Boswellia extracts usually have poor bioavailability because of their hydrophobicity and poor water solubility. Pharmacokinetic studies conducted in human and in animal models indicate that after oral administration of Boswellia products, a sufficient systemic concentration of AKBA is required for its anti-inflammatory activity[22–26]. Poor absorption through the intestine, and/or extensive metabolism is the crucial factor affecting the systemic availability of AKBA and thus limiting the anti-inflammatory efficacy of standard Boswellia extracts.

By the preparation of a micellar formula in the form of liquid NovaSOL® Boswellia, the bioavailability is strongly increased. The administration of a Boswellia extract in its solubilized form is shown to result in a significant increase of BA plasma concentrations, specifically AKBA for which the bioavailability is increased up to 50 fold [27].

Combination Curcumin / Boswellia

While the activity of both Curcumin and Boswellia extracts have individually been well defined, the combination of both can further promote their multi-target anti-inflammatory activity. The diversity in the mechanism of action of these actives will result in a synergistic effect with additional benefits.

While both Curcumin and Boswellia partly affect the same inflammatory pathway by modulation of NF-κB and several other pro-inflammatory cytokines (TNFa, IL-1β, IL-2, and IL-6), Curcumin also acts as free radical scavenger and selectively down-regulates the activity of cyclooxygenase-2 (COX-2). Boswellia in its turn modulates the lipoxygenase pathway (5-lipoxygenase [5-LO]).

As the activity of both Curcumin and Boswellia extracts is affected by their low bioavailability, micellar solubilization also results in an increased anti-inflammatory activity of curcumin, boswellia and their combination compared to their respective native forms.

A new study shows that liquid, micellar curcumin in combination with boswellia not only increases their bioavailability, but also enhances the biological activity [28].

The combination of solubilized curcumin with boswellia resulted in a significantly more potent anti-inflammatory activity in comparison with native and standalone extracts.

Key features NovaSOL® Curcumin / Boswellia

- Potent anti-inflammatory combination
- High bioavailability
- Effective at low dosages
- Synergetic effect
- Strongly supported by science

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