

Concentrated Celery-Seed Fraction

Standardization: Minimum 85% total phthalides
(butylphthalide and sedanenolide)

Delivered as 1:1 Free Flowing Powder 42.5% Total Phthalides

Product Features

- **Clinically proven to reduce pain from arthritis and gout.**
- **Produced with proprietary process**
- **Distinct analytical footprint**
- **Dosage controlled -- effective and high cost/benefit ratio**

Strategic Positioning

- **Reduction of discomfort from gout and reliance on pharmaceutical regimens such as Allopurinol**
- **Joint health support against rheumatoid arthritis**
- **Formulated with glucosamine hydrochloride and chondroitin sulfate for synergistic and redundant mechanisms of action**
- **As a superior celery-seed extract for circulatory health and reduction of high blood pressure and other conditions leading to heart attacks.**

<u>Product Characteristics in Powder Form</u>	
Source:	Celery seeds (<i>Apium graveolens</i>)
Appearance:	Light yellow powder
Analysis:	HPLC and Spectrophotometry
Excipients:	Microcrystalline cellulose and silica (less than 1%)
Other Ingredients:	>1% dicalcium phosphate
Use Level:	150mg of the powder /capsule 75mg of actives
Ratio of Extract to Excipient:	1:1 (powder 42.5% total phthalides)

Discussion

The aging process and physiological imbalances result in degenerative-painful conditions such as rheumatoid arthritis, Gout, and muscle stiffness. Extracts and essential oils from celery seeds are proven effective in combating the progression and symptoms of these conditions.

Recent hospital studies in both Australia and India attribute the effectiveness of BioActives' Celery-Seed Fraction to its phthalide complex (butylphthalide, sedanenolide and sedanolide). The proprietary and patented process used in producing BioActives' Celery-Seed Fraction results in the highest concentration of phthalides available in the market today -- the only product clinically proven to significantly reduce pain, increase mobility and establish a increased sense of well-being.

How does BioActives' celery seed fraction work?

Rheumatic illness is accompanied by inflammation, stiffness and joint degeneration..

Phthalides help the body to:

- Reduce inflammation by inhibiting the prostaglandins
- Reduce the abrasive and degenerative uric acid levels in the blood through vasodialation and removal.
- Relax muscles in spasm thereby increasing mobility and reducing pain.

Focusing on Gout, recently in vitro studies at BioActives were conducted exploring the inhibition of xanthine oxidase by our Celery-Seed Fraction. It has been clinically shown that there is an overproduction of uric acid during gout attacks resulting in inflammation and pain. One of the therapeutic approaches to treat gout is the use of xanthine oxidase inhibitors that block the production of uric acid. Results indicate that the Celery-Seed Fraction inhibits the enzyme, ~25% at 80-100 micrograms. Allopurinol (only medication used for gout in the past three decades) also works by the same mechanism, but is a strong inhibitor (~30% at 0.2 micrograms). This is the first report on the mechanism of action of celery seed extract apart from the diuretic effect which has a direct effect on reduction of uric acid levels. Addioionally, the Fraction does not inhibit the activity of Allopurinol.

Why is BioActives' celery seed fraction superior?

BioActives' produces its Celery-Seed Fraction through a multi-phase proprietary process involving solventless infusions, extraction and vacuum separations. The process requires days as compared to hours in other methods and results in a highly focused product, 80% to 85%-rich in phthalides.

Other celery-seed extracts are processed using petroleum solvents, and contain significantly lower levels of phthalides rendering them less focused and effective. Analytical studies show that BioActives' celery seed complex contains more that 2.5 times the amount of phthalides than its closest competitor.

Essential oils from celery seed are produced from steam distillation and contain high levels of D-limonene and comparatively low levels of the phthalide complex -- only about 5% of the essential oil complex are phthalides as compared to over 80% in BioActives' product.

BioActives' Celery Seed Complex -- a cost effective product

Clinical studies provide evidence for effective dosage levels allowing claims to be made for dosages of about 75mg per capsule (150mg powder). This provides a cost-effective product.

In Combination with glucosamine hydrochloride and chondroitin sulfate

Nutritional supplements such as glucosamine hydrochloride and chondroitin sulfate have similar or identical functions to BioActives' Celery-Seed Fraction but the mechanism of action to achieve the functions may differ. This overlap of functions is advantageous in that individuals often respond differently to a single chemical. Also, the response of an individual may vary based on his environmental and physiological conditions at the time of therapy. Hence, a multiplicity of phytochemicals with similar functions which complement each other accommodates diversity within and among individuals and populations. Of course, another reason for enhanced efficacy is the synergy provided by having a complete array of functional ingredients in one composition. For example, glucosamine and chondroitin sulfate function by rebuilding worn cartilage, which reduces pain and increases joint mobility. Nearly 4-6 weeks are necessary to perceive the onset of action by the glucosamine and chondroitin sulfate formulation. Addition of celery seed fraction to the formulation would result in a quicker onset of anti-inflammatory effect, providing relief for the patients, while the joint repair mechanism is initiated by the other two compounds. It may also help the patients to stay with the formulation till the effects are achieved.

Brief Background On the Effects of Celery Seed

Celery seeds (*Apium graveolens* Linn., Apiaceae) have long been used in Ayurvedic and traditional Chinese medicine as a diuretic, tranquilizer, antispasmodic, nerve tonic, blood purifier, and anti-rheumatic (Lu, 1986; Kapoor, 1990). It is included in the British Pharmacopeia (1983) as a treatment for arthritis and gout. Historic use and individual experience indicates that the seeds can be used in the prevention and treatment of gout (Duke, 1997). Celery is listed as a GRAS plant by the US FDA.

As to celery seed's other beneficial effects Whitehouse et al (2001) have reported that a supercritical extract from celery seeds showed gastroprotective effects against gastric injury from various NSAIDs in chronically inflamed rats. In other reports, animal studies have indicated that 3-n-butylphthalide has vasorelaxant effect, is hypotensive, may inhibit nitric oxide production and reduce inflammation following focal ischemic brain injury in rats (Tsi and Tan, 1997; Xu and Feng, 2000).

The phytochemicals in celery seed include flavonoids such as apigenin, flavon and fragrance compounds, and phytosterols. The celery seed oil contains phthalides, d-limonene, and other essential oil components. The pharmacological activities of celery seed are attributed mainly to the seed oil, specifically to the phthalides. The phthalides classified as C12 lactones, are structurally closely related. The major phthalides in celery seed oil are reported to be 3-n-butylphthalide and sedanenolide (Uhlig et al., 1987; Lund, 1978).

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