FIBROMYALGIA

A syndrome characterized by widespread musculoskeletal pain accompanied by fatigue, sleep, memory and mood issues.

2%–5%

Present in 2 to 5% of the general population.

Causes unknown, but most likely involves certain genetic mutations, infections, physical or emotional trauma, and psychological stress.

Patients exhibited high circulating levels of cortisol and increased release of pro-inflammatory cytokines by monocytes.

TREATMENT

No cure nor nonspecific pharmacological therapy for fibromyalgia.

Medications can help control symptoms, including exercise, and other stress-reduction activities.

Nutritional intervention: Take BiPRO® Alpha 9000 as protein supplement.

What is Alpha-lactalbumin?

Agropur BiPRO® Alpha 9000 is an alpha-lactalbumin protein isolate, with protein content higher than 92%. Alpha-lactalbumin is one of the main components in whey protein. It is a high-quality complete protein, rich in essential amino acids, especially tryptophan and cysteine, and bioactive peptides with effects of antioxidation and anti-inflammation.

Ratio of Tryptophan and Large Neutral Amino Acids (LNAAs) Comparison

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Tryptophan</th>
<th>Cysteine</th>
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</thead>
<tbody>
<tr>
<td>BiPRO® Alpha 9000</td>
<td>0.12</td>
<td>0.07</td>
</tr>
<tr>
<td>BiPRO® 9500</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

Graph 1: Comparison of Essential Amino Acids

- BCAAs
- Cysteine
- Tryptophan

<table>
<thead>
<tr>
<th>Protein Isolate</th>
<th>Cysteine</th>
<th>Tryptophan</th>
<th>BCAAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BiPRO® Alpha 9000</td>
<td>4.6g</td>
<td>2.8g</td>
<td>19.4g</td>
</tr>
<tr>
<td>BiPRO® 9500 Whey Protein Isolate</td>
<td>4.9g</td>
<td>2.2g</td>
<td>16.1g</td>
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<tr>
<td>Soy Protein Isolate</td>
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<td></td>
<td>16.3g</td>
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**Technical Data and Conclusion**

**BiPRO® ALPHA 9000 FOR FIBROMYALGIA TREATMENT**

**Anti-oxidation effect of Alpha-Lactalbumin**

Chronic fatigue syndrome and fibromyalgia have underlying pathophysiological mechanisms, reactive oxygen species (ROS) production, resulting in mitochondrial dysfunction. Anti-oxidant therapies hold promise for improving mitochondrial performance.

Consumption of whey protein, which increases glutathione levels in vivo, would an effective therapeutic strategy. Whey proteins exhibit antioxidant properties, because it is rich in the sulphur-containing amino acids, cysteine and methionine, that enhance antioxidant defense through intracellular conversion to glutathione.

Alpha-lactalbumin isolated from whey protein is even higher in cysteine, as shown in graph 1.

Additionally, alpha-lactalbumin can chelate heavy metals, leading to the reduction of oxidative stress because of its iron-chelating properties.

**Anti-inflammation effect of Alpha-Lactalbumin**

Study shows that alpha-lactalbumin has a marked suppressive effect on pro-inflammatory cytokine release.

Alpha-lactalbumin can also release bioactive peptides with immune-modulating effects after digested in body.

**Alpha-Lactalbumin Rich in Tryptophan**

Chronic fatigue syndrome and fibromyalgia is also a tryptophan pathway related disorder. High quality tryptophan food supplements can be useful, because serotonin and dopamine are known to be low in fibromyalgia patients. Tryptophan is a critical precursor in synthesis of serotonin and dopamine, the neurotransmitters regulating pain and fatigue feeling, sleep and mood. Additionally, tryptophan supplementation has been shown to reduce cortisol release in stress-prone patients and to benefit the treatment of pain in acute and chronic pain syndromes.

Alpha-lactalbumin is a natural milk protein rich in essential amino acid tryptophan and contains a surprisingly high ratio of tryptophan to other large neutral amino acids (LNAAs). LNAAs is a group of amino acids that compete with tryptophan to cross blood brain barrier. Therefore, the higher ratio of tryptophan to LNAAs, the higher plasma tryptophan is and the more tryptophan uptake into brain. Studies show that a meal containing alpha-lactalbumin elicited substantially higher increases in the serum and brain tryptophan concentrations and in the rate of serotonin synthesis compared with meals containing other proteins.

The pain and lack of sleep are also always associated with fibromyalgia. The frustration of dealing with an often-misunderstood condition also can result in depression and health-related anxiety. Alpha-lactalbumin has been proved to regulate neurobehavioral effects, improve sleep quality, calm down mood and reduce anxiety.

**BiPRO® Alpha 9000 whey protein isolate is premium protein source for fibromyalgia and chronic pain syndromes treatment, as well as for sleep quality improvement, mood control, and other neurological disorders.**

Agropur’s Protein Technology Center can work with you to understand your applications and meet your needs. Contact us for a consultation at ingredients@agropur.com.