



Proteolytic-Plus
(Anti-Inflammatory Formula)

The ingredients in Proteolytic-Plus have been shown to provide effective treatment for conditions associated with sports injuries, acute trauma, chronic pain, overstressed muscles and joints, and surgery. This formula is a special blend of ingredients designed to naturally reduce inflammation and the pain associated with it. The proteolytic enzymes, select minerals and choice botanicals provide systemic anti-inflammatory benefits.

What are Proteolytic Enzymes?

Enzymes are complex proteins that are produced by living cells and catalyze specific biochemical reactions. Every metabolic function that takes place in your body requires enzymes. Proteases, or proteolytic enzymes, regulate protein function in the body.

A custom blend of proteolytic enzymes has been formulated for this product. Proteolytic enzymes provide anti-inflammatory benefits as well as digestive system support. Taken between meals, these proteolytic enzymes function to break down residual large proteins that may remain within the gastrointestinal tract after meals. In addition, certain portions of these enzymes are absorbed intact through the intestinal mucosa to combat systemic inflammation.

Let's take a look at how inflammation works.

Inflammation is a cellular and vascular response designed to defend the body against foreign substances and to dispose of dead and dying tissue prior to cellular repair.

The cellular response is a complicated cascade of events that begins with the release of pro-inflammatory compounds known as cytokines.



Supplement Facts

Serving size: 2 capsules
Servings per container: 45

Amount per serving	% DV
Calcium (as calcium amino acid chelate)	20 mg 2%
Magnesium (as magnesium amino acid chelate)	10 mg 3%
Manganese (as manganese amino acid chelate)	1 mg 50%
Potassium (as monobasic potassium phosphate and potassium citrate)	69 mg 2%
Whole-istic proprietary enzyme blend	170 mg
Bromelain	2 mil FCCPU *
Protease 4.5	20,000 HUT *
Serrazimes®	20,000 U *
Protease 6.0	10,000 HUT *
Peptidase	2,500 HUT *
Quercetin	20 mg *
Wheat germ	20 mg *
Acerola (fruit) ext.	9 mg *

* Daily value not established

Other ingredients: Rice bran, vegetable cellulose, and water





Cytokines are released in response to trauma or the presence of foreign substances. Concurrently, the vascular response begins with the vasoconstriction of small vessels in the area of injury, followed by: the release of humoral substances, an increase in blood flow (vasodilation), and an increase in capillary permeability that allows leakage of large quantities of fluid and protein into the tissues.

Various studies have shown that proteolytic enzymes can reduce the production of pro-inflammatory cytokines, and thus interfere with the production of immune complexes. This is very important in arthritic conditions, in which reducing the amounts of pro-inflammatory immune complexes can disrupt the chronic, destructive, inflammatory process and enable the tissues to heal.

At the same time, proteolytic enzymes appear to help the body's own enzyme systems counteract inflammation by increasing capillary permeability earlier in the inflammatory response, as well as reducing the viscosity of edematous fluid, and hydrolyzing the fibrin plugs in lymphatic vessels. As a result, edematous fluid drainage occurs earlier and the inflammatory response is diminished.

Why do we have more than one type of Proteolytic Enzyme in Proteolytic Plus?

This formula contains a unique combination of several proteolytic enzymes. **Protease 6.0** and **Protease 4.5** both have predominantly endo-peptidase activity; in other words, they hydrolyze the interior peptide bonds of proteins. **Bromelain** also has endo-peptidase activity. **Peptidase** is an exo-peptidase that selectively hydrolyzes the protein molecules at the terminus of the peptide chain, liberating an amino acid.

Serrazimes exhibit both endo-peptidase and exo-peptidase activities. The multiple activities

of these enzymes gives us the most complete protein breakdown available. Furthermore, this combination of enzymes is added at high activity levels in order to provide a systemic effect in the body.

The Wonders of Bromelain.

Bromelain is the main component of this proteolytic blend. Bromelains are sulfhydryl proteolytic enzymes obtained from the pineapple plant (*Ananas sativus*). The bromelain used as a dietary supplement is derived from the stem, and is a mixture of several proteases (endopeptidases), including carboxy-peptidase. It also contains small amounts of several non-proteolytic enzymes, such as phosphatase, peroxidase and cellulase, along with polypeptide protease inhibitors and organically bound calcium. The basic chemical structure of bromelain is that of a glycoprotein. It has a molecular weight of 28,000 and an active pH range of 3-10, with optimal activity being between 5 and 8, depending upon the substrate.

Bromelain has been shown to be particularly effective in treating almost all inflammatory conditions, regardless of etiology, including those resulting from physical trauma, infectious agents, surgical procedures, immunological reactions, and prostaglandin metabolism. The action of bromelain can be compared to that of the endogenous protease plasmin, because it acts on fibrinogen to stimulate the biosynthesis of anti-inflammatory prostaglandins. During trauma, plasmin is inhibited and the pro-inflammatory prostaglandins PGE(2), PGF(2 α), and TxA(2) (thromboxane A(2)), increase many times above their normal levels. The synthesis of pro-inflammatory prostaglandins is also stimulated by activated thrombin, which reacts with fibrinogen to





form fibrin.

Bromelain inhibits PGE(2), which does not block the synthesis of all pro-inflammatory and anti-inflammatory prostaglandins, as in the case of aspirin, but results in a partial inhibition of thromboxane synthetase. This partial and dose-dependent inhibition decreases the total amount of pro-inflammatory prostaglandins and changes the ratio of the anti-inflammatory prostaglandins in favor of the latter. Anti-inflammatory prostaglandins compete more favorably for receptor sites on the cell membrane, thereby stimulating adenylate cyclase, which increases the concentration of c-AMP. This effect has far-reaching implications and explains why bromelain can influence seemingly unrelated diseases. Bromelain is also known to activate compounds that break down a substance called fibrin. Fibrin forms a matrix that walls off the area of inflammation, resulting in blockage of blood vessels and inadequate tissue drainage and increased edema.

Bromelain blocks the production of kinins, which are produced during inflammation and are known to increase swelling and cause pain. Bromelain may also be helpful in reducing reactions to allergens and is an extremely effective anti-inflammatory; especially when combined with vitamin C.

This Numerous studies have demonstrated the anti-inflammatory effects of bromelain in the treatment of thrombophlebitis, deep vein thrombosis, cellulitis, ecchymosis and edema. In addition, several clinical studies have investigated bromelain's ability to reduce edema, bruising, healing time, and pain following various surgical procedures and in treating sports-related injuries. This same basic mechanism of increasing plasmin also explains bromelain's ability to inhibit platelet

aggregation. Platelet aggregation is a major factor in atherogenesis. As result, bromelain supplementation has been reported to be quite effective in treating angina.

Proteolytic Plus Contains Minerals

Calcium Citrate: In addition to helping activate the enzymes, calcium also helps regulate the passage of nutrients into and out of cell walls, and because of its buffering activity, helps decrease the collection of uric acid and lactic acid that is created from injury. Many people who have chronic inflammation, particularly due to arthritis, have taken many types of pain medications including steroids. These medications hinder the absorption of calcium, which may accelerate the development of osteoporosis. This condition, in turn, leads to more pain and inflammation.

Potassium Citrate, Potassium Phosphate:

Potassium is a mineral that is found in high amounts in the body, mainly in the intracellular fluid. Like calcium, it too contributes to the buffering activity to decrease the collection of uric acid and lactic acid that is created from injury. Potassium helps alleviate abnormal clotting and collection of acid in the area of injured tissue. Potassium assists in the conversion of glucose to glycogen which can be stored in the liver. It functions in cell metabolism, in enzyme reactions, and in the synthesis of muscle protein from amino acids in the blood.

Magnesium Citrate: It too contributes to the buffering activity. Magnesium also promotes the absorption and metabolism of other minerals, such as calcium, phosphorus, sodium, and potassium. Among its many uses, magnesium activates enzymes necessary for the metabolism of carbohydrates and amino acids.





Manganese (amino acid chelate) plays a role in activating numerous enzymes. It aids in the utilization of choline and is an activator of enzymes that are necessary for utilization of biotin, thiamine, and ascorbic acid. It also plays a part in protein, carbohydrate, and fat assimilation. Manganese serves as one of the "building blocks" to produce SOD (super oxide dismutase). SOD is a powerful antioxidant our body produces that has been shown to reduce inflammation and enhance cellular repair.

Proteolytic Plus Contains Minerals

Wheat Germ provides antioxidants and several vital nutrients to help stabilize cell walls, reduce swelling and increase healing. It contains 50% of the RDI for Folate, the B vitamin that aids in the production of healthy red blood cells. It also contains a good amount of Vitamin E, Thiamin and Zinc. Zinc is another "building block" of SOD, a powerful antioxidant that our body produces to reduce inflammation and enhance cellular repair.

Acerola (*Malpighia glabra* L.) is an excellent natural source of **Vitamin C** and a good source of iron, calcium and phosphorus. Inflammation is a major source of oxidants and Vitamin C is one of the best free radical scavengers due to its antioxidant properties. Acerola has also shown active anti-fungal properties. In addition to its vitamin content, Acerola contains mineral salts which have been shown to aid in the remineralization of tired and stressed skin, while the mucilage and proteins have skin hydrating properties and promote capillary conditioning.

Quercetin is a bioflavonoid that offers protection from inflammation and gout by inhibiting xanthine oxidase, leukotriene synthesis and release, neutrophil accumulation and enzyme release. It has shown its best results when taken with bromelain between meals.





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