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From cocoon to clots: Serrapeptidase

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Enzymes have become quite prominent in antimicrobial chemotherapy in recent years. They have high specificity and consequently, each enzyme acts on its substrate making them highly effective. There are many therapeutic drugs that work by inhibiting the growth of the causative agent of the disease. Unlike such common therapeutic agents, enzymes do not inhibit the disease-causing pathogen directly, but rather act on a specific biochemical target that affects either the organism directly or relieves the symptoms of the disorder. Serrapeptidase is an industrially produced enzyme that is obtained from the non-pathogenic bacterium Serratia marcescens. This microorganism commonly grows in the intestine of the silk moth, Bombyx mori. It is this enzyme that helps the moth to come out of its cocoon by decomposing it. Serrapeptidase is a proteolytic enzyme that breaks down the peptide bonds of proteins. It is produced by culturing the Serratia marcescens on tryptic soy broth, a medium made rich in maltose and peptones. After 48 hours of cultivation, a high yield of serrapeptidase is obtained as a result of fermentation. It is purified through dialysis and high-performance liquid chromatography (HPLC) techniques. The enzyme may be immobilised and formulated as a drug. Serrapeptidase has anti-inflammatory activity and is used for the treatment of rheumatoid arthritis, osteoarthritis and other autoimmune disorders. This enzyme inhibits the release of bradykinin, a pain-inducing peptide and hence it is also used for reducing postoperative swelling and pain in patients. Besides its direct effects, serrapeptidase also enhances the activity of antibiotics by dissolving biofilms. It has fibrinolytic activity by virtue of which it can dissolve clots and other tissues, and thus it is used in certain cardiovascular conditions like atherosclerosis as well. In the case of bronchitis, it can help to improve breathing by reducing mucus formation. Despite all its benefits, serrapeptidase is still not that well known in the medical industry. Research continues to be done on its antimicrobial activity and health benefits so that it can be developed further and soon become a household name.

Keywords: Serrapeptidase, Antimicrobial activity, Therapeutic drugs, Proteolytic enzyme, Fermentation, Anti-inflammatory activity

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