

## Nattokinase as an alternative in treating cardiovascular diseases

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Nattokinase is a protease derived from the traditional Japanese fermented soybean food, natto. Due to its ability to destroy and prevent blood clots, natto has been fermented by inoculating *Bacillus subtilis* as a starter culture. The nattokinase enzyme is recognisable as a potential alternative antithrombotic agent in preventing cardiovascular diseases. Antithrombotic drugs, which are therapeutically used today, face issues related to bleeding and other clinically significant adverse effects. As several *in vivo* and *in vitro* studies showed, nattokinase produces less to no side effects. It displays anti-coagulation and fibrinolytic activities that involve multiple different pathways. It directly degrades blood clots and employs several processes to support its fibrinolytic activity. It can be attributed to the enzyme's specific affinity for fibrin degradation, as revealed by analysing its gene. It also amplifies the production of clot-dissolving agents and inhibits platelet aggregation that leads to clotting. Apart from preventing side effects, nattokinase is also resistant to the high acidity of gastric juice and high temperatures in the stomach. Further, its oral ingestion enhances the fibrinolytic activity in plasma. Currently, the enzyme is being produced as a food supplement in capsule form. Several of its functions include thinning the blood, preventing blood clots, and improving blood circulation in several countries. Clinical trials are still proving the enzyme's effectiveness to lower atherothrombotic risk and in slowing down the progression of atherosclerosis. Antithrombotic activity is only one of its pharmacological effects. With various other pharmacological effects, nattokinase proves to be an exemplary drug candidate against cardiovascular diseases.

*Keywords: Nattokinase, Natto, Antithrombotic, Cardiovascular diseases, Fibrinolytic*

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