



## Antithrombotic properties of propolis

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The formation of thrombi in blood vessels results in thrombosis that is responsible for a considerable morbidity and mortality because it is associated with arterial diseases such as myocardial infarction, stroke, and peripheral occlusive disease in addition to venous thromboembolic disorders. Pharmaceutical agents such as anticoagulant agents and antiplatelet agents are applied for the prevention of the recurrence of thrombotic disorders. However, the use of these pharmaceuticals can result in side effects such as bleeding, as well as renal and hepatic disorders. The prevention and treatment of diseases using functional foods and alternative medicines have recently attracted an attention. Functional foods and alternative medicines with possible antithrombotic properties that have been used for many years are now receiving a significant focus in terms of the treatment and prevention of thrombosis. As they have already been used for so long, they are likely to be safe. Propolis is a hive product comprising resinous materials collected by bees from plants, and it includes various chemical compounds. Various biological activities of propolis have been indicated, and propolis is used as folk medicine and health supplement worldwide. This report reviews the possibility of using propolis as an antithrombotic agent. Blood normally flows through blood vessels unobstructed. Nevertheless, blood components such as cells and plasma can leak from wounds in damaged vessels, and severe bleeds can be fatal. Blood clots at wound sites of damaged vessels stop bleeding in a process called hemostasis that includes platelets and a cascade of coagulation factors. In a broad sense, the fibrinolytic system and its besides having antibacterial properties, honey has been shown to decrease inflammation, bring about rapid autolytic debridement, and stimulate the immune response for healing[8]. Studies have shown that manuka honey upregulates tumor necrosis factor-alpha, interleukin-1b, interleukin-6, and prostaglandin E2 production, which in turn stimulate the by.

Therefore, the dressing must be changed whenever it is moist with exudate, which is typically multiple times per day. However, when the amount of drainage decreases acids such as octanoic or dodecanoic acid and pinobanksin illustrates a schematical representation of the royal jelly composition and the main functional activit The prevention of thrombosis has been prioritized in the developed countries, where (unhealthy) lifestyles have increased the risk of thrombotic events and the incidence of thrombosis. Various drugs that are used to prevent thrombotic diseases in developed nations can prevent thrombosis , but these also prevent the hemostatic system from working properly, resulting in increased susceptibility to bleeding. Thus, milder agents with minimal side effects such as bleeding are desirable. The discovery of natural products and alternative medicines that have antithrombotic properties is now a significant target, and the application of such products to prevent thrombosis is anticipated. In general, antithrombotic activity generally refers to antiplatelet action and the anticoagulant action of plasma and occasionally fibrinolytic activity . Antithrombotic substances comprise anticoagulants that halt the coagulation system and interfere with further clot expansion, antiplatelet agents that decrease platelet aggregation and inhibit thrombus formation, and fibrinolytic enzymes that directly dissolve thrombus . Whether or not these compounds exert antithrombotic effects through actions on blood coagulation factors, platelets and the fibrinolytic system should be experimentally assessed in vitro and in vivo. This review outlines the possible antithrombotic properties of propolis and natural substances found in propolis.ies of its compounds.