

## **In vitro antiatherothrombotic effects of extracts from *Berberis vulgaris* L., *Teucrium polium* L., and *Orthosiphon stamineus* benth**

### **ABSTRACT**

Coronary artery disease is the leading cause of mortality and morbidity worldwide. The pathogenesis is mainly due to atherosclerosis, plaque rupture, and platelet thrombus formation. The main risk factors for coronary artery disease include obesity, hypercholesterolemia, smoking, diabetes, and high blood pressure. As a part of disease management, treatment options using anticoagulant and antiplatelet drugs can be applied with addition to lipid-lowering medication. However, medicinal plants comprising antiatherothrombotic effects can be used as options to combat the disease rather than drug therapies with lesser adverse effects. Therefore, the haematological effect of *Berberis vulgaris* L., *Teucrium polium* L., and *Orthosiphon stamineus* Benth extracts was studied using in vitro model to prevent and to treat coronary atherothrombotic disease. The aqueous, methanol, and polysaccharide extracts of *B. vulgaris*, *T. polium*, and *O. stamineus*, respectively, were studied for their anticoagulant and antiplatelet effect on human whole blood. Extracts were subjected to the prothrombin time (PT) and activated partial thromboplastin time (APTT) test for anticoagulant activity. The antiplatelet activity was investigated using an electrical impedance method. *B. vulgaris* aqueous extract (BVAE), *B. vulgaris* polysaccharide extract (BVPE), *T. polium* aqueous extract (TPAE), and *T. polium* polysaccharide extract (TPPE) significantly prolonged the coagulation time in a concentration-dependent manner ( $p < 0.05$ ). The administration of BVAE demonstrated the most effective antiplatelet activity against platelet aggregation caused by arachidonic acid (AA) and collagen. These antiplatelet activities may correspond to the presence of higher total phenolic compound, which thus inhibit the platelet aggregation activity. In conclusion, these findings provide strong evidence on the antiatherothrombotic effect of BVAE and TPPE.

**Keyword:** *Berberis vulgaris* L.; *Teucrium polium* L.; *Orthosiphon stamineus* benth