Antiplatelet and anticoagulant effects of two diterpenes isolated from the Brazilian marine algae Dictyota menstrualis

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The cardiovascular diseases, in which platelet aggregation and blood coagulation are involved, represent a major cause of disability and death worldwide. The current antithrombotic therapy has an unsatisfactory performance and may produce side effects. Therefore, alternative therapies are under hard investigation and natural products have been routinely assayed. Marine organisms produce several and complex substances with different ecological functions and pharmacological properties. In this work, we evaluated the effects of two diterpenes (dichotomane and pachy/isopachydictyol A) isolated from the Brazilian marine brown algae Dictyota menstrualis upon platelet aggregation and blood coagulation, using in vitro assays only. The dichotomane inhibited platelet aggregation on platelet-rich plasma (PRP) induced by collagen (IC50 1.1 mM) and ADP (IC50 0.32 mM). Meanwhile, the pachy/isopachydictyol A did not inhibit platelet aggregation upon PRP, but did inhibit aggregation induced by collagen (IC50 0.13 mM) and thrombin (IC50 0.23 mM) upon washed platelets. Moreover, both diterpenes were able to inhibit the clotting evaluated through plasma recalcification, fibrin clot, Prothrombin Time, activated Partial Thromboplastin Time and catalytic activity of thrombin as well, despite showing different intensities. In conclusion, the two diterpenes from the algae D. menstrualis showed antiplatelet and/or anticoagulant properties, thus revealing biotechnological potential on the antithrombotic therapy. This work also shows the importance of bioprospecting studies on the rich Brazilian marine biodiversity in order to search for novel products that could be used in drug discovery.

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