Mild Acid Hydrolysis of a Brown Algal Sulfated Galactofucan Produces a Venous Antithrombotic Derivative

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Algal sulfated polysaccharides are usually exploited as alternative anticoagulant and antithrombotic reagents. These bioactive phytocompounds commonly speed up the action of thrombin-plasma inhibitors (antithrombin and heparin cofactor II) blocking thus the clotting process. Herein, the sulfated galactofucan from the brown algal cell wall *Laminaria abyssalis* (Phaeophyta) as well as their derivatives obtained with mild acid hydrolysis (MAH) were analyzed by both *in vitro* anticoagulant assays and *in vivo* venous plus arterial antithrombotic tests. A more in deep structural studies of these samples were also performed through metilation-analyses and NMR experiments. Intriguingly, a low anticoagulant MAH-resistant fragment with a mean venous antithrombotic activity was selectively obtained. In contradiction, the native sulfated galactofucan (NSGF) was almost inactive as antithrombotic, and highly active as anticoagulant. This high molecular weight (MW = 20kDa) MAH-resistant fragment is composed mostly by galactosyl units (75 %), whereas the NSGF has only 5-10% of the total. Since both fragment and NSGF have high MW, and they differ mainly by their sugar composition, the venous antithrombotic action seems to be, for these particular polysaccharides, a sugar type-dependent action. Fucose-enriched oligosaccharides with well-defined MW were also produced by MAH and showed high pro-thrombotic actions even with low MW (< 10kDa). No arterial antithrombotic effects were detected for any sample. Our investigation here detailed strongly supplies useful pharmacological results for development of drugs that act only on specific types of thromboembolim.

Palavras Chaves: antithrombotic activity, *Laminaria abyssalis*, mild acid hydrolysis, sulfated galactofucan

Supported by: CNPq, FAPERJ and FUJB