Extraction and antioxidant, immunostimulant and antiproliferative properties of laminarins from brown algae

Paiva, A.A.O.[1]; Medeiros, M.J.C.[2]; Alves, M.G.C.F.[1]: Rocha, H.A.O.[1]

[1]Dep. de Bioquímica, [2]Dep. de Química, UFRN, RN, Brazil.

Introduction: Glucans with structure β(1→3) and β(1→6)-branches having molecular weight of 5 kDa are called laminarin. They are found in several organisms. In brown algae laminarin are found in large quantities in their fronds. They stand out because they have biotechnological properties as antioxidants, immunostimulant and antitumor activities. The laminarin of *Lobophora variegata* algae have not been evaluated for the activities. **Objectives:** Thus, we present the extraction process and chemical characterization of a laminarin from *L. variegata* and demonstrate its antioxidant, immunostimulant and antiproliferative properties. **Material and Methods:** The seaweed were collected in Búzios (Nízia Floresta-RN/Brazil), and after proper processing they were subjected to purification protocols, chemical analysis and structural evaluations (chromatography and infrared), antioxidant activity (chelation of copper and iron and $ABTS^+$ assay), immunostimulant activity of RAW 264.7 cell (cytokine assays [IL-6, IL-10 e TNFα] and Nitric oxide [NO]). Laminarin toxicity was evaluated with kidney carcinoma cell (786-0) and RAW 264.7 (normal mouse macrophages) cells lines using MTT assay. **Results and Discussion:** Polysaccharides with molecular weight ranged from ~5 kDa were obtained. The polysaccharides are composed only by glucose. No proteins and phenolic were detected. This laminarin (0.3 mM) showed 70,9% ± 0,47% and 81,4 ± 0,32% for copper and iron chelating activity, respectively. 12.8 ± 2.1% of $ABTS^+$ radical reduction was observed when 10 mM laminarin was used. At this concentration, this laminarin stimulate production of IL-6 (11,6 µg/mL), IL-10 (15,2 ng/mL), TNFα (8,1 µg/mL) e ON (101 ± 5%, $p<0,001$). In addition, *Lobophora* laminarin (10 mM) inhibited by 21,7 ± 0.88% 786-0 cell viability ($p<0,001$), whereas stimulates normal cell proliferation ($p<0,01$). **Conclusions:** The *Lobophora* laminarin demonstrated promising antioxidant, immunostimulant and antiproliferative potential and have been selected for further studies of structural characterization in order to figure out its biological and structural relationship.

Keywords: Glucans; Metal chelation; Antiproliferative activity.
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