Sulfated Heterorhamnan from the Green Seaweed *Gayralia oxysperma* (Ulvales): Chemical Structure and Antiviral Activity

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Marine green algae synthesize a great variety of water-soluble polysaccharides. Algae from the genera *Ulva* and *Enteromorpha* (Ulvales) produce sulfated glucuronoxylorhamnans. In contrast, the species from genus *Monostroma* (Ulvales) biosynthesize sulfated rhamnans. Both types o sulfated polysaccharides have a broad range of biological activities, comprising antiviral, immunomodulating, anticoagulant, antioxidant, besides antihyperlipidemic properties. The present study was dedicated to determine the chemical structure and antiviral activity of the sulfated polysaccharides produced by the green seaweed *Gayralia oxysperma*. The milled alga was extracted with water at 25°C and, sequentially, with the same solvent at 80°C, giving rise to Go1–Go6 fractions. Go3 was purified by ultrafiltration through a 300 kDa cut-off membrane, yielding a homogeneous fraction Go3r (MW of 1,519 kDa). Go3r was rich in uronic acids (19.0%) and sulfate groups (25.8%), presenting rhamnose (77.0%), xylose (18.2%), glucose (4.9%) and galactose (1.0%). The structure was established by methylation analyses of the carboxyl-reduced, carboxyl-reduced/desulfated, carboxyl-reduced/Smith-degraded and carboxyl-reduced/Smith-degraded/desulfated products and NMR spectroscopy analyses. The heterorhamnan backbone is constituted by 3- and 2-linked rhamnosyl units (1.00:0.80), the latter being ~50% substituted at C-3 by side chains containing 2-sulfated glucuronic and galacturonic acids and xylosyl units. The 3- and 2-linked rhamnosyl units are unsulfated (20%), disulfated (16%) and mostly monosulfated at C-2 (27%) and C-4 (37%). This branched and sulfated heterorhamnan had high and specific activity against herpes simplex virus. Supported by CNPq and PRONEX-CARBOIDRATOS.