

Determination of Soluble and Insoluble Dietary Fiber Content of Marine Macroalgae and Microalgae

Paulo Nova^{1*}, Ana Pimenta Martins¹, Joana Gabriela Silva², Rui Pereira³, Helena Abreu³, Ana Machado Silva⁴, Ana Freitas¹, Ana Gomes¹

¹Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal

²Allmicroalgae – Natural Products Avenida Duarte Pacheco, 19, 7th floor, 1070-100, Lisboa

³ALGApplus - Produção e Comercialização de Algas e seus Derivados. CIEMar - Travessa Alexandre da Conceição s/n 3830-196 – Ílhavo

⁴SONAE, Lugar do Espido, Via Norte, 4471-909 Maia

*pnova@porto.ucp.pt [Research Fellow: VALORMAR (POCI-024517-FEDER)]

Diet composition, daily dietary intake and acute dietary changes have a big impact on modulating the microbial composition of the gut [1]. In fact, nowadays scientists recognize that diet is a key environmental factor for modulation of gastrointestinal microbiota composition and metabolic function and that the consumption of specific dietary ingredients such as fibers is an excellent form to benefit human gut microbiota and overall health since it is correlated with metabolic, immunologic, and protective functions in the human organism [1-4]. Seaweeds and microalgae are excellent sources of potential prebiotic fibres such as fucoidans, alginates, carrageenans and exopolysaccharides that are not digested, and are then selectively fermented by beneficial colonic microbiota [5]. In this work the soluble and insoluble fiber contents of five macroalgae (*Palmaria palmata*, *Gracilaria gracilis*, *Porphyra* spp, *Ulva rigida* and *Fucus vesiculosus*) obtained from land-based cultivation systems, under the Integrated Multi-Trophic Aquaculture (IMTA) sustainable concept, and three microalgae (*Chlorella vulgaris*, organic certified *Chlorella vulgaris* and *Tetraselmis chuii*) all cultivated in fully controlled closed systems, were estimated following the acid detergent method developed by Van Soest *et al* [6]. Macroalgae revealed to be an excellent source of total fibers with values ranging from 4.7±0.1 (*P. palmata*) to 37.0±0.4 % (w/w) (*F. vesiculosus*) – insoluble fibers registered values between 1.33±0.05 (*Porphyra* spp.) and 22±2 % (w/w) (*F. vesiculosus*) and soluble fibers between 1.7±0.2 (*P. Palmata*) and 20.4±0.8 % (w/w) (*Porphyra* spp.). In comparison with macroalgae, microalgae present lower fiber contents with values ranging from 0.84±0.04 (*Chlorella vulgaris*) to 2.42±0.06 % (w/w) (*Tetraselmis chuii*) – insoluble fibers registered values ranging from 0.39±0.06 (*Chlorella vulgaris*) to 1.3±0.2 % (w/w) (Organic *Chlorella vulgaris*) and soluble fibers between 0.4±0.2 (Organic *Chlorella vulgaris*) and 1.81±0.07 % (w/w) (*Tetraselmis chuii*). Interestingly the organic *Chlorella vulgaris* presented almost double the content of total dietary fiber compared to the conventional counterpart (1.63±0.21% and 0.84±0.04 % (w/w), respectively). These marine resources, and particularly macroalgae, present an excellent source of soluble and insoluble fibers that could act as prebiotics modulating positively human gut microbiota.

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