

Microalgae a new promising omega 3 fatty acid source

N.M. Bandarra⁽¹⁾, D. Duarte⁽¹⁾, R. Pinto⁽²⁾, C. Sampayo⁽²⁾, M. Ramos⁽¹⁾, I. Batista⁽¹⁾, M.L. Nunes⁽¹⁾, A.P. Batista⁽³⁾, A. Raymundo⁽³⁾, L. Gouveia⁽⁴⁾, B.S. Lima⁽²⁾

(1) INRB/L-IPIMAR, Av. Brasília 1449-006 Lisboa, Portugal; (2), IMED.UL, Faculdade de Farmácia Universidade de Lisboa, Av das Forças Armadas 1600 Lisboa, Portugal.

(3) Núcleo de Investigação em Engenharia Alimentar e Biotecnologia, Instituto Piaget - ISEIT de Almada, Quinta da Arreinelas de Cima, 2800-305 Almada, Portugal; (4) Instituto Nacional de Engenharia e Tecnologia Industrial - INETI-DER - Unidade Biomassa, Estrada do Paço do Lumiar, 1649-038 Lisboa, Portugal

It is well recognized that seafood omega 3 fatty acids (n-3 PUFA) have an important role in the prevention of several disorders, in particular coronary heart disease by lowering blood pressure and heart rate variability; reducing serum triglycerides, thrombotic tendency, inflammation and arrhythmias. Moreover, the scarcity of some fish species used for fish oil production, pointed out the need of new n-3 PUFA sources. Thus, *Diacronema vlkianum* a marine microalgae is a new promising source of these fatty acids. Nevertheless, dietary use cannot be established before the bioavailability evaluation.

The aim of the present study was evaluating the incorporation of the main n-3 PUFA in subcutaneous and visceral fat and consequently their bioavailability.

Experiment: 14/15 male Wistar rats/group respectively were orally administered, by gavage, with 0 (control) or 100mg/Kg/day single dose of microalgae suspended in water. Animals were daily monitored. At the beginning and after two months animals were sacrificed and tissues were collected and preserved at -80°C for subsequent fatty acid profiling GC-FID. Statistical analysis of the data obtained consisted of two-sample assuming unequal variances t-test t-student's. Comparisons were made between microalgae and control group, after two months of experiment. Differences were considered significant at $P < 0.05$.

Discussion: *D. vlkianum* main n-3 PUFA were 20:5n-3 (EPA), 22:5n-3 (DPA) and 22:6n-3 (DHA) used as biomarkers of microalgae tissue incorporation. Obtained results showed that EPA presented in subcutaneous fat a high significant level in supplemented group compared with control ($0.21\% \pm 0.04$ vs $0.06\% \pm 0.05$). Moreover n-3 PUFA also presented a high level in treated rats faced to control ($2.48\% \pm 0.21$ vs $1.97\% \pm 0.47$). In the case of visceral fat, microalgae group had increased levels of DPA in comparison to control ($0.14\% \pm 0.01$ and $0.05\% \pm 0.08$, respectively). Deposition rate values showed a higher incorporation of EPA and DPA in visceral fat comparatively to subcutaneous fat in supplemented group. In addition, this *in vivo* model allow concluding that consuming microalgae for two months presented more beneficial pronounced changes in visceral than in subcutaneous fat. The increase of EPA in subcutaneous and DPA in visceral fat supports the benefits of microalgae supplementation in the prevention of CHD. Thus, the bioavailability of n-3 PUFA of microalgae was confirmed.

Acknowledgements: FCT grant PTDC/AGR-ALI/65926/2006

Preferência de apresentação: Oral;

Nome: Narcisa M. Bandarra;

Endereço: IPIMAR Av. Brasília 1449-006 Lisboa

Telefone: 00351 213027069; Fax: 00351 213015948

e-mail: narcisa@ipimar.pt