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Vitamin, Free Amino Acid and Fatty Acid Compositions of Some Marine Planktonic Microalgae Used in Aquaculture

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Abstract

Vitamin, free amino acid and fatty acid analyses were carried out on selected different microalgal species used in aquaculture as an evaluation for proposed cosmetic use. In most cases greater amounts of vitamins were obtained in the microalgae than in the usual human food sources. On a dry weight basis, tyrosine, alanine and glutamic acid were the main free amino acids found in the strains studied. Considering fatty acids and total lipid, the ratio of polyunsaturated fatty acids (PUFA) to saturated fatty acids remained nearly constant for the species analyzed and PUFA were dominant. For both *Chaetoceros calcitrans* and *Skeletonema costatum*, myristic and palmitic acids were the main saturated acids and EPA the major unsaturated acid, but for *Tetraselmis suecica* palmitic acid represented 29.4% of total fatty acids. This species also contained interesting amounts of oleic, linoleic and octadecatetraenoic acids.

Introduction

Unicellular microalgae are mandatory in the marine food chain and are conventionally utilized for aquaculture purposes. Our research center has been working for several years on analyses of these organisms in order to use them as raw material in dietetics and cosmetics. In the present study, we report on the determination of their content of dermogenic elements interesting for their activity on the skin. We have analyzed vitamin, free amino-acid and fatty acid composition in different strains of microalgae used in shellfish hatcheries of the French Atlantic Coast.

Material and Methods

Plant material

Seven species of microalgae, *Tetraselmis suecica* (Kylin) Butcher, *Isochrysis galbana* Parke, *Pavlova lutheri* (Droop) Green, *Skeletonema costatum* Greville, *Chaetoceros calcitrans* (Paulsen) Takano, *Chaetoceros gracilis* Schutt and *Thalassiosira pseudonana* (Hust.) Hasle *et* Heimdal which are commonly used in aquaculture to feed larval or juvenile shellfishes grown in hatcheries or nurseries, were studied. All the culture strains originated from the IFREMER laboratories at Brest.

For the vitamin analyses, non-axenic cultures were grown in the laboratory in plastic bags containing 30 liters of culture medium (Conway medium without vitamins) under continuous illumination (De Roeck-Holtzhauer *et al.* 1991).

For the determination of amino acids and fatty acids, algae were collected at an aquaculture center of the region 'Pays de la Loire' (France) that carries out controlled batch cultures in 300 L vessels under continuous illumination. The culture medium was made using natural seawater sterilized and enriched with Conway medium. Previously to their analysis the microalgae were concentrated using a centrifugation method at 3000 rpm for 30 to 40 min. An algal cream was obtained and kept frozen at −18 °C for less than 3 months excepted for the vitamin analyses which were carried out only on fresh material.