SOME PHYSIOLOGICAL ASPECTS OF DIATOMS LIPID SYNTHESE (FOOD RESOURCE FOR ABALONE POSTLARVAE)

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Diatoms are eukaryotic microalgae broadly present in freshwater and marine ecosystems. These unicellular organisms dominate the phytoplankton communities and are considered as the most important primary producers in sustaining the marine food chain (Gatidou, 2008).

Benthic diatoms are the main principal of food source for postlarval abalone in hatcheries (Kawamura, 1996 and 1998). In spite of the increasing number of studies on the nutrition of newly settled abalone larvae (Kawamura and Takami, 1995; Kawamura, 1995,1996,1998; Kawamura et al., 1998; Daume 1009, 2000 and Gordon et al., 2006), growth and survival rates during the early postlarval stages as reported in the literature are variable and generally low (Searcy-Bernal et al., 1992). Among those are poor and unpredictable performance is related to availability of food of different diatoms and their composition, as well as the abalone species and the growing conditions in hatcheries (Kawamura, 1998). The aim of this research was to investigate lipids contents and biofilm formation of 4 diatom species *Cylindrotheca closterium, Navicula sp., Amphora sp., Nitzshia sp.* and *Cocconeis sp.*

Biochemical composition of algal cells is one important factor to improve the nutritional value of diatoms for feeding marine aquatic organisms in aquaculture (Dunsatn et al, 1994). Diatoms are an important component of the food for zooplankton, shellfish and fish larvae. New biotechnological applications of microalgae lipids widespread and one of the important is for Biofuel production. In metabolic pathways of microalgae, the light-harvesting complex composed by chlorophyll and carotenoids capture light energy as photons. This energy is used by photosystem II in the catalytic oxidation of water, forming protons, electrons, and molecular O2. Low-potential electrons are transferred through the photosynthetic electron transport chain leading to the reduction of ferredoxin for the formation of NADPH. An electrochemical gradient is formed because of the release of protons after water oxidation into the thylakoid lumen, which is used to drive ATP production via ATP synthase. The photosynthetic products NADPH and ATP, are substrates for the Calvin–Benson cycle where inorganic CO2 is fixed into 3-C molecules that are assimilated into the sugars, starch, lipids, or other molecules required for cellular growth (Beer et al., 2009). In this study, the biochemical composition of *Cylindrotheca closterium, Navicula sp., Amphora sp*. and *Cocconeis sp*. were analyzed, they contained high levels of total lipids (6.4%- 14.5% of dry weight) and fatty acids (16%-22% of lipids); from 39% to 48% of fatty acids were polyunsatured (PUFA). Fatty acids composition of 4 species was presented in Table.

Fatty acids composition of totai lipids from Cylindrotheca closterium, Navicula sp., Amphora sp. and Cocconeis sp.

Fatty acid (molar %)	Cylindrotheca losterium	Navicula sp	Amphora sp.	Cocconeis sp.
14:0	5.5	2.8	5.6	6.2
16:0	25.4	9.1	7.2	21.3
16:1	24.9	30.8	28.9	30.1
16:2	1.8	3.2	26.9	27.3
16:3	3.7	18.3	2.5	2.4
18:0	0.6	trace	0.2	0.3
18:1	2.6	6.2	4.6	5.2
18:2	2.5	3.9	5.0	4.8
20:5	17.2	14.5	12.3	16.2

Fatty acids are easily absorbed by postlarvae (Manahan and Jaeckle, 1992), a fact that is especially important in very early life stages, before the complete development of the gut enzymes involved in protein digestion (Takami et al., 1998). For this reason the diatom composition phase of the present study has focused on fatty acids. Studied diatoms had high levels of lipids and polyunsaturated fatty acids (PUFA), especially the essential PUFA 20:5(n-3) (Dunstan et al., 1994 and Brown et al., 1997), and therefore may fulfill the nutritional requirements of abalone postlarvae better than other algae. PUFA of both n-3 and n-6

families are essential for growth of juvenile *Haliotis discus hannai* (Mai et al., 1996). Their primary function is considered to be structural (Mai et al., 1995 and Floreto et al., 1996). Among PUFAs, 20:5(n-3) seems to contribute the most to faster growth of juvenile *H. discus hannai* (Mai et al., 1996).

From the results, obtained in this study, *Cylindrotheca closterium, Navicula sp., Amphora sp*. and *Cocconeis sp*. present the suitable nutritional basis proposed for low performance of abalone postlarvae in their natural habitat and in certain artificial settings; the biochemical composition of the diatoms can be proposed as food for abalone postlarvae.In the same moment, the mass culture of these diatoms can to be assure. Differences in n-3 PUFA and in FA composition of studied diatoms accentuate the high diatom nutritional value and have to be used in feeding of abalone larvae and as increase the postlarval growth and survival. The findings present the practical help in the reproduction of abalone in culture.