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Medium Optimization for Algal Culture in Bivalve Hatchery

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Microalgae are of great importance since they play a central role in global geochemical cycles of carbon, nitrogen, phosphorus, sulfur, and silicon. They also represent a source of various compounds, that can be used in pharmaceutics, cosmetics, chemical, and energetic industries. In addition, they are employed in aquaculture feed applications processes, mainly in hatcheries. Indeed, bivalve hatcheries entirely depend on live microalgae as a food source for larval stages. Microalgae production is labour intensive, and the cost of microalgae production is generally 30–50 % of the total operational cost for a bivalve hatchery[1]. The efficient production and use of microalgae are therefore of great interest in bivalve production. Nutritional quality is the primary criterion for the choice of microalgae species for bivalve larvae culture, which, in turn is a function of optimal microalgae growth conditions.

The conditions required for microalgae growth, such as temperature, light intensity, pH values, concentration and composition of the culture medium influence their intracellular enzymes and organisms' function and finally their nutritional value. Among the different parameters that can influence the growth and biochemical composition of microalgal species, the culture medium plays a central role, especially for what concerns nitrogen content. The chemical composition of microalgal cells is also known to vary during their growth phase, particularly with respect to their lipid component. In this study, the effects of different culture media on microalgae growth and composition are investigated. In particular, culture media containing different amount of boron and microelements were considered. All experiments were conducted in photobioreactors in controlled conditions and Isochrysis Galbana (Parke; Clone T-ISO) microalgae species was selected to test the optimal culture medium. Wet algae samples were sampled at different times during the algal growth phases (induction, exponential, and stationary) the growth rate and the lipid content was determined. The preliminary results indicate that biochemical composition of microalgae is influenced by microelements concentrations in the culture media.

[1] P.C. Oostlander, J. van Houcke, R.H. Wijffels, M.J. Barbosa, Microalgae production cost in aquaculture hatcheries, Aquaculture Volume 525, 30 August **2020**, 735310

[2] Yue Gao, Chunyang Zhou, Camille Gaulier, Arne Bratkic, Josep Galceran, Jaume Puy, Hao Zhang, Martine Leermakers, Willy Baeyens. Labile trace metal concentration measurements in marine environments: From coastal to open ocean areas. *TrAC Trends in Analytical Chemistry*. **2019**. 92-101.

[3] Enver Güler, Cüneyt Kaya, Nalan Kabay, Müşerref Arda, Boron removal from seawater: State-of-the-art review, Desalination,Volume 356, **2015**, pages 85-93.

[4] Svetlana V. Smirnova, Dmitry V. Ilin, Igor V. Pletnev, Extraction and ICP-OES determination of heavy metals using tetrabutylammonium bromide aqueous biphasic system and oleophilic collector, *Talanta*. **2021**, Volume 221.

[5] Jens Søndergaard, Gert Asmund, Martin M. Larsen, Trace elements determination in seawater by ICP-MS with on-line pre-concentration on a Chelex-100 column using a 'standard' instrument setup. *Department of Bioscience, Aarhus University.* MethodsX**. 2015.** Volume 2, *Pages 323-330*.

[6] G. L. Foster, P. A. E. Pogge von Strandmann and J. W. B. Rae, Boron and magnesium isotopic composition of seawater, *Geochemistry. Geophysics. Geosystems.* **2010**, Volume 11, Number 8.