Exploring Valuable Microalgae of Diatoms: A Future Plan for Development of Microalgae at LSIH, Brawijaya University, Indonesia

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ABSTRACT : Diatoms are one major group of microalgae in seas and oceans that accounts almost half of primary food production. They have been identified as a promising candidate in biotechnology and in producing a variety of bioactive compounds. Thousand species from hundreds genera are recorded in the world. Their potential applications in pharmaceuticals, biofuels, nutrient supplements and cosmetics have gained attention increasingly. They have important source of natural and bioactive compounds such as fatty acids, lipids and Triacylglycerols (TAGs) that can be used for sustainable production of biofuels, sterols and steroids, oxylipins, isoprenoids. Other benefits in wide area of pharmacognosy, biotechnology and environmental stimulants have been reported by many authors. The secondary metabolite contained in microalgae has been known have role for human health. The main photosynthetic pigments in diatoms are chlorophylls a and c, fucoxanthin, diadinoxanthin and diatoxanthin. One of diatoms, *Haslea ostrearia* has long been known for producing blue pigment marennine that presents different biological activities. As a part of the GHaNA and Vasabi projects, BioEcotox Research Center at the Central Laboratory of Life Sciences (LSIH), Brawijaya University is developing culture plant for microalgae. Several species, including diatom from the genus *Haslea* are on the step of the Laboratory Scale culture. Future the development has been programmed for the next ten years.

Microalgae Development Plan

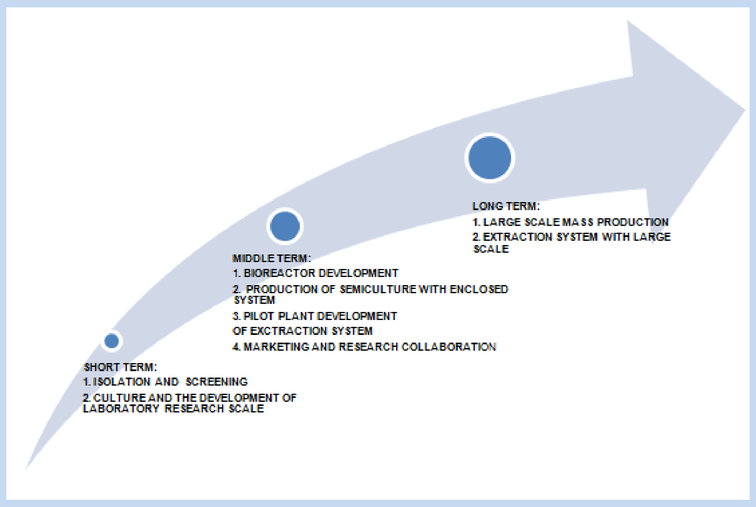
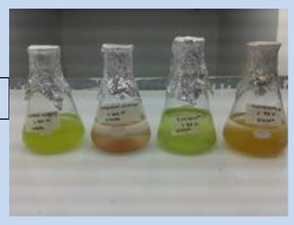


Figure 1. Microalgae Development Plan (2017-2027) at the Central Laboratory of Life Science (LSIH), Brawijaya University

Methodology of Microalgae Culture

Isolation of Microalage



Petri Dish Culture with added nutrients

Microalage Culture in enlemeyer

Microalage culture using 5 L of volume with aerator

Figure 2. Scheme of isolation and cullture of several type microalgae at LSIH, Brawijaya University, Indonesia

Species Variants of Diatoms

Diatoms from Lakey Beach, Dompu, West Nusa Tenggara

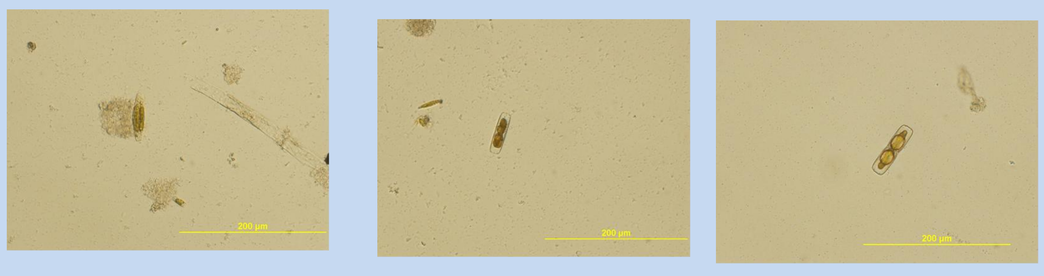


Figure 3. Diatoms variants attached at the surface of *Padina sp* observed under inverted microscope, with 200x magnification. Samples were obtained from Lakey Beach, Dompu, West Nusa Tenggara, Indonesia

Autofluorescence of *Haslea ostrearia*

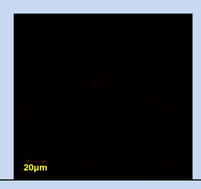
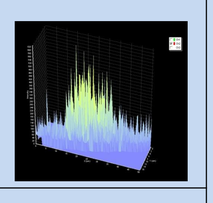
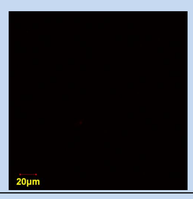
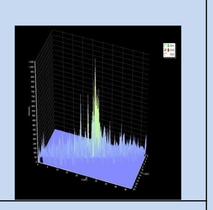
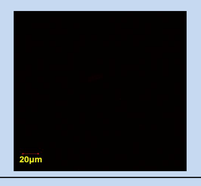
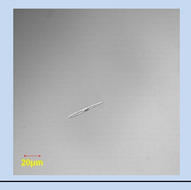
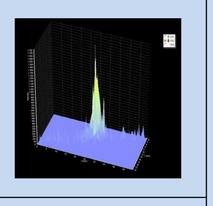
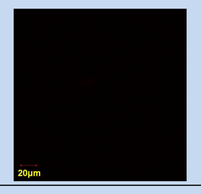
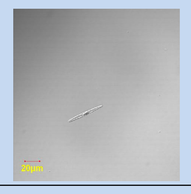
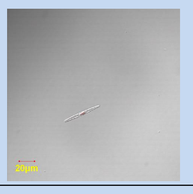
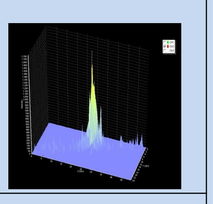
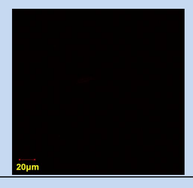
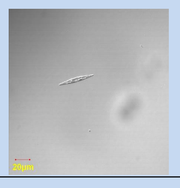
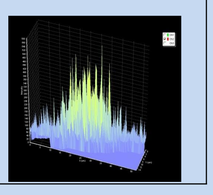
	Fluorescence	DIC	SI	Graph
Alexa (614 nm)				
CY3 (570 nm)				
PI (636 nm)				
Rodhamine (590 nm)				
TRITC (576 nm)				

Figure 4. Autofluorescence of *Haslea ostrea*aria observed under different wave lenghts using Confocal Laser Scanning Microscope (CLSM) with 400x magnification. Wave lenghts : Alexa (614 nm), CY3 (570 nm), PI (636 nm), Rodhamine (590 nm) and TRITC (576 nm)

Autofluorescence intencity of *Haslea ostrearia*

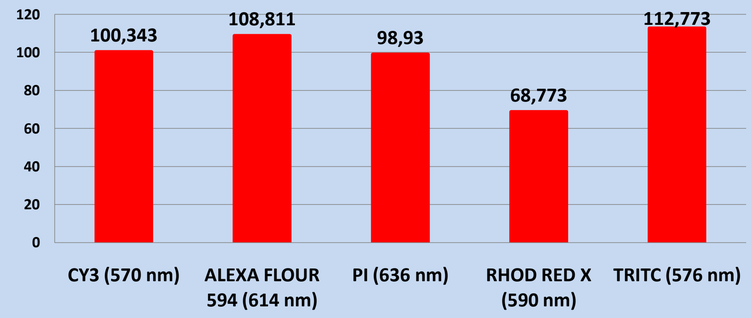


Figure 5. Autofluorescence intencity of *Haslea ostrearia* under different wavelengths.

Utilizations of *Haslea ostrearia*

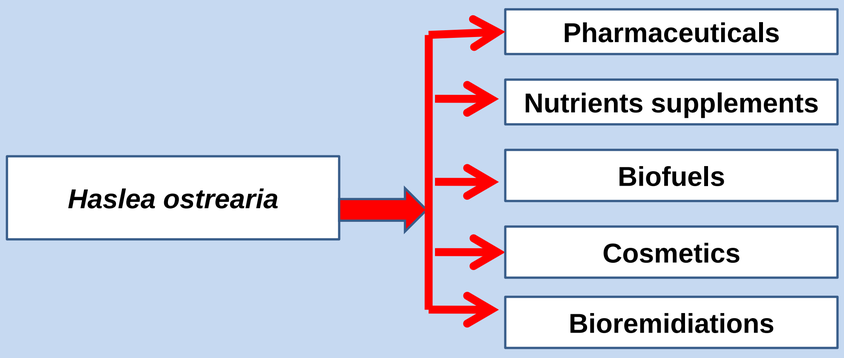


Figure 5. Utilizations of *Haslea ostrearia*

Aknowledgement

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