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Process for obtaining the biomass of the red microalga *Porphyridium cruentum* - source of omega 3 lipids with polyvalent properties

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Aim: It consist in developing of a new process for cultivating of the red microalga of biotechnological interest *Porphyridium cruentum* in order to obtain biomass with increased omega-3 lipid content.

Solution: Using a gold nanoparticles with a size of 5 nm as a stimulator of omega-3 lipid biosynthesis by the marine microalga of biotechnological interest *Porphyridium cruentum*, known as a producer of omega-3 lipids.

Advantages:

- A natural source for the manufacture and development of nutraceuticals and polyvalent remedies based on omega-3 lipids;
- High content of omega-3 lipids in porphyridium biomass according to proposed proceeding;
- High potential for application in biotech, nanobiotech, pharmaceutical companies, Human Health –Care-Cosmetics.

Essence:

Red microalga *Porphyridium cruentum CNMN-AR-01*

Preparation of the nutrient medium with the composition: *macronutrients in g/L*: - NaCl-12,52; KCl-16,04; KNO_3-1,24; $MgSO_3 \cdot 7H_2O$-2,5; $CaCl_2$-0,118; $K_2HPO_4 \cdot 3H_2O$-0,5; KI-0,05; KBr-0,05 and the solution of trace elements - *1ml/L* that it contains *mg/L*: MoO_3-0,015; $CuSO_4 \cdot 5H_2O$- 0,08; $MnCl_2 \cdot 4H_2O$-1,81; H_3BO_3-2,8; FeEDTA - 0,5mL

AuNPs, 5nm, stabilized in citrate, 4,8-5,1nM; First day of cultivation

Innoculation of porphyridium suspension: 0,50-0,55g/L BAU

Cultivation at the temperature 25-28$^{o;}$C; illumination - 50-57 µmol photons/m^2 s; pH = 6,8-7,2; 14 days of cultivation

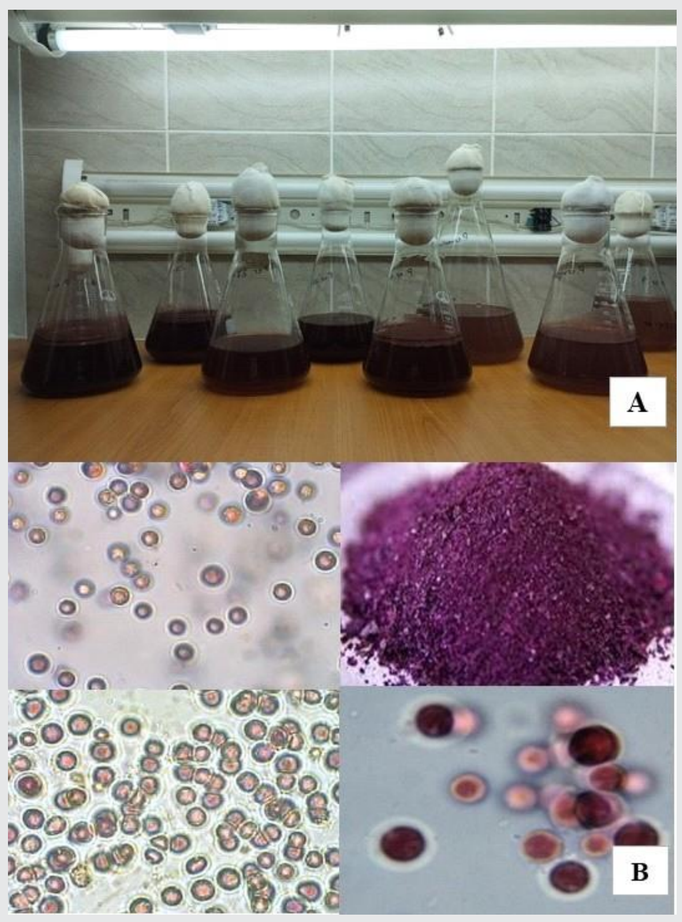
Porphyridium biomass: LIPIDS - 21,5-21,6% (increase by up to 52%)

Anti-inflammatory ↔ Anti-atherogenic

Remedies and nutraceuticals

Antioxidant ↔ Regenerating

Process for cultivating the red microalga of biotechnological interest *Porphyridium cruentum*, in order to obtain biomass with increased omega-3 lipid content.



Red microalga *Porphyridium cruentum*: A. - in culture; B. - porphyridium cells.

A new procedure for obtaining raw material of natural origin is proposed for the manufacture and development of nutraceuticals and polyvalent remedies based on omega-3 lipids. According to the solution, the marine microalga of biotechnological interest *Porphyridium cruentum* is cultivated on a nutrient medium containing citrate-stabilized gold nanoparticles 5 nm in size, in the concentration range of 4.8 - 5.1 nM, for 14 days at a constant temperature of 25-28^{0}C and continuous illumination with an intensity of 50-57 µmol photons/m^2 and periodic slow stirring. The process ensures a 52% increase in the content of omega-3 lipids in biomass. The porphyridium biomass obtained according to the process can be used as a raw material for the manufacture and development of new nutraceuticals and original remedies based on omega-3 with antioxidant, anti-inflammatory, anti-atherogenic, regenerating properties.

The invention was developed based on the results obtained within the project 20.80009.5007.05 "Biofunctionalized metal nanoparticles – obtaining using cyanobacteria and microalgae", funded by NARD, Republic of Moldova

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