POULTRY WASTEWATER TREATMENT USING *PORPHYRIDIUM* SPP.

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Abstract

Wastewater contains various nutrients that can be used by microalgae for their growth. Microalgae are capable of removing nitrogen, phosphorus, heavy metals, as well as some toxic compounds from wastewater [1]. Microalgae species must present the ability to adapt in wastewater and the capability of growing to high cell density [2]. Several species, such as *Chlorella vulgaris, Nannochloropsis* spp., *Rhizoclonium* spp., *Scenedesmus intermedius* were used for wastewater treatment, while few studies reported the potential of *Porphyridium* spp., a red microalgae, to grow in wastewater [3].

The main objective of the present study was to investigate the capability of the marine microalgae, *Porphyridium* spp. to grow in poultry wastewater containing heavy metals and other contaminants in various concentrations. The composition of wastewater was determined before and after the microalgae cultivation, in order to monitor the ability of *Porphyridium* spp. to reduce the metals concentration. The initial pH of the wastewater as a growth medium was 6.6. After ten days of growth period, the pH value increased up to 8.6 suggesting that the *Porphyridium* spp. adapted to the new conditions. Also, the conductivity of the medium increased to 8.2 mS/cm after treatment compared with the initial value (before treatment) of 0.73 mS/cm. The highest removal efficiency exceeded 98 % in case of Al, followed by 95 % in case of Zn, 92 % for Fe and 90 % for B, while the lowest removal efficiency of 7 % was obtained for Mg. The results revealed a removal percentage of 41 % for Cd, 67 % for Cr, 54 % for Co, 10 % for Cu, 44 % for Mn, 30 % for Ni, 7 % for Mg, 79 % for Si, 8 % for K and 67 % for Ca. However, *Porphyridium* spp. exhibited low biomass productivity after wastewater treatment, compared with the control biomass grown in modified F/2 (Guillard's) medium. Even if the growth rate was low compared to the control, poultry wastewater has the potential to be used as an alternative growth medium for microalgae with simultaneous uptake of the metals and organic contaminants.

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References

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