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Paper production from filamentous algae (*Mougeotia* sp.)- Experimental study

G.B.H. Sumanasekara*, R.D.A. Gunasekara, W.G.S. Manel Kumari and K. Massakorala

Department of Botany, University of Ruhuna, Sri Lanka

Abstract

The paper making is one of the largest industries in the world, with 390 million tons of annual production. The main source of cellulosic fibre which is used in the pulp for paper production comes from wood and non-wood fibres are used to a lesser extent. However, a renewed interest exists in the use of non-woody raw materials for paper pulp due to their abundance, low-cost and eco-friendly. Therefore, developing an alternative method for paper production using non woody fibre-based pulp is vital. *Mougeutia* sp. is filamentous green algae with the rapid growth forming a dense mat under eutrophic condition in freshwater habitats worldwide. It is growing as a weed and eradicating is difficult. Thus, use it as a raw material helps to control their growth in the aquatic environment. The study aimed to find a method for making paper pulp using green algae of *Mougeutia* sp as a non-woody fibre source. *Mougeotia* sp. sample (5g) was boiled at 100 ºC with 250 mL of water for 45 minutes. Then the boiled sample was sun-dried for five hours after the addition of 25 mL of Sordium Hypochloride (NaOCL), the mixture was left for 20 minutes for bleaching. Finally, excess of NaOCl was washed out using tap water. The paper pulp was prepared by mixing 100 mL water and 50 mL of slime which was obtained from cactus species of Opuntia sp. with the bleached sample of *Mougeotia* sp. Opuntia is a highly abandoned invasive plant and obtaining slime is a low-cost process. The resulted mixture was filtered using muslin clothes and the product was spread on the plastic strainer to form a thin layer. After three hours of drying under sunlight, the thin layer was removed as a sheet of paper. GSM value (63.904) and thickness (1.067 x 10-1 cm) of the product were tested and they were equally to normal paper. Thus, the results highlight the potential of making an eco-friendly and cost-effective paper pulp by using filamentous green algae of *Mougeotia* sp. as a non woody fibre source and invasive plant species of Opuntia sp. as a source for obtaining slime.

Keywords: *Mougeotia* sp., Paper pulp, *Opuntia* sp

****Corresponding Author:*** h.himaranga@gmail.com