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## **Preparation of Biochar and Activated Carbon Granules from Cinnamon Wood**

Devinda Karunathilaka, Mahesh Alahakoon and Ruwan Gallage\*

*Department of Mechanical and Manufacturing Engineering, Faculty of Engineering,  
University of Ruhuna, Hapugala, Galle*

\*Corresponding author: [rgallage@mme.ruh.ac.lk](mailto:rgallage@mme.ruh.ac.lk)

### **ABSTRACT**

Sri Lanka is the third largest cinnamon exporter in the world. But Sri Lankan cinnamon industry only consumes cinnamon bark as the product and the leftover cinnamon stem is used as biomass for energy generation by burning. In this study, value addition for remaining cinnamon wood is carried out by converting cinnamon wood into activated carbon granules. Activated carbon granules are widely used in many industries as filter materials and, one of the example is purifying contaminated (by chemicals and heavy metals) water. According to the literature review, It is rare to find the study about the preparation of activated carbon granules from cinnamon wood. The chemical activation process was used with two-step pyrolyzing under an oxygen-deficient environment at 700°C and 800°C respectively. For that, a stainless furnace was designed and fabricated to produce biochar from cinnamon wood. Biochar granules in a range of 0.6 -1.18 mm were sieved for the preparation of activated carbon. Biochar yield from the cinnamon wood is calculated and the microscopic structure of biochar particles was examined. The chemical activation process was conducted at 700°C and 800°C using NaOH and KOH as activation agents under impregnation ratios of 1:1 and 1:3. Surface morphology of the biochar and activated carbon granules prepared under different conditions was observed using a scanning electron microscope (SEM) to examine the developed pore structure. SEM images represented a considerable difference between pore structures after chemical activation. Both KOH and NaOH can be used to activate biochar and NaOH may lead to a reduction of the surface area with compared to the KOH as observed by the SEM images. During the comparison of SEM images with the previous case studies about producing activated carbon based on coconut shell, cinnamon wood activated carbon represents diversity in pore sizes and the majority of the pores were observed as larger than activated carbon produced from coconut shell.

**Keywords:** *Activated carbon, Biochar, Chemically activated, Cinnamon*