

Characterization of the Physicochemical Property of Lye Extract from Wood Saw Dust Ash and Its Alternative Use as a Raw Material in Soap Making

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Abstract

This research work was conducted to Characterize the Physicochemical property of lye-extract from wood sawdust and its alternative use in soap-making. The lye extracted from the ashes of the Hard-wood sawdust served as a raw material for the production of liquid and bar soap and its physicochemical property when examined gave Density (D) as 1.00kg/m^3 , pH is 7.5, Water content is 53.6% and Viscosity (V) is 2.672 cSt. The metal composition was analysed and compared to the Canadian standard and the elements present were lead (Pb) 1.00183mg/l , Iron (Fe) 3.59624mg/l , Magnesium (mg) 1.43475mg/l , Calcium (Ca) 19.50093mg/l , Sodium (Na) 4.74821mg/l , Potassium (K) 7.31976mg/l , Phosphorus (P) 5.17342mg/l and Mercury (Hg) 0.00135mg/l but their various amounts were not in accordance to the permitted Canadian limit required for soap production. The soaps produced were analysed for parameters like foam height, pH, dissolved-solids, suspended-solids, sediments, foam-dispersal, toxicity, lather texture, solubility in water and foam capacity, hardness in 50g, penetration, moisture content, reactivity in hard water and total alkali content, the characteristics and physicochemical property of the lye-extract revealed that it could serve as an alternative raw material but lacks the sufficient minerals required for the production of the best quality of soaps unless more reagents were added.

Keywords: Characterization, Physicochemical Property, Lye-extract, Hard-wood, sawdust-ash, soap-making.

1.0 INTRODUCTION

Wood is a hard-fibrous material that makes up most of a tree substance and it forms the trunks and branches of trees. The main types of woods are the soft woods (Gymnosperms), some examples are redwood, cedar, spruce, and fir (Ramange *et al.*, 2017; Okonkwo *et al.*, 2016). The hard woods (angiosperms), examples are maple, walnut, mahogany, oak, cherry, (Awe *et al.*, 2019; Beetseh and Godwin, 2015). Another special wood type called the Engineered wood is specially designed to meet up specifications, examples are medium density fibre board, plywood and composite board. The term “Semi-hard wood” refers to partially mature wood (Sotannde and Riki, 2019).

Saw dusts are obtained as waste products from wood work operations like screwing, sanding, sawing, etc. (Risse, 2010). The particle sizes of the saw dust depend on the wood type and the saw- teeth size used during wood work operation (Bello, 2017; Bariska *et al.*, 2016; Rizki *et al.*, 2010). It finds its application in the following areas such as: Saw dust is used as fertilizer (Onochie *et al.*, 2018; Risse *et al.*, 2010). Sawdust can act as an oil sorbent (Kelle, 2018; Deli *et al.*, 2015), it could be used as source of fuel for cooking, as a food additive in some packaged foods, for making Poultry beddings and as an alternative raw material for soap production (Beetseh and Godwin, 2015). Saw dusts is a rich source of potash production. The quality and quantity of Potash yield depends on the type of tree and the part of tree combusted (Onochie

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