

Abstract

Large amount of sugar industrial by products is generated annually without fully utilization capacity. Investigation of high value added compounds could be a way to improve this limitation and hopefully overall value chain of sugar industry could be increased. Polyphenols is a group of secondary metabolites available in various plants including sugarcane. It becomes more and more interesting compounds due to its ability to inhibit oxidation reaction which make it suitable for various products either food i.e flavors, nutritional food and pharmaceutical products or non-food such as precursor for polymer industries. Lignin is a macropolyphenols found abundantly in bagasse, this work therefore aims at investigating a suitable lignin extraction method as well as characterizing its chemical structure and biological activity in order to provide necessary information for wound dressing fabrication. The results indicated the effect of extracting media (1%NaOH and formic acid: acetic acid: H₂O, 30:55:15, v/v/v), solid: liquid ratio (1:6 and 1:12), age of bagasse (fresh and 6 - 12 month old bagasse) and pretreatment (\pm steam explosion) on extraction yield. The highest extraction yield of lignin (26%) was obtained from extraction old bagasse with 1:12 of bagasse: 1%NaOH (w/v) without steam explosion while 22% yield could be obtained from new bagasse using the same extraction condition but with steam explosion. Lignin obtained from new bagasse gave better antioxidant activity than those of old bagasse which could be partly due to lignin oxidation. All lignin obtained from all extraction conditions at the concentration of 1,250 μ g/ml (Minimum Inhibitory Concentration; MIC) could inhibit microbial growth. The better inhibition was observed in gram negative bacteria (*Vibrio cholera* (DMST 15778), *Salmonella typhimurium* (DMST 562) and *Escherichia coli* (DMST 4212)) than gram positive bacteria (*Staphylococcus aureus* (DMST 8840)). In addition, delignified bagasse could be reutilized as an energy source with slight reduction of heat building capacity (2 - 15%) as extracted lignin is also a part of energy produced by bagasse.