

Effect of Time and Solvent/Feed Ratio on the Extraction of Mannan from Aloe Vera Leaf Pulp

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Abstract – Mannan is one of oligosaccharides contained in the Aloe Vera leaf pulp gel, which exhibits promising potential as a raw material of edible coating due to its antimicrobial, antifungal, coating and drying properties. The objective of this work was to investigate the effect of time and solvent/feed ratio on the extraction of mannan from *A. Vera* leaf pulp. Extraction was carried out in a three necked flask equipped with mechanical agitator, Leibig condenser and thermometer. Two hundreds grams of *A. Vera* leaf pulp was juiced and the remaining pellet was then subjected to water extraction at 40°C and certain solvent/feed ratios for a specified time. Upon precipitation of *A. Vera* juice and supernatant by addition of ethanol, the precipitated extract was lyophilized and determined its mannan content. The optimum extraction time was found to be 45 minutes where reasonable yield and rendement were obtained with highest extract purity. The optimum feed/solvent ratio was 4, where highest yield and rendement were obtained at good extract purity. Hydrolysis was likely to happen when feed/solvent ratio higher than 4 as excess water at warm temperature causing reduction of extraction yield and rendement. The proposed mathematical model suited the experimental data very well. **Copyright** © 2011 Praise Worthy Prize S.r.l. - All rights reserved.

Keywords: *Aloe Vera*, Extraction, Mannan, Ratio, Time

I. Introduction

Aloe Vera is one of tropical and subtropical plants that have been very popular since the old time due to its medicinal and therapeutic properties [1]. *A. Vera* produces two major liquids in its large leaf parenchyma cells, namely the yellow latex (exudates) and a clear gel (mucilage) [2]. The predominant medical uses of the orally ingested gel juice are against ulcerous, gastrointestinal, kidney and cardiovascular problems and also to lower the cholesterol and triglyceride levels in blood. Scientific researches have discovered the other properties belong to *A. Vera* such as anti-inflammatory and antibiotic activities and activities against some diseases (diabetes, cancer, allergy, AIDS) [1]-[2]-[3]. To date, the main use of *A. Vera* gel is in the cosmetic industry, including treatment of burns and scars and in wound healing [4]. Instead of the above mentioned facts, there are also some reports on the antifungal activity of *A. Vera* gel against several pathogenic fungi including *Botrytis cinerea* [5]-[6]-[7].

Consider that *A. Vera* gel exhibits antifungal and antimicrobial properties; it is plausible to use the gel as an edible coating for post harvest treatment on fruits and vegetables [8].

Most of berry type fruits show severe problems during post harvest storage and retailing. The losses of quality are based on weight loss, color changes, accelerated softening and rachis browning, and high incidence of

berry decay [9]-[10], which lead to a reduction of shelf life. The most important disease in berries with severe economical repercussions is gray mold caused by *B. cinerea*. Edible coatings are commonly used to enhance food appearance and conservation due to their environmentally friendly nature [11]. Generally, coatings can be divided into proteins, lipids, and polysaccharides, either used alone or in combination. They function as barriers to moisture and oxygen during processing, handling, and storage and do not solely retard food deterioration but also enhance its safety due to their natural biocide activity or the incorporation of antimicrobial compounds [12]. The use of edible coatings may reduce the generation of packaging waste, because they are biodegradable. Following the high demand in healthy food products, there has been increasing interest for the use of *A. Vera* gel in the food industry as a functional ingredient food in drinks, beverages, and ice creams [13]. The liquid gel is considered as a structural component because it is viscous and accounts for most of the pulp by weight and volume, i.e., the primary contributor to the succulent nature of the pulp. It is rich in mannan. The mannan is a soluble polysaccharide present in the liquid gel and also the basis for the viscoelastic property of the liquid gel. Nevertheless, most of the so-called *Aloe* products may contain very small amounts of the active compounds, because the processing techniques used to produce *A. Vera* gel could affect the product quality and the amount