

Optimizing Tannin Precipitation in Cashew Apple Juice

Trakul Prommajak^{1*}, Noppol Leksawadi²
and Nithiya Rattanapanone^{2,3}

¹*Division of Food Safety in Agribusiness, School of Agriculture and Natural Resources, University of Phayao, Phayao 56000, Thailand*

²*Faculty of Agro-Industry, Chiang Mai University, Chiang Mai 50100, Thailand*

³*Postharvest Technology Research Institute, Chiang Mai University, Chiang Mai 50200, Thailand*

*Corresponding author. E-mail: tpromjak@gmail.com

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ABSTRACT

The juice extracted from cashew apples contains tannins that must be reduced due to their astringency and anti-nutritional properties. This study investigated reducing the tannins in cashew apple juice by mixing gelatin at 0.0 to 1.0% (w/v) with the juice for 5 to 15 min. Response surface methodology was used to simulate tannin concentration, turbidity, and weight of precipitate as a function of gelatin concentration and mixing time. All models were significant ($P < 0.01$) and residuals exhibited normal distribution. Increasing the gelatin concentration decreased tannins and juice turbidity. Optimal conditions for minimum concentration of tannins and turbidity were obtained by adding gelatin at 0.67% (w/v) for 15 min. Cashew apple juice with the tannins reduced could be used in the subsequent production of wine and bioethanol.

Keywords: Tannins, Gelatin, Cashew apple, Response surface methodology

INTRODUCTION

Cashew apples are cultivated primarily for their nuts-cashew nuts. The nuts represent only 10% of the total fruit weight, with the remainder typically left in the field as waste. However, juice from the cashew apple offers potential alternative uses, including fermenting into wine, probiotic beverages, and bioethanol (Prommajak et al., 2014).

Cashew apple juice contains high amounts of sugar (about 10%) and ascorbic acid (280 mg/100 ml) (Inyang and Abah, 1997; Figueiredo et al., 2002). However, the tannins in cashew apple juice (0.6 mg/100 g) cause an astringent taste (Rocha et al., 2007). Tannins are also an anti-nutritional factor, acting as metal ion chelators and digestion inhibitors (Hagerman, 2011). Tannins are phenolic compounds that are categorized into three groups: condensed tannins, hydrolysable tannins, and complex tannins. Condensed tannins can be hydrolyzed under harsh conditions and are responsible for the dry-mouth feeling in red wine (Vermerris and Nicholson, 2006).