UNIVERSITI TEKNOLOGI MARA

EFFECT OF INLET TEMPERATURE IN PINEAPPLE AND *CENTELLA ASIATICA L.* SPRAY DRYING

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ABSTRACT

Spray drying is one of the method to convert fruit juice into powder form to improve shelf life and easy transportation but it tend to become sticky due to high sugar content especially in Moris pineapple. The effect of addition of CAL with maltodextrin as carrier agent and inlet air temperature towards physicochemical of pineapple powder were studied. The spray dryer model used was a laboratory scale dryer and samples were run at different inlet temperatures of 130°C, 150°C, and 170°C. Maltodextrin was used as a carrier agent at different concentrations of 20%, 30% and 40% (w/v) while CAL at 5%, 10% and 15% (v/v) respectively. The pineapple powder were then analyzed for pH, sugar levels, moisture content, bulk density, antioxidant activity, product yield and colour. pH powder slightly increased from 3.80-3.96 to 3.81-4.02. Sugar level decreased significantly after spray drying from 19.0-29.9°Brix to 6.6-9.7°Brix. At higher inlet temperatures and increment of maltodextrin content, the moisture content of pineapple powder decreased from 6.03-6.12% to 5.28-5.48%. The highest bulk density is 0.58 g/ml at 130°C and 40% concentration. Product yield increased with increasing of inlet temperature from 5.57% to 8.89%. The colour of powder produced is light green yellowish affected by CAL juice. The antioxidant activity showed best at 130°C where it obtained positive value. As a conclusion, the best condition of spray drying to be at 170°C and 40% maltodextrin concentration due to its low moisture content, high bulk density and product yield. The addition of CAL also does affect the physicochemical properties due to it contain high moisture content, dark green in colour, pH value at 5.5 and high antioxidant level.

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CHAPTER ONE
INTRODUCTION

1.1 Research Background

Morris pineapple cultivars are most well-known fruits in Malaysia. Seventy percent of the fresh pineapple harvested in Malaysia is from 'Nanas Morris'. The fruit is funnel shaped, profound yellow, with deep eyes which require a thick slice to expel the strip totally and it is less fibrous. It is delicious and sweet, of fine flavor with a little and tender core. Morris pineapple are prickly, brilliant yellow in shading and emanate wonderful smell and flavor once ripe. The fruits are reaped when eyes turns yellow and its normal weight of pineapple differs from 600 to 800 g. It has all the great organoleptic characteristics, for example, colour, smell and taste. Juice produced is bright yellow in colour. Total soluble solid (TSS) differs from 13° to 18°Brix relying on the phase of development and season, have scope of pH 4 to 4.5 and its water content is 80% to 90% (De Silva, 2008).

Pineapple has broadly been devoured as jelly, jam, juice and as a dried product in type of powder. Pineapple contains abundant of vitamin A, B, and C and also the minerals calcium, phosphorus, and iron. Pineapple juice has generally been utilized to mitigate sore throats and nausea. The bioactivity of this fruits is because of the presence of compounds, for example, polyphenols and ascorbic acid or otherwise called Vitamin C, which gave to the antioxidant activity that can prevent cancer of the fruit extract (Amzad Hossain & Mizanur Rahman, 2010). Antioxidants are the substances can avert or hinder oxidation forms in human body and food products as ascorbic acid, phenolic and flavonoids (Caparino et al., 2012).

In order to convert pineapple juice in liquid state to powder form which in solid state, spray drying method has been used. Spray drying is a method used widely in food processing industries especially in production of fruit juice powder and it is operated according optimum process state to form powders with good quality and low water activity (Bicudo et al., 2015). There are many advantages of fruit juice in powder form instead of in liquid condition such as lowering weight and volume, easier handling and transportation, minimize packaging and much longer shelf life. Other than that, its physical properties contributes a steady form, simply changing the dose type ingredients