UNIVERSITI TEKNOLOGI MARA

EFFECT OF MALTODEXTRIN (MD) CONCENTRATION AND PUMP FLOW RATE IN PINEAPPLE SPRAY DRYING

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ABSTRACT

In recent years, the spray drying process have been a popular subject among producers and researchers. Many people wanted to know how to improve the spray drying process, in particular by altering the process parameters. Such process parameters include, but not limited to, the inlet and outlet air temperatures, the inlet and outlet feed temperatures, the rate of atomization and pump flow rate. For this research, the effect of maltodextrin concentration and pump flow rate in pineapple spray drying is investigated. Varying concentrations of Maltodextrin, (15, 20 and 25 %wt) will be mixed with corresponding feed mixture. The feed mixture will be fed into the spray dryer unit at varying flow rate based on the pump flow rate settings at the spray dryer unit. The results will be tabulated. It was noted that changes in the pump flow rate of the spray drying process and the concentration of maltodextrin do affect the drying yield, the powder's moisture content, bulk density and colour.

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INTRODUCTION

1.1 Introduction

Spray drying is a method of producing a dry powder from a liquid or slurry by rapidly drying with a hot gas. Figure 1.1 shows a graphic representation of a spray dryer unit. This method is the favored method of drying for many thermally-sensitive substances such as foods and pharmaceuticals. The yield of this process have consistent particle size which is why this particular method is used to spray dry catalyst for industrial processes. Air is the heated drying medium; however, if the liquid is a combustible solvent such as ethanol or the product is oxygen-sensitive then nitrogen is used. (Mujumdar, 2007)

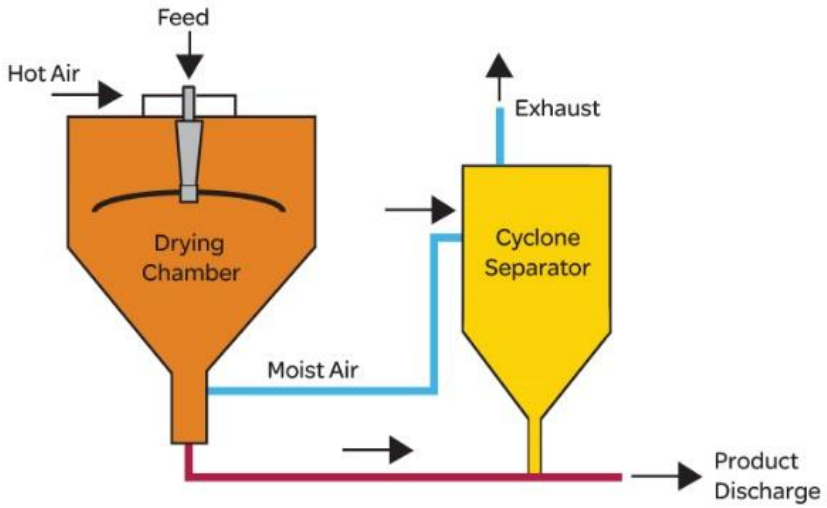

Figure 1.1 A graphic representation spray drier unit

Spray dryers use some type of atomizer or spray nozzle to scatter the liquid or slurry into a fixed drop size spray. Rotary disk and single-fluid high pressure swirl nozzles are the most common types of atomizer. Atomizer wheels are well-known to deliver wider particle size distribution. Nonetheless, both techniques are capable of producing a consistent distribution of particle size. (Elan Technology, 2011)

The drying process has been used for thousands of years to reduce the transport weight. Let's take a look at milk, for example. Since milk is about 80 – 90% water, by spray drying it, one can effectively reduce its bulk weight by about 10 – 15%. Spray