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Pre-Treatments Effect on Pepper Drying Time and Microstructure

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ABSTRACT. The traditional pepper drying process takes 4 to 5 days, although it can take longer on wet day. This paper presented a study on the effects of two pre-treatment methods to the improvement of drying rate of black pepper production. Boiling and chilling were used to pre-treat two samples of pepper berries respectively. To avoid microbial infections, the samples must be dried quickly after pre-treatment. Each sample was then spun in a rotary drum drier at a predetermined temperature to achieve this. The weight of the sample was recorded at regular interval until it reached moisture content of 12%. The physical and chemical characteristics of each sample were also checked using Fourier Transform Near Infrared (FT-NIR). The surface morphology of the skin and core of the samples were observed using Scanning Electron Microscopy (SEM). When compared to untreated samples, pre-treated samples took less time to dry. The dried core of the pre-treated samples revealed less damaged than the untreated sample when microstructural alterations were seen using SEM. This study found that pre-treating pepper berries before drying reduced drying time from 8 hours to 2½ hours (based on untreated sample). The moisture percentage of dried pre-treated samples was similarly within the acceptable range. Thus, the application of rotary drum dryer to dry the pre-treated pepper is the novelty to this research.
Keywords : *Black pepper; boiling; freezing; drying time; FT-NIR; moisture content; rotary drum dryer; SEM*

INTRODUCTION

Malaysia is the fifth largest pepper producer in the world after Indonesia, Brazil, Vietnam and Malabar [1]. Sarawak, a Malaysia state located in Borneo, is the main pepper producer in Malaysia. The pepper plantation in Sarawak alone covers approximately 16,000 hectares. The year 2007 to 2016 observed increasing trend of pepper planting in Sarawak [2, 3]. The trend highlights that pepper is an important cash crop and source of income to the locals. Furthermore, in alignment with one of the United Nation's sustainable development goal i.e. goal 12 on responsible consumption and production, it is pertinent to investigate aspects that improve management and efficient

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