CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

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Ahmed Tariq Jameel
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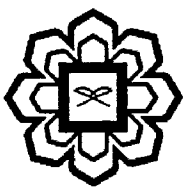

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CHAPTER 20

PROCESS IMPROVEMENT OF CONVENTIONAL PALM OIL MILLING: DEPULPER

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ABSTRACT

One of the objectives of this study was to analyze the capability and efficiency of depulper in separating loose fruits cooked at atmospheric pressure into fibrous mesh and nuts. This analysis leads to possibility in replacing the function of conventional digester with depulper. The study confirmed that depulper gave better separation of mixture of nuts and light fibers for the fruit bunches cooked at 1 bar compared to those cooked at 3 bars. However, the equipment gave almost similar separation of fibrous mesh at both pressures. Thus the study confirmed the proposed depulper can be integrated to the rest of the palm oil milling process in a conventional palm oil mill as well as integrating it in the proposed alternative palm oil milling process.

Keywords: Depulper, conventional digester, horizontal sterilizer, mini sterilizer

INTRODUCTION

Digestion involves mashing of the sterilized palm fruits under steam-heated conditions. Heating by steam is essential and is done by steam jacket around the digester or by live steam injection. Sufficient heat (steam) must be supplied to raise the temperature of the digested fruit close to 100°C at the bottom of the outlet. This temperature is desirable to break the oil bearing cells of the mesocarp but also to minimize nut breakage in the screw press by increasing the elasticity of the nuts. Digesters fitted with a steam jacket have the possibility of local overheating of the fruit, which will lead to nut breakage in the screw press. The use of direct steam injection however, leads to formation of a considerable amount of condensate in the digester and this might be expected to impair digestion if no drainage is provided by reducing friction. Good digestion occurs only when the level of the fruit in the digester is kept as high as possible all the times to ensure maximum holding and also maximum stirring effect. Besides that, the arms of the digesters must be long enough to prevent the building up of a layer of dried material on the wall of the digester. This would reduce the rate of heat transfer in the case of a steam-jacketed kettle. The extent of this vertical movement will be reduced if the arms are badly worn and the thoroughness of the digestion will be lessened (Ngan et al., 1999; Palm Oil Research Institute of Malaysia, 1985).