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THEORETICAL ANALYSIS OF ENERGY REQUIREMENT FOR HEMP DECORTICATORS

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ABSTRACT Hemp fibre is a renewable natural material which has been used in a wide range of areas. With the increasing need of high quality hemp fibres, various processing methods have been developed during the past decades. Decortication is a core procedure during fibre processing. Currently, the decorticators such as hammer mill and roll crusher are used both for laboratory research and commercial production. However, the selection of most machines and operational parameters for decorticators is based on experience and trials, and is mainly focusing on fibre quality and productivity improvement. Energy consumption is possibly high due to inefficient design. Little research has been conducted on decorticator's energy requirement. Lack of systematic theory in this aspect makes it difficult to efficiently develop better machines and optimal processing methods. This study constructed a theoretical analysis of energy requirement for hammer mill and roll crusher as the decorticators in hemp fibre processing. The estimation of energy requirement provided by the theory will help future improvement of decortication machine. The long term objective of this study is to extend the estimation of energy requirement for the decorticator to the whole processing line so that improvement of energy consumption for the entire fibre process is achieved.

Keywords: hemp fibre processing, decortication, energy requirement, hammer mill, roll crusher