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Dehulling canola for production of low fibre meal

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Statement of the Problem: Seed hulls are fiber rich and typically contribute little nutrient value. Dehulling seed is often practiced to enrich protein and decrease fibre content. The dehulled product has improved properties as a food and feed. Dehulling oilseed has been a challenging process. Different approaches for dehulling oilseeds have been proposed including disc, roll, and impact milling, in conjunction with preconditioning of the seeds using thermal and moisture treatments. These methods, which are adaptations from dehulling processes of other seeds, have not been suitable for removing hull from the kernel without significant transfer of seed oil to the hull. Unfortunately, small and heterogeneous seed is difficult to dehull. To the best of our knowledge, there are few studies focused on developing a dehulling process specifically for canola that could be industrialized for the production of oil and meal. The purpose of this study is to identify and optimize the most efficient oilseed dehulling process for canola. Any process developed should be practical and suitable for industrial production. We have observed the dehulling of single seeds using a roll milling device at low speeds and with different roller sizes.

Findings: It was observed that minimal compression between rolls is ideal to avoid seed bruising and smaller rollers reduced the compression time of the seed. However, the efficiency of roll milling is dependent on seed size and difficult to optimize. Therefore, a size-independent method might be more suitable; for instance, tangential impact on seeds with a moving object at high speeds might provide an alternate approach.

Conclusions & Future Work: Size-independent processes might me more suitable to overcome the issue of working with heterogeneous seed sizes. The size dependency of roll milling could be reduced by implementing soft material rollers which could adapt to different seed sizes. To optimize any of the proposed methods, it is required to determine the mechanical behavior of the seeds under compression stress and shear stress, which would yield information of the mechanical properties, such as elastic modulus and ultimate strength, of both cotyledon and hull. This analysis should also include different seed treatments that could benefit the removal of the hull from the kernel.

Biography

Edgar E Martinez-Soberanes is a Mechatronic Engineer with experience in advance design and Applied Engineering in interdisciplinary problems. During his master studies, he gained experience in microfabrication and processes with microparticles. He has special interest in practical engineering problems that involve design methodologies that required high innovation and conceptual abstraction. He did his Bachelor of Engineering in Mexico, and he finished his Master's degree in Mechanical Engineering at the University of Saskatchewan. He is undertaking a PhD degree program at the University of Saskatchewan studying canola dehulling

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