

**MECHANICAL CELL DISRUPTION METHODS FOR INDUSTRIAL SCALE
CANDLENUT OIL PRODUCTION WITH RESPECT TO OIL YIELD AND
QUALITY**

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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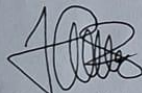


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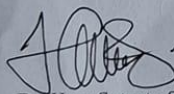


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ABSTRACT

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The production of candlenut oil is inefficient due to the poor separation of solid-liquid phase during mechanical processing. This study compares three mechanical cell disruption methods to direct this efficiency problem: A screw oil press expeller, an industrial meat grinder and an industrial spice grinder. In the screw oil press expeller, the nuts are subjected to compression and shear producing a wet solid paste. In the industrial meat grinder, the nuts are minced with shear force to produce a uniform dense ground paste. For the spice grinder, the blades spin at high speed to pulverize the nuts into a semi-powder paste. Since the crushing method used beforehand determines oil yield, hydraulic pressing and industrial centrifugation are introduced after crushing to aid separation. Each method was run three times to ensure reproducibility. By comparing production capacity, oil yield, and quality, the three methods are evaluated to determine which method is most optimal. Oil yield was measured via gravimetric analysis, production capacity relied on the total processing time required per batch. As different crushing methods may affect the oil clarity and stability, both remained important quality parameters. Oil clarity was measured by a colorimeter and oxidative stability by a peroxide value test.

Keywords: *Candlenut oil, mechanical cell disruption, screw press, meat grinder, spice grinder, hydraulic pressing, centrifugation, oil yield, production capacity, oil clarity, colorimetry, peroxide value, oxidative stability*

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DEDICATION

I dedicate this work to advancing efficient candlenut oil processing, in the hope that future efforts can lead to more efficient industrial scale production.



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