

**DESIGN AND CONSTRUCTION OF A CRYSTALLIZER FOR
SMALL SCALE KAONG SUGAR PRODUCTION**

THESIS

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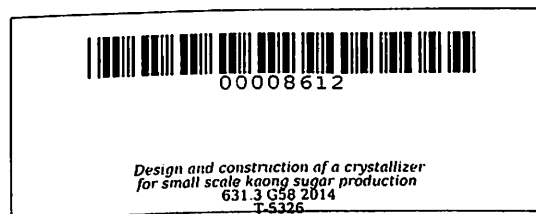
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**Undergraduate Thesis Proposal
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ABSTRACT

GOMEZ, CLAUDINE MAY P. Design and Construction of A Crystallizer for Small Scale *Kaong* Sugar Production. Undergraduate Thesis. Bachelor of Science in Agricultural Engineering. Cavite State University. Cavite Philippines. April 2014. Adviser: Dr. Marilyn M. Escobar.

The study was conducted from August 2014 to March 2014 at Cavite State University- SPRINT field office, Indang, Cavite, to design and construct a crystallizer for small scale *kaong* sugar production. Specifically the study aimed to: 1. document the process condition and variables of existing practices for crystallizing the *kaong* syrup; 2. construct a *kaong* syrup crystallizing machine based on design concepts; 3. evaluate the performance of the machine in crystallizing *kaong* syrup with three different types of impellers at two different levels of TSS of the syrup; and 3. determine the cost of the machine.

Three different impeller designs at two levels of total soluble solids (TSS) of the syrup were used to evaluate the performance of the machine. Preliminary field test was performed. Data collected were analyzed using the two-way ANOVA in a Randomized Complete Block Design and Tukey's Honest Significant Different Test.

The study yielded the following results: In terms of crystallization time, impeller 3 at 85-87 °Brix is the most time efficient, while impeller 1 at 80-84 °Brix was the least time efficient. In terms of production yield, impeller 3 at 80-84 °Brix can produce the highest yield of *kaong* sugar among other combinations. The crystallized *kaong* sugar using impeller 2 at 85-87 °Brix contains less moisture content among others. The impeller 1 at 85-87 °Brix and impeller 3 at 85-87 °Brix produced medium amber *kaong* sugar which is the known color of *kaong* sugar produced in manual operation. Lastly, in

terms of noise emission level, the performance of the three different designs of impellers at two levels of TSS of the syrup in producing crystallized *kaong* sugar was acceptable.

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INTRODUCTION

The fabulous sugar palm of the Philippines is duly noted as one of the world's most economically important palms for products of human consumption. Sugar palm also known as "*kaong*" is one of the most versatile palm species because almost all parts of the tree can be used, with the palm sap being the most important product. Sugar palm derived from the tropical palm tree called *Arenga pinnata* is one of the local delicacies widely consumed by Asians and used as an ingredient in making cakes, desserts, food coating or drinks (Panyakul, 2001).

The palm sap can be used to make brown sugar that has more health benefits compared to regular sugar and other substitutes. The low glycemic index being provided by brown sugar from sugar palm is an outstanding property of sugar which can be used in promoting the product. Moreover, the increasing demand for brown sugar may be supplied if the existing simple machines on each of the different unit operations are capable of producing brown sugar on its optimal production.