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**FACULTY OF ENGINEERING**

**DEPARTMENT OF CHEMICAL AND PROCESSING ENGINEERING**

**FINAL YEAR PROJECT PROPOSAL REPORT**

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**PROJECT TITLE**

**DESIGN, CONSTRUCTION AND TESTING OF A NOVEL ROUND THE CLOCK SOLAR CROP  
DRYER WITH WATER RECOVERY**

**PART 4: THE REFRIGERATION SYSTEM**

**OTHER TEAM MEMBERS: AKANKWATSA ADELLA**

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**DECLARATION**

I **KAKOOZA IBRAHIM** declare that this report is out of my own research and has never been submitted for any academic award at Busitema University or any other institution.

Signature.....

## **DEDICATION**

I dedicate this report to my lovely parents, Mr. and Mrs. Muhammad Hassan, my cherishing auntie Hajjat Halima Hassan for being so loving, caring, and supportive in all aspects of life and always provided career guidance that has changed me into a better person. My dearest friend chen chen cornelious, Hamis, siblings and my course mates to mention but a few. May the Almighty Allah reward you abundantly?

## **Approval**

This is to certify that this research proposal has been carried out under the supervision of my project supervisor and that it is ready for submission to the department.

**Supervisor's name: Mr kant kanyarusoke**

Signature.....

## **ACKNOWLEDGEMENT**

My sincere thanks goes to the Almighty Allah for whatever He provides me with always, and blessed me with life and knowledge.

I extend my appreciation to my parents Mr. and Mrs. Muhammad Hassan for their tireless and unconditional love, care, financial and spiritual support. May the good Lord reward them abundantly?

Special thanks go to my siblings that have supported me in all aspects of life including my academic career.

In a distinctive way, I would like to thank my lecturers at Busitema University who gave me the theoretical knowledge that will help me succeed in the construction of the project.

I also extend my heartfelt thanks to my friends; Hamis, Badoru. Musa, Huda and the entire BUMSA community. My classmates Adella, Sarah, Doreen, Enock and the rest for the support and care they have provided to me for the time we have been together. May the Almighty Lord grant them all their wishes?

## **ABSTRACT**

The drying of foods and crops is a major operation in the food industry consuming large quantities of energy. Providing the most suitable drying conditions for a particular crop ensures that it reaches acceptable moisture content for storage with minimum use of energy within a specified time. (Mcdoom et al., 1999). In the food sector, many studies have been laid to optimize the drying operation by rationalizing energy consumption and improving the quality of the dried product. In this regard, solar drying is an adequate solution for developing countries which are poor in conventional energy resources but have an important solar input practically during all the year. Solar energy is preferred because it is abundant, free, inexhaustible and non-polluting. This report describes the use of a refrigeration system as a heat pump to provide heat required for drying during the night and cloudy weather conditions. The use of refrigeration in crop drying is quite limited and perhaps the existing one is freeze drying. However, because of the low temperature and low pressure, the drying rate tends to slow down. Freezer burn, sometimes seen in frozen foods is an example of undesirable freeze drying. Freeze drying is quite expensive compared to many other drying methods because it is limited to drying high value materials. The main objective of this work is to design a solar refrigeration system that will provide energy to the system and recovery 5litres of water from 75kg of maize during the night. Special procedures are described that were applied to ensure effective even drying of the crops to the required moisture content and results in terms of heating load and cooling load were obtained with accompanying quantity of water collected. In my conclusion, there is inadequate satisfactory data at present to justify the effectiveness of drying that was carried out during the night thus more time and attention should be paid to the night drying such that systematic results can be obtained for evaluation.

A refrigeration system in this study was developed through data collection which involved literature review, assembly of the system components and the major role it plays towards the drying chamber. The dryer was constructed and testes and results were analyzed.

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