

THE RELEVANCE OF SOME ENGINEERING PROPERTIES OF COCOYAM (COLOCASIA ESCULENTA) IN THE DESIGN OF POSTHARVEST PROCESSING MACHINERY

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ABSTRACT

In this study the determination of some engineering properties of cocoyam, (shape, size, colour, volume, particle density, Sphericity, weight, surface area and compressive strength) was determined at moisture contents of 71.8 %. Under approved standard laboratory conditions and using standard methods and instruments, experiments were conducted and results were obtained. The highest value of compressive strength for cocoyam when placed horizontally and vertically is 1.84 KN and 1.40 KN respectively. The maximum values of the Major, Intermediate and Minor Diameter are 112.3mm, 48.2mm and 46.0mm respectively. The minimum values were calculated to be 56.0mm, 29.0mm and 38.77mm respectively, and mean to be 74.33mm, 41.04mm and 38.77mm respectively. These values were used for sorting, grading and construction of sieve to separate the values below the mean obtained. The coefficient of variation of the major, minor and intermediate was gotten to be 19.0%, 14.8% and 15.5% respectively. These results are important for maximum efficiency in designing equipment required for further processing of Cocoyam and the reduction of mechanical damage to agricultural produce during postharvest handling and processing.

Keywords: Engineering properties of Cocoyam, Postharvest Handling and Processing

INTRODUCTION

The ever increasing importance of agricultural products together with the complexity of modern technology for their production, processing and storage need a better knowledge of the engineering properties of these products. It is however necessary to understand the physical laws guiding the response of these agricultural products so that machines, processes and handling operations can be designed for maximum efficiency and the highest quality of the final end products (Mohsenin, 1970).

CONTEXT AND LITERATURE REVIEW

Agricultural products especially those of the plant origin (for example cocoyam) are now frequently used for a wide range of activities with importance of other increasingly emerging products. These agricultural products have over the years been underexploited in the regions of which they are produced especially in the developing countries. It is therefore necessary to determine their engineering properties which are important in the design of agricultural machinery, equipment and facilities for proper design of equipment for handling, conveying, separation, drying etc.

Cocoyam can be used as food for man and feed for animals, and mucilage which can be utilized in the paper industry or possibly in medicinal tablet manufacture. Cocoyam can be used as a source of power (Alemede, 1994; Montaldo, 1991; Wilson, 1984; Tambong et al., 1997; Lebot&Aradhya, 1991; Onokpise, 1999; Kolawole, 2005; Montaldo, 1999; Douglas, 1994)