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CHARACTERIZATION OF CHITIN WITH DIFFERENT AGING OF LEUCAENA LEUCOCEPHALA PODS

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ABSTRACT

This study was done to characterize chitin with different aging of Leucaena leucocephala pod by using elemental analyser. The sample collected was dried under sunlight before it been grinded. Then, the sample was analysed using elemental analyser. The size of the Leucaena pod was in range 4.5-23.5 cm length and 0.3-2.3 cm wide. The age of the sample also was recorded based on observation of the samples tree and the seed size. Result shows the smallest amount of nitrogen content in the sample was sample Leucaena 5 with 3.20% and the largest amount was sample Leucaena 2 which is 4.67%. After calculation using the formulas, the percentage of protein content and the degree acetylation (DA) was recorded. Sample 5 with smallest nitrogen content became the largest amount of protein and DA value compared to others and sample Leucaena 2 became the smallest. The result of this study shows that the chitin in Leucaena leucocephala can be characterize but to get the value as pure as the chitin which is 6.89% nitrogen content and 100% DA need further deproteinization or extraction of the Leucaena leucocephala.

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CHAPTER 1
INTRODUCTION

1.1 Research Background

Chitin contain hydrogen bond such as hydroxyl, amine, and carbonyl groups which will lead to the formation of micro fibrils. This hydrogen bond then will linked and interact with 2-acetamide-2-deoxi-D-glucopyranose and β(1→4) glycosidic bonds. Chitin also is one of the polysaccharide structure that contain scaffold material that can protect the organisms such as fungi, arthropods and nematodes. Generally, chitin produced from proteins, mineral compounds such as calcium and magnesium carbonate, and different proportions of pigment (Campana-filho, Lavall, & Assis, 2007).

Chitin can be grouped into three which are α-chitin, β-chitin, and γ-chitin. α-chitin is the most structure found which has a compact orthorhombic cell form from parallel and antiparallel chains (Campana-filho et al., 2007). This α-chitin is the most stable polymorphic form, that is why it is the most structure found in crustaceans and insect cuticles (Majt, Kogan, & Sim, 2007). Then, β-chitin contain monoclinic unity cell which is polysaccharide chains form in parallel (Campana-filho et al., 2007). It can be found in squid *Ommastrephes bartrami* pens, *Loligo* species and cuttlefish (*Sepia officinalis*)(Majt et al., 2007). γ-chitin can be identified as parallel and antiparallel form of structure and it is a simple distortion of α and β structure if compared to different polymorph (Campana-filho et al., 2007). γ-chitin can be found in insect's cocoons (Majt et al., 2007).

Chitinase is one of the large and diverse family of hydrolytic enzymes that will breakdown chitin glycosidic bonds (Khajuria, Buschman, Chen, Muthukrishnan, & Zhu, 2010). In order to maintain the stability of protein in the insect chitinase, there are some putative N-linked glycosylation sites that may be needed (Merzendorfer & Zimoch, 2003). Chitinase also can attack main component of chitin molecules in fungal cell wall and insect's skeleton. Chitinase can be found in animals such as snails (Sharma et al., 2011). This chitinase also can be found in many insects such as Manducasexta, Anopheles gambiae, Bombyx mori and many other insetcs. Chitinase can be used as a