

***Zingiberaceae* EXTRACTION AS BIOLOGICAL CONTROL AGENT FOR
COCOA POD BORER MANAGEMENT IN COCOA INDUSTRY**

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ABSTRACT

***Zingiberaceae* EXTRACTION AS BIOLOGICAL CONTROL AGENT FOR COCOA POD BORER MANAGEMENT IN COCOA INDUSTRY.**

Theobroma cacao was classified as an economical crop in Malaysia agricultural industry. In early 2000, the number of cocoa production in cocoa industry have declined due to heavy infestation of pests and diseases. The most serious pest is *Conopomorpha crumellana* that known as cocoa pod borers (CPBs) which commonly found in Peninsular Malaysia and Sabah. The common control that always used by the farmers is chemical control. However, the chemical pesticide can harm the environment and human. At the same time, the uncontrolled use of chemical can cause the insect resistance problem. Based on these problems, the researchers were investigating to use the plant extraction. The plant contains a lot of secondary metabolites that can be a good control of insect pest without causing any environmental pollution and safe for human. Due to the high chances of plant product in controlling pest, this study was focusing on the uses of *Zingiberaceae* extraction to control the cocoa pod borer on the cocoa plantation. Thus, the objective of this study was to examine the best extraction concentration of *Zingiberaceae* species (tumeric and ginger) that can control the population of CPBs pupae. There were five concentration of tumeric and ginger; Control, 5ml, 10ml, 15ml, and 20ml of tumeric and ginger extraction have been tested to kill the CPB. These two different *Zingiberaceae* species with five different concentration were extracted using maceration technique and then the extraction were apply on CPB's pupae as treatment in laboratory condition. Among all treatment ginger show the positive result in controlling the population of CPBs. The effective among measured starting from 10ml until 20ml for ginger. Thus, it can be concluded that the *Zingiberaceae* species have a good potential in control *Conopomorpha crumellana*.

KEYWORD : *Conopomorpha crumellana*, *zingiberaceae*, pesticide, maceration extraction and CPBs pupa