EFFECT OF *Bacillus macerans* ON THE GROWTH OF FUNGI ON COPRA DURING STORAGE, WITH SPECIAL ATTENTION TO AFLATOXIN LEVELS IN A MEDIUM SCALE PROCESSING UNIT

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Abstract

Prevention of contamination and detoxification of aflatoxigenic fungi and aflatoxins, have been a major issue in the global food industry as well as in the copra industry. This project examined the possibility of a potential bio control agent against toxigenic fungi to prevent the fungal contamination and the aflatoxin accumulation on copra during storage and also in coconut oil and coconut meal (cake), which is used as a dietary part and livestock feed in Sri Lanka and other countries. This project was carried out as a pilot program to examine the effects and biocontrol potential of *Bacillus macerans* on aflatoxigenic fungi on copra products to be used as a commercial preparation.

A pure culture of *B. macerans* was mass cultured and introduced to the copra after curing. Copra processing was carried out in a copra kiln of the Coconut Research Institute (CRI) designed by U. Samarajeewa, in a normal processing procedure. After processing, three sets of copra cups were sprayed with 3 treatments (Treatment 1-control, Treatment 2-water and Treatment 3-*B. macerans*) to control the growth of fungi on copra. Frequency of occurrence of fungi on copra following each treatment was assessed once in every two weeks.

Aspergillus flavus, *Aspergillus niger*, *Curvularia sp.* and *Penicillium sp.* were the four fungal species identified on copra pieces during storage period. A significant association between the treatments and the fungal growth was observed during the frequency study. The frequencies of occurrence of *A. flavus* and *A. niger* on *B. macerans* treated copra were significantly lower than control and water indicating an inhibitory effect of *B. macerans* on the growth of these fungi. No significant difference was observed between treatment 1 and treatment 2 for *A. flavus* and *A. niger*. During fourth week of storage, treatment 3 (*B. macerans)* demonstrated a higher reduction in growth of *A. flavus*. Absence of *A. niger* was observed in the first two weeks of storage in treatment 3.

Oil was expelled from copra and subjected to Thin Layer Chromatographic analysis, after one month and two months of storage to identify the aflatoxins in the samples. Same procedure was adopted for a copra sample obtained from a storage house near CRI premises. The results revealed that the oil samples processed from CRI copra kiln did not contain any aflatoxins, irrespective of the treatment. However, the oil and the coconut meal samples obtained from a nearby storage house, indicated the presence of aflatoxins.

The copra processed in the CRI kiln, was low in moisture and did not contain any aflatoxins. Therefore, this copra can be graded as good quality copra without high fungal incidence and aflatoxins. The frequency study revealed that *Bacillus macerans* can be used as a potential biocontrol agent to control growth of *Aspergillus flavus and Aspergillus niger*, on copra.