Evaluation of the Repellent Potential of Noni (Morinda citrifolia) Fruit Extract Applied in Food Packaging to Inhibit Weevils (Sitophilus spp. and Tribolium castaneum)

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Weevils such as Sitophilus spp. and Tribolium castaneum have high dispersion power and the ability to perforate packages, making contaminated grains consumption unviable. Looking for an alternative method, the repellent potential of the Morinda citrifolia fruit extract applied in food packaging was evaluated, since the fruits are rarely consumed by insects. The fruits were collected in the city of Aparecida do Taboado/MS - Brazil. The extract was obtained by 5 cycles of freezing and thawing (283K to 298K, 12 hours each). The T01 test evaluated the repellent potential of the extract by direct spraying on grains, T02 on surfaces treated with the extract, T03 quantified the repellent action of the extract, T04 qualified and quantified the effectiveness of the treated packaging, T05 analyzed the contamination of grains by the extract, using ISO 4120:2013/ABNT NBR and $p<0.05$ as parameters, at the end the average variable cost (AVC) of application per m² was raised. Qualitative tests regarding the effectiveness of the extract by direct contact showed that weevils tend to avoid samples and/or environments with the extract. Quantitative tests for direct application and packaging reached rates of 100% efficiency. In T05 of the 50 trials, there were 13 correct answers, confirming the non-contamination of the grains. AVC was U$ 1.11 per m². Therefore, it is concluded that the extract in question applied in food packaging is a sustainable alternative to the problem of weevils, and can be used on an industrial scale, contributing to SDGS 9, 11, 12 and 15.

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