Study of aqueous fraction composition obtained by slow pyrolysis of Licuri residues: potential inseticide in the control of stored grain pest *Rhizopertha dominica*

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This work presents the study of the slow pyrolysis process applied to the licuri shell (*Syagrus coronata*) to obtain aqueous fractions aiming the use of these products as a fumigant in the control of stored grain pests, which represents a serious problem for Brazilian agriculture. The thermal decomposition in the absence of oxygen (pyrolysis), widely used to obtain energy, had no destination for the aqueous fraction obtained during the process, ending up being discarded. The aqueous fractions were collected in 5 different fractions. The evaluation of the biological activity consisted in the observation of the fumigant activity. The method used filter paper of 2 cm diameter attached to the lid of 40 ml containers, impregnated with 25 µL of aqueous solution. Then, 20 insects were added, thus constituting the experimental unit. Mortality was observed every 24 hours for 4 days. The tests were conducted using a total of n = 120 insects for each

treatment. Preliminary results of the liquid fractions obtained under conditions of slow pyrolysis of licuri bark show a promising insecticidal activity against the stored grain pest Rhyzopertha dominica, reaching values close to 75% mortality in 24H after treatment and higher than 80% mortality after 96 hours of treatment, thus suggesting a low residual power. To investigate the chemical composition of the samples, the aqueous fractions were treated by fractional distillation, liquid-liquid extraction, lyophilization and headspace. The samples were analyzed using gas chromatography-mass spectrometry (GCMS) to study the chemical composition and its correlation with the observed biological activity. The high concentration of acetic acid plays a very effective role in the synergistic process. The furan derivatives and l-alanine ethylamide (S), in combination with other minorities in aqueous solution at acidic pH, should have an effective participation in the activity effect observed in each fraction studied. The activity observed against *Rhyzopertha dominica* does not come from phenolic substances, as these are predominantly in the liquid, not in the volatiles. The hydrocarbons that appear in aqueous fractions probably do not contribute to the observed activity. Volatile substances that may contribute to the activity are included in the furan derivatives, ketones/aldehydes and carboxylic acids/esters. However, further studies will be required for this confirmation.

Keywords: Licuri, slow pyrolysis, stored-grain pests, *Rhyzopertha dominica*, fumigation

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