

Repellency and Toxicity of Calneem™ oil to *Tribolium castaneum* (Herbst) (Coleoptera Tenebrionidae) in stored products

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Abstract. The wide spread use of pesticides to control stored-product pests is posing serious environmental and health problems. Native to India and Burma, the neem tree, *Azadirachata indica* A. Juss is a member of the mahogany family, Meliaceae. It was introduced to Africa earlier this century and is now well established in at least 30 countries, including Ghana where it has become an important source of fuel, lumber and bioinsecticide. Calneem oil is a biopesticide produced and marketed in Ghana by AQUA AGRIC Community Projects (AACP). It is an in-house prepared, cold pressed, double filtered, pure and natural oil derived from high quality neem seeds. Calneem oil contains about 0.3% azadirachtin as its major active ingredient. It is a broad-spectrum insecticide which is effective against several pests of vegetables, food crops, fruit and other tree crops and durable stored products. Toxicity and protectant potential of Calneem against *Tribolium castaneum* was investigated in the laboratory using contact toxicity, grain treatment and repellency assays. The Calneem oil was applied as concentrates in which the oil was dissolved in water using soap as emulsifier. It was applied at six concentrations (0.1%, 0.2%, 0.5%, 1.0%, 2.0% and 3.0%). Calneem oil applied topically, impregnated on Whatman filter papers of weight, 0.58 g and 90 mm diameter or mixed with whole grains was highly toxic to *T. castaneum*. Calneem oil was more effective on grain and on filter paper discs since the lowest dosage of 0.1% killed more than 50% of the beetles within 24 h. The effectiveness of Calneem oil was significantly reduced by the length of storage after application. Calneem oil was also highly repellent to *T. castaneum* tested with overall repellency in the range of 80-100%. The development of eggs and immature stages inside cracked wheat was completely inhibited by Calneem oil treatment. The implications of these results with respect to the suitability of Calneem oil for grain protection against insect pest infestation are discussed.

Key words: Calneem, *Tribolium castaneum*, stored product, wheat

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