Developing Eco-Friendly Fire Ant Bait Killer (Solenopsis geminata) Management Strategies Through Plant Extracts

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The tropical fire ant, *Solenopsis geminata* (Fabricius,1804), is a well-known pest in many parts of the world. Its powerful stings can cause pain, allergies, and other complications for humans. This study aimed to develop an organic ant killer bait using natural plant extracts of *Crysanthemum* sp, *Citrus aurantifolia* (Citrus), *Cymbopogon citratus* (Lemmon grass), *Azadirachta indica* (Neem) and *Derris trifoliate*. Neem, citrus, and lemongrass leaf powders were extracted with ethanol in a Soxhlet extractor, refluxed at 68 °C–90 °C for 2–3 hours, and concentrated using a rotary evaporator at 40 °C and 50 rpm. Ten grams of powdered Common Derris roots were macerated with 95 % ethanol, and then agitated with water. The precipitate was separated and air-dried. Dried Chrysanthemum petals were soaked in 100 % petroleum ether for three days, mixed with 80 % methanol, shaken, and left to settle. The yellow layer was isolated and evaporated using a rotary evaporator. The bait was prepared by mixing 0.5 g each of soybean oil, honey, corn, and 5 % of each plant extracts (0.01 ml). After an overnight starvation, 20 worker ants were placed in escape-proof containers with the bait mixture (0.05 g). After 36 hours, the number of dead ants was counted and the Median Lethal Dose (LD50) of insecticide was calculated. This process was repeated five times and a bait containing food attractants but no plant extracts was used as a control. Five dead ants were recorded over 36 hours following 12 ants were dead within 72 hours. The median lethal dose calculated by the Karber-Behrens method after 72 hours of exposure was 1.09 mg/kg. This suggests some level of tolerance in *Solenopsis geminata* to these particular organic insecticides. To reveal the impactful active ingredients of that prepared bait killer should be identified in future studies.

Keywords: Fire Ant, Fire Ant Management, Eco–Friendly Method, Utilizing Plant Extract, Median Lethal Dose