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Acaricidal efficacy of Essentria® IC-3 and its active ingredients against acaricide resistant and susceptible strains of *Rhipicephalus (Boophilus) microplus*

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Ticks and tick-borne diseases are a major constraint for the sustainable cattle industry in the tropical and subtropical regions of the world. The developments of resistance to most of the commonly used acaricides lead to an attempt to screen herbal products and their combinations for their possible acaricidal activity to develop an eco-friendly tick control alternative. Essentria® IC-3 insect concentrating on crawling and flying insect pests contains rosemary oil (10%), geraniol (5%) and peppermint oil (2%), and acts on target pests by octopamine blocker technology. Essentria and its active components were evaluated for acaricidal activity against acaricides resistant and susceptible strains of cattle tick, *Rhipicephalus (Boophilus) microplus* by Larval Packet Test (LPT) using 14-21 days old unfed larvae. The efficacy was assessed by measuring percent larval mortality and estimating lethal concentrations at 50% (LC50) and 95% (LC95) with 95% Confidence Limits (CL) using probit analysis. A concentration-dependent mortality response was observed with Essentria and Geraniol whereas; rosemary oil and peppermint oil failed to produce such response against any tick strain. The LC50 and LC95 (95% CL) values of Essentria and Geraniol against deutsch strain were 0.55% (0.55-0.56) and 0.10% (0.98-0.10), and 0.59% (0.58-0.60) and 0.11% (0.10-0.11), respectively. Interestingly, the acaricide resistant strains showed resistance to Essentria with Resistance Factor (RF) of 1.49 (Yucatan) and 2.20 (fipronil resistant), but susceptibility against Geraniol similar to deutsch strain was recorded in resistant strains. We report resistance against herbal acaricide in cattle tick for the first time, possibly due to cross-resistance to fipronil.

Biography

Nirbhay Kumar Singh is working as an Assistant Professor, Department of Veterinary Parasitology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India. He is currently a Visiting Scientist to USDA-ARS, Cattle Fever Tick Research Laboratory, Edinburg, Texas, USA under the Raman Post-doctoral Fellowship by University Grants Commission, New Delhi. He has contributed significantly in detection of acaricide resistance status and its underlying biochemical and molecular mechanisms in cattle tick; and development of herbal acaricide. Besides 34 accession numbers obtained from Genbank, NCBI, he has published 104 research articles in national and international journals, 33 extension articles, authored one book along with 10 laboratory manuals.

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