RESUMO - ECTOPARASITOS: SISTEMÁTICA, EPIDEMIOLOGIA E CONTROLE

EVALUATION OF THE EFFICACY OF METARHIZIUM PINGSHAENSE ASSOCIATED WITH MENTHA PIPERITA ESSENTIAL OIL ON DERMANYSSUS GALLINAE

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Dermanyssus gallinae, popularly known as the Poultry Red Mite, affects domestic and wild birds and is highly relevant for commercial poultry farming because it is a hematophagous mite with nesting habits. Infestations by D. gallinae cause stress, affect farm productivity, reduce weight gain, and can cause severe anemia in chickens that can lead to death. D. gallinae is

commonly controlled using synthetic acaricides, but the inappropriate use of these products can select mite populations resistant to synthetic acaricides such as pyrethroids and formamidines. Therefore, biological control using entomopathogenic fungi such as the genus Metarhizium spp. is an interesting tool for controlling these mites. This study aimed to analyze the efficacy of a native isolate of Metarhizium pingshaense associated or not with Mentha piperita (peppermint) essential oil on topically treated D. gallinae. The acaricidal effect of the fungal suspension associated with the essential oil was evaluated using thirty-five adult mites collected in traps removed from the bedding of naturally-infested laying hen sheds. The groups were treated with 1 mL of aqueous suspension as follows: I) control group (Tween 80® 1%); II) M. pingshaense group (108conidia/mL); III) Mentha piperita essential oil group (0,01 mg/mL); IV) M. pingshaense group associated with M. piperita essential oil (108 conidia/mL + 0,01 mg/mL EO). Treated are applied to the mites, and plates were stored at 27ºC ± 1°C and RH = 80%. Mites' mortality was evaluated every 24 hours for eight days. Chicken egg analysis was conducted to evaluate whether the entomopathogenic fungus could be detected in or on the eggs after the fungus treatment and shell cleaning. Eggs were separated into two groups with fifteen eggs each: I) Control group (eggs sprayed with Tween 80® 1%) and II) M. pingshaense group (eggs sprayed with 108 conidia/mL). The eggs were topically treated with the suspension at 1 mL/egg and stored at room temperature (20–25 °C) in a flow hood. Thirty-six hours after the treatment, the eggs were superficially sanitized, adapting the cleaning and disinfection protocol established. After this process, 50 µL of the residual washing water from the control and treated groups were inoculated in an artificial solid medium. Wood shavings fragments, where the eggs were supported, and the internal egg content were also inoculated onto the artificial medium. All material was incubated at 25 °C and 80% RH and evaluated 72 h, 7, and 14 days after incubation. Mites treated exclusively with M. pingshaense had less than 50% survival 24 h after treatment. The group treated only with essential oil had 75% survival and the group treated with essential oil and M. pingshaense had 75%, while the untreated mites had 96% survival 24 h after treatment. After eight days of treatment, the control group was the only one that still had live mites, with 40% survival. Regarding the analysis of the presence of fungi on the surface of

topically treated eggs, M. pingshaense was detected on 66.6% of the egg surfaces analyzed, while only on 6.6% of the internal content. However, studies highlight that fungi of the genus Metarhizium do not pose risks to human health, and despite the presence of fungi in 6.6% of the internal content, it is believed that external contamination is possible. No colonies of M. pingshaense were detected on the plates with residual wash water and fragments of wood shavings. Our study supports the applicability of entomopathogenic fungi for the biological control of D. gallinae.

Palavras-chave: biocontrol; entomopathogenic fungi; red mites; essential oils.