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CLOVE ESSENTIAL OIL: ALTERNATIVE FOR SANITIZING HATCHING EGGS

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RESUMO

The sanitation of hatching eggs mainly involves the use of paraformaldehyde, a sanitizer that, although effective against microorganisms, is carcinogenic, presenting a risk to the health of chicken embryos and chicken egg handlers. Therefore, the aimed of this study was to evaluate the use of clove essential oil as an alternative to paraformaldehyde, measuring the eggshell microbial count and hatchability. The present study was approved by the Ethics Committee on Animal Use of the University of Brasília under opinion No. 33/2019. A total of 1,460 brown hatching eggs (from 37-week-old CPK breeder hens) were collected under aseptic conditions and randomly distributed into four treatments before incubation (nonsanitized; spraying with grain alcohol to a concentration of 93.5%; spraying with clove essential oil to a concentration of 0.39%; fumigation with paraformaldehyde to a concentration of 6 g/m³). The grain alcohol used in this study served as the carrier vehicle of the clove essential oil. Therefore, its isolated effect on the sanitation of hatching eggs was also tested. Sanitation procedures were performed in a room at a commercial hatchery 20 minutes after egg collection. After the sanitation process, the eggs were incubated. The setters were operated at a mean temperature of 37.7°C, a mean relative humidity of 60%, and with automatic turning every hour at a 45° angle for the first 18 days of incubation. Starting on day 19, the setters were operated at a mean temperature of 36.6°C and a 65% relative humidity. A randomized block design was used for hatchability with four replicates per treatment. A completely randomized experimental design was used for eggshell bacterial count with five replicates per treatment. The data were analyzed by analysis of variance using SAS Studio University Edition, and means were compared using Tukey's test at a significance level of 5%. The count of total aerobic mesophilic bacteria was significantly lower ($P < 0.0001$; CV = 9.54%) after spraying with clove essential oil (2.30 ± 0.24 log₁₀ CFU/mL) than on nonsanitized eggs (3.49 ± 0.34 log₁₀ CFU/mL) or on eggs sprayed with grain alcohol (3.09 ± 0.14 log₁₀ CFU/mL) but did not differ significantly ($P > 0.05$) from the count in the paraformaldehyde group (2.23 ± 0.29 log₁₀ CFU/mL). The count of Enterobacteriaceae was significantly affected ($P = 0.0066$; CV = 98.24%) by the treatments and ranged from zero in the clove essential oil and paraformaldehyde groups to 1.19 ± 0.70 log₁₀ CFU/mL for the negative control. The hatchability ($P = 0.0043$; CV = 3.86%) differed significantly between the studied treatments. The mean values for the eggs treated with clove essential oil ($84.69 \pm 1.65\%$) and paraformaldehyde ($81.87 \pm 3.92\%$) were statistically

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similar but were higher than those for the negative control ($74.03 \pm 3.58\%$) and the eggs treated with grain alcohol ($73.59 \pm 2.87\%$). Clove essential oil is effective for eggs intended for incubation. Its use as an alternative to paraformaldehyde in the sanitation of hatching eggs is recommended because it reduces the eggshell microbial load, resulting in a high percentage of hatchability.

PALAVRAS-CHAVE: Science and technology of animal products, artificial incubation, bacterial enumeration, hatching eggs, sanitizers

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