

Colloquium on Applied Sciences 2 2024

8-14 July 2024, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

EVALUATION OF FAECAL PRESERVATION METHODS ON THE INTEGRITY OF MICROBIAL DNA AND PARASITIC LOAD IN SHEEP

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Structured Abstract

Background: Helminths are commonly found in the gastrointestinal tracts of livestock animals. Heavy infections lead to economic losses by reducing livestock production and increasing human morbidity. Given the extensive coevolution and close coexistence of gut helminths and microbiota within hosts, interactions between these organisms are expected. For researchers conducting epidemiological or clinical studies to assess sheep welfare, it is essential to run multiple analyses on a single non-invasive faecal sample, which may be limited in quantity or difficult to obtain due to time or geographic constraints. Therefore, this study aimed to evaluate present faecal biomarker-specific preservatives to identify the best one for preserving both microbial DNA and parasite eggs.

Methods: Six faecal samples from two sheep breeds, Santa Inés and Dorper (three of each breed), were collected and preserved under three conditions: at -20°C (Control), submerged in NAP buffer and frozen at -20°C, and submerged in 2.5% Potassium Dichromate (K₂Cr₂O₇) and frozen at -20°C. After a considerable period, the samples were analysed for DNA concentration and purity using the Nano Drop spectrophotometer, as well as faecal egg count (FEC).

Results: Data analysis showed no significant differences among the preservatives in maintaining DNA concentration and purity. However, the post-hoc test indicated a tendency for DNA concentration and purity to be significantly lower in faeces preserved with Potassium Dichromate compared to those preserved with NAP buffer and at -20°C. The FEC analysis revealed significant differences between the preservatives ($p < 0.05$), with the NAP buffer showing the highest mean EPG. Additionally, analysis between the breeds indicated a significant difference in FEC ($p < 0.05$) for the best preservative, NAP buffer, where the Santa Inés breed had a lower mean EPG compared to the Dorper breed.

Conclusion: Although the small sample size limits the study, it concludes that -20°C and NAP buffer are similarly effective in preserving microbial DNA in faecal samples, with the NAP buffer also being the best at preserving parasitic eggs. Additionally, the Dorper breed appears to be more susceptible to parasites than the Santa Inés breed.

Keywords: Faecal preservation, sheep, parasite eggs, gut microbiota

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