Abstract

Shining a Light on *Haemonchus contortus* in Sheep [†]

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Abstract: Heavy infestations of the Barber's pole worm, *Haemonchus contortus*, can cause severe wasting, morbidity and mortality in animals if not promptly treated. The current detection methods for this blood-sucking parasite involve faecal worm egg counts and diagnosis of anaemia, both of which are time consuming and require expertise. As blood is detected in sheep faeces sooner during infection than worm eggs, quantitative evaluation of blood may serve as a sensitive indicator of *H. contortus* infection. Here we investigated the feasibility of rapid estimation of haemoglobin (Hb) in sheep faeces using visible near-infrared spectroscopy. Haemoglobin (Hb) was assessed at various concentrations in moist sheep faeces using portable visible near-infrared (vis-NIR) spectrometers. Calibration models were developed for the region of 400–600 nm, where Hb absorption bands can be found. Within this wavelength region, Hb in sheep faeces can be estimated with minimal interference from background moisture (970 nm) or chlorophyll (670 nm), suggesting that difference in diets in sheep will have minimal effect on prediction accuracy. Predictions for sheep faeces based on a drenching threshold of 3 µg Hb/mg faeces showed high levels of accuracy with minimal sample preparation (Sensitivity = 89%, specificity = 80%). The success in detecting Hb in sheep faeces indicates the potential of vis-NIR spectroscopy as a rapid, on-farm diagnostic method for predicting blood in sheep faeces, and timing treatment of *H. contortus* infections.

Keywords: *Haemonchus contortus*; visible-near infrared spectroscopy; portable spectroscopy; gastrointestinal nematode diagnosis; haemoglobin; faeces; NIR

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