MODELLING OF FAECAL EGG COUNT REDUCTION TEST PROCEDURES: IMPROVING OF DETECTION OF ANTHELMINTIC RESISTANCE

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The faecal egg count reduction test (FECRT) is the most commonly used test to detect anthelmintic resistance (AR) in ruminants. This test is the best initial screening method for AR in the field due to its suitability to all drugs and the ease of performing. Laboratory and field FECRT procedures can largely differ among surveys and several methods to calculate FECR are applied following different criterions, but their implications on FECRT outcomes have not been determined to date. Therefore, the interpretation of results is somewhat arbitrary. In this work, we simulated the process of conducting a FECRT under different laboratory and field conditions. We simulated the calculation of FECR with six different methods combining estimations of FECR at individual and group level, using faecal composites or including or not an untreated group as control. These calculations were carried out for all combinations of several detection thresholds of McMaster technique (six levels), parasite distribution across host populations (42 levels), true AR simulated value (nine levels), and sample size (seven levels). In addition, for composite based methods we simulated different number of McMaster chambers carried out to estimate FECR (20 levels) and variation in the weight of the sample of faeces that each individual contribute to composite (four levels). Modelling results showed that precision of FECRT estimates was largely dependent on sample size and the detection threshold of McMaster technique. Individual based methods performed lower than group estimation based ones, whereas composite based methods exhibited, under several procedure conditions, similar performances than the more costly individual or group based methods. The main conclusion was that criteria to discriminate if AR is present or not in a flock should be corrected in function of the FECRT procedure implemented.

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Palabras clave: Anthelmintic resistance; Diagnostic; Faecal egg reduction test