THE USE OF EFFECTIVE MICROBES FOR WORM CONTROL IN GOATS – A PRELIMINARY STUDY

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ABSTRACT. Anthelmintic resistance which is escalating in Malaysia and other countries is forcing farmers worldwide to look at alternative, green technologies to improve productivity and reduce diseases caused by helminths in livestock. One such method is the use of effective microbes or Useful Microbes (UM) for worm control. Therefore, a preliminary study was conducted to evaluate the anthelmintic effect of UM on nematode parasites of goat in a government farm. Fifteen Boer goats were randomly selected and fed with UM Bokashi mix (effective microbes in the form of granules) with commercial goat pellets and UM fluid in drinking water. UM used in this study was produced by Department of Veterinary Services Penang by fermenting UM stock culture with a fruit base and molasses. Faecal egg counts (FEC) using the modified McMaster technique was carried out weekly for 5 weeks. The results show that the UM used for animal feeding (5% Bokashi with commercial goat pellet) and ad lib UM fluid in drinking water, fed over a period of 1 month showed Faecal Egg Count reduction from 3240 e.p.g. to 677 e.p.g. (79% reduction). The general packed cell volume also increased in a majority of the animals indicating better general health. Further studies are necessary to establish the systematic use of UM in smallholder farms as well as large commercial establishments and to determine its mode of action in the pathophysiological aspects in the face of common limitations such as poor nutrition and other stress factors.

INTRODUCTION

Livestock farming contributes significantly to the economy of Southeast Asian farmers. The total number of sheep and goats in Malaysia has increased from 538,538 heads in 2007 to 562,554 heads in 2008. The 2008 census from the Department of Veterinary Services, Malaysia recorded the total number of sheep and goat populations as 124,749 heads and 437,805 heads respectively (Livestock Statistics Handbook, Department of Veterinary Services). Thus, their combined numbers, which constitute the small ruminant industry of Malaysia, is an important component to the overall livestock sector

for the country. One of the main problems limiting productivity in small ruminants of Malaysia is gastrointestinal helminth infections which causes mortality and morbidity in goats and sheep in Malaysia (Fatimah *et al*., 1985, Sani *et al.,* 2004). A wide variety of anthelmintics, covering the entire range of chemical groups, are used for the treatment of helminthiasis. These chemical groups include: the benzimidazoles (e.g. albendazole, fenbendazole etc), the imidothiazoles (e.g. levamisole), the salicylanilides (e.g. closantel) and the macrocyclic lactones (e.g. ivermectin) (Chandrawathani *et al*., 1994).

However due to anthelmintic resistance problems in Malaysia and worldwide, there is a growing demand for alternative green technology of parasite control to reduce the dependence on these drugs. Thus, this study was designed to further investigate the effect of using Useful Microbes (UM) as a possible natural anthelmintic for use in small ruminants.

MATERIALS AND METHOD

Fifteen female Boer goats from a government farm were randomly selected and fed with UM Bokashi mix (effective microbes in the form of granules) with pellet and UM fluid in drinking water. The UM used in this study was produced by Department of Veterinary Services Penang by fermenting UM stock culture with fruit base and molasses (Useful Microbes Guideline, DVS Penang, 2010). The UM products (bokashi and fluid) consisted of lactobacillus, photosynthetic bacteria as well as other 'good microbes' as tested by several independent laboratories.

Faecal egg counts (FEC) using the modified McMaster technique (Christopher *et al.,* 1992) was carried out weekly for 5 weeks. Blood was collected by jugular bleeding and the Packed Cell Volume (PCV) (Christopher *et al*., 1992). was estimated pre and post treatment to establish the haematology parameters. FAMACHA© (Bath *et al*., 2001) a tool introduced by South African parasitologists was also used to assess the level of anaemia in small ruminants. Here, animals are monitored individually whereby the lower eyelid of the animal is examined and the colour of the ocular mucous membrane is recorded based on a standard FAMACHA chart, and this indicates anemia caused by the helminth infection. No anthelmintic treatment was given throughout the trial. Animals were fed routinely with pellets, cut improved grasses such as guinea grass and Napier and provided with ad lib water. They were housed on raised floor pens throughout the trial.

Weight gains and general body scores were recorded pre and post treatment to establish the effectiveness of the UM controlling helminths and subsequently improving the bioavailablity of feed in the goats. The general performance of the goats were observed throughout the 5 weeks and a comparison was made pre and post treatment.

Table 1. Packed Cell Volume data from Week 1 to week 5

ANIMAL ID	PCV (%)		% Increase / decrease in PCV
	Pre	Post	
2426	38	36	-2
2427	26	30	+4
2455	27	31	+4
2464	23	26	+3
2478	24	30	+6
2484	31	Died due to accidental causes	
2486	22	24	+2
2488	30	33	+3
2490	12	22	+10
2492	31	29	-2
2496	22	24	2
2498	28	26	-2
2922	26	24	-2

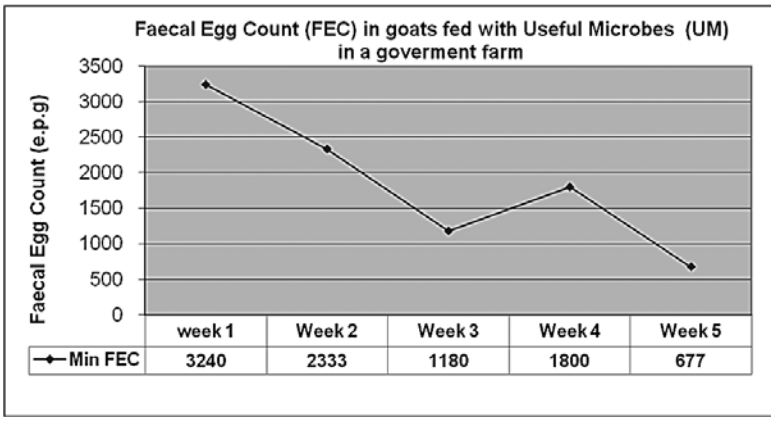
All the data was analysed using SPSS program to establish the effectiveness of UM in reducing anaemia, controlling helminthes and increasing weight.

RESULTS AND DISCUSSION

The results show that the UM used for animal feeding (5% Bokashi with commercial goat pellet) and ad lib UM fluid in drinking water, fed over a period of 1 month indicated Faecal Egg Count (FEC) reduction from 3240 e.p.g. to 677 e.p.g. (79% reduction). In terms of FEC, there is a significant reduction from week 1 to week 5 ($p<0.05$). Worm egg count dropped steadily from week 1 to week 5 as shown in Graph 1. Individual faecal egg counts were fluctuating throughout the study. During the course of the trial, one animal had died and one animal did not have faecal sample on the fifth week.

In terms of FAMACHA and PCV values, there is a positive correlation throughout the study where seven out of the 15 animals showed an increase in PCV and subsequent improved FAMACHA scores. Although there was a slight reduction in PCV (by 2%) in some animals, overall body condition was better. There is a significant increase in the body weight of each animal post treatment ($p<0.05$).

In Malaysia previous studies have been conducted on treatment of polluted water using UM (Nur Afiqa, 2010). However, not many studies were conducted on the anthelmintic properties of UM for animal or livestock use. Further studies are necessary to establish the systematic use of UM in larger population or smallholder



farms and to determine its mode of action in the pathophysiological aspects in the face of common limitations such as poor nutrition and other stress factors.

CONCLUSION

In the face of severe anthelmintic resistance in the small ruminant population, there is an urgent need to look for alternative methods of worm control and improve productivity. One such avenue is the use of useful microbes, as a feed additive and /or water additive to improve the general health and immunity of animals thereby making them more resilient to field worm infections. This new technology is easily available to farmers, cheap and user friendly but animals need consistent monitoring to ensure the health is not jeapordised.

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