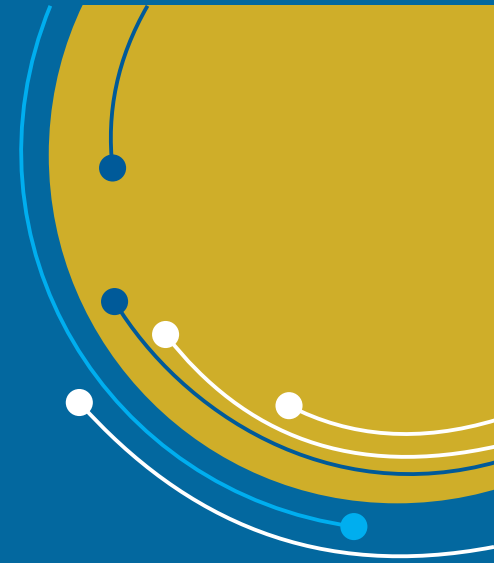
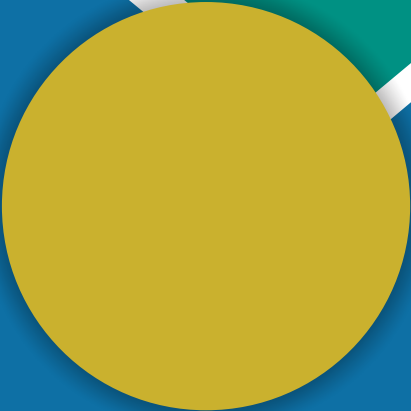


# Targeted selective treatment for control of drug resistant/susceptible *Haemonchus contortus*



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Small ruminant industry is a profitable business for poor Pakistani families because of higher growth rate, low capital investment, high reproductive performance, no special need of cultivation of crops and their ability to maintain themselves on bush lands or pastures for grazing. But profitable sheep and goat farming is affected by many diseases particularly parasitic problem. Among parasitic diseases, *Haemonchus (H.) contortus* is the most dangerous because of its economic significance worldwide. This parasite sucks 0.03-0.05 ml blood per day that leads to a condition called haemonchosis. Usually the infection with *H. contortus* causes severe anaemia and hypoproteinemia which ultimately leads to pale mucus membranes, reduced productivity, depression and death in severe cases. For control of *H. contortus*, traditional practices are adopted to deworm the entire flock. Due to excessive and un-necessary use of commercial anthelmintics, parasite has developed resistance against these drugs. Thus, there was need for new technologies for an economical control of these drug resistant parasites.

## Technology for control of parasites:

FAMACHA system is an eye color scoring chart which has five color categories for comparison with color of the mucus membranes of lower eyelids. Score "1" on the card means healthy and score "5" indicates severely anaemic animal or in need of treatment. In this system, only those animals are given treatment which fall in the categories of "4" and "5" or in other words they are in danger of dying due to anaemia caused by *H. contortus*. FAMACHA System has been standardized for use in Pakistani sheep and goat breeds.

On the other hand, for long term protection of animals against infection with *H. contortusa* new treatment method has been tested which is equally effective against drug resistant and drug susceptible parasites. Copper Oxide Wire Particles (COWPs) are potentially cheap alternative to anthelmintics especially where anthelmintic resistance has developed in *H. contortus*. In studies conducted in Pakistan COWPs have been found very effective in controlling drug resistant as well as drug susceptible *H. contortus*. These particles killed the *H. contortus* with an efficacy of more than 90%. Thus, farmers are advised to select the animals for treatment using FAMACHA system instead of treating all animals in herd and use COWPs for this purpose.

## Benefits

Following are the benefits of using this new method of treatment.

- i. Targeted selective treatment reduces the treatment cost as only 20-30% herd had to be dewormed, which results in 70-80% reduction in anthelmintic treatment
- ii. Slows down the development of drug resistance on farm.
- iii. The most susceptible animals can be removed from the flock after identification with FAMACHA system to improve the genetic status
- iv. COWPs are equally effective against drug resistant and susceptible worms
- v. Single treatment with COWPs is sufficient for 3-6 months

COWPs also help in overcoming the copper deficiency in animals, which is an additional benefit



**Figure 1.** Figure showing FAMACHA card used for eye color scoring of infected goats, and copper oxide wire particles used for treatment of infected goats.