

Short Communication

IVERMECTIN 3.15% FORMULATION-AN EFFICACY STUDY IN CATTLE

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ABSTRACT: Ivermectin as a medicine in veterinary science plays an important role towards eradication of ectoparasite at the concentration of 200 µg/kg body weight. Recently developed ivermectin 3.15% in oily preparation was examined in cattle infected with both endo and ectoparasite. 120 cattle were included in a study at Balarampur block in Purulia district of West Bengal, India. The preparation of 3.15% ivermectin was found to be highly efficacious in the present experiment of 90 days long study period.

Key words: Ivermectin 3.5%, Cattle, Ectoendoparasite.

Ivermectin is a broad-spectrum antiparasitic drug extensively used in veterinary medicine. The composition of the pharmaceutical preparation affects its absorption and so systemic availability. After the introduction of ivermectin formulation (propylene glycol/glycerol formal 60:40) used at 200 µg/kg, different pharmaceutical modifications have been assayed to extend its persistent endectocide activity (Lifschitza *et al.*, 2007). Pour-on formulation is used at 0.5 mg/kg (Gong *et al.*, 2011). Though Pour-on (PO) formulations are more convenient but exhibit greater variability between animals compared with Subcutaneous (SC) or PO administration (Bousquet *et al.*, 2011). Recently, Ivermectin 3.15% long-acting (Endact-LA) preparation introduced. Grooming behavior of cattle has a

major influence on the plasma disposition of topical macrocyclic lactones (Nuttall *et al.*, 2014). One low-volume SC dose (1 ml/50 kg, equivalent to 630 µg/kg Ivermectin) effectively treats and prophylactically controls many internal and external parasites of cattle (Kristjanson *et al.*, 2009).

The macrocyclic lactones have a very high (>98%) efficacy against all stages (including inhibited forms) of the common cattle nematodes (Graef *et al.*, 2012). A wide range of effective chemoprophylactic systems has been developed to prevent outbreaks of parasitic gastroenteritis and control infections in grazing calves. Strategic anthelmintic medication during the grazing season, using carefully timed administration of macrocyclic lactones, has proved to be highly effective in Western Europe

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for the control of GI nematodes of grazing calves during their first year (Charlier *et al.*, 2014).

In the present study we investigate the effect of Endact-LA (Ivermectin-3.15%) on parasitism in the cattle in Balarampur block of Purulia district in West Bengal. Irrespective of any general parasite (both endo and ecto parasite) infection under study, we used Endact-LA to see, how far it could protect the animal from recurrence of parasite infection.

Study design

Ethical approval: The study was conducted at Balarampur block, after obtaining the necessary consent from the owner of the animals.

Experimental design: A field trial was conducted to see the efficacy of Ivermectin 3.15% in the name of Endact LA on infected cattle. A total 120 cattle with parasite infection were included in the study at Balarampur block of Purulia district. The block was consisted of 7 gram panchayats. For ectoparasite, infection load was screened and scored by visual examination. Faeces were examined for presence of egg, counting of egg per gram and scoring was done for endoparasite. Ivermectin 3.15% was given at the rate of 1 ml/50 kg body weight subcutaneously. Faecal examination was done on day 0, day 15, day 30, day 45, day 60 and day 90. For ectoparasite, only visual examination/ skin scapping was done on the same day. Ivermectin 3.15% was procured from Vetoquinol animal health.

Sample collection: Faecal and skin scraping material were collected by livestock development assistant/ Pharmacist/ Pranibandhu and brought to laboratory for immediate examination for presence of egg and or ectoparasite if any.

Direct smear method for microscopy: To examine the faecal sample for presence of egg of parasite, a small amount was put on slide and with a drop of water it was diluted as to spread like smear. Dart portion in the smear was removed manually. Then it was covered with glass cover slip. Whole preparation was examined at 10X objective in a light microscope. Depending on the severity a score was given as +++, ++, + or 0 (where +++: High Count, ++: Medium Count, +: Low Count, 0: Nil Count)

Dilution method for EPG: Only egg positive samples from direct smear method were counted for EPG analysis. From whole sample about 1 gram of faecal material was taken in a stoppered graduated falcon tube. Up to the mark of 15 ml, N/10 NaOH solution was added. The tube was tightly closed and shaken gently to mix the contents by adding 10-12 glass beads. After shaking, 0.15 ml of the well mixed suspension was drawn with a pipette and placed on a glass slide, covered with a cover slip and the total number of eggs in the entire preparation was counted under low power objective (10X) of the microscope. The number of eggs per gram of faeces was determined by using the formula: $EPG = \text{Number of eggs} \times 100$ (where 100 is the dilution factor).

Smear technique for skin scapping: Affected animal were subjected to scapping with scalpel till blood oozes out. Scotch tape was attached on the affected area (70 mm long). The tape was taken back and smoothly attached to a clean glass slide. The glass slide was observed under microscope to identify the ectoparasite. Depending on the severity, a score was given as +++, ++, + or 0 (where +++: High Count, ++: Medium Count, +: Low Count, 0: Nil Count).

Table 1. Determination of egg per gram from different places at Balarampur block, Purulia, WB.

Name of GP in balarampur block	No. of Animals	Mean EPG on 0 day
Balarampur GP	10	410
Bela GP	10	410
Tentlow GP	10	450
Genrua GP	10	430
Darda GP	10	430
Ghatbera-Kerowa GP	15	410
Bara-Urma GP	15	390

Table 2. Efficacy of Endact-LA on different days of post administration by direct smear/visual examination.

Infestation	Observation on					
	Day 0	Administration of Endact-LA	Day 30	Day 45	Day 60	Day 90
Roundworms (Fecal Sample Examination for Eggs of Roundworms)	Eggs Present / Absent		Eggs Present / Absent	Eggs Present / Absent	Eggs Present / Absent	Eggs Present / Absent
Grading +++ , ++ , + , 0	+++		0	0	0	0
Mite (Skin Scrapping for Mites or Eggs of Mites) /Tick /lice(Visual Examination)	Mites Present / Absent		Mites Present / Absent	Mites Present / Absent	Mites Present / Absent	Mites Present / Absent
Grading +++ , ++ , + , 0	+++		Absent	Absent	Absent	Absent

Data Analysis: During analysis of data all the symbolic score was transformed to alphabetical score as +++: 3, ++: 2, +:1 and 0: 0. Data were analysed by using gaph pad prism 5; 1 way ANOVA followed by Dunnett’s Multiple Comparison Test (Dunnett, 1964).

Finding of the study

Out of 120 cattle, 40 cattle were in ectoparasite group and 80 cattle was in endoparasite group. The mean values of egg per gram from different Gram Panchayats were

given in Table no 1. It was observed that endoectoparasites were absent for 90 days in all animals under trial during whole period. Though on day 0, all animals were severely affected and average score was ‘+++’/3 as score in the direct microscopy (Table 2). Egg per gram counted by dilution method was ≥ 390 on day 0. But after administration of endact-LA in the study period no egg was found on 15th, 30th, 45th, 60th and 90th day under microscope by direct smear method and score was 0 (Table 2).

The nematodal parasites have direct life cycle

and are transmitted by faecal contamination of feed, water and soil (Cisneros *et al.*, 2014). EPG level would be helpful in knowing the amount of infection in the animal suffering from parasitic diseases (Verweij and Stensvold, 2014). Parasitism, especially endoparasitic infection produces ill effects such as weakness, emaciation, inappetance and predisposes the animals to various potential pathogens (Papini *et al.*, 2011). It has been reported that regular faecal examination for parasitic ova/larva along with assessment of parasitic load and administration of appropriate anthelmintics, when warranted, at regular intervals would be able to curtail parasitic infection (Wilson *et al.*, 2005). An oil-based, long-acting formulation of Ivermectin (3.15% w/v Ivermectin) was registered in Brazil in 1998 and is available in most Latin American and African countries. A long-acting parental formulation for Moxidectin has also been developed (Rugg *et al.*, 2012). The injectable solution (1 mg/kg, SC, behind the ear) is an oil-based formulation containing 10% Moxidectin and is currently in use. In controlled studies (Gokbulut *et al.*, 2010, Schumacher *et al.*, 2009), the periods of protection against some nematode infections using long-acting ivermectin formulation were 90–150 days according to the species. The result in the present study is in accordance with those earlier findings. Moreover, being safe in pregnancy, endact-LA could be used quarterly through out the year to minimize both endo and ectoparasite load in animals.

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