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Comprehensive control of G.I. helminths and mite infestation in growing piglets with chemical and herbal anthelmintic and miticides packages

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Abstract

Present study has been planned to achieve a long term effective control of concurrent natural infection of gastro-intestinal helminths, lice and mange infections in pigs. Piglets were randomly divided in to two groups (I and II) each group contains six piglets. For the comprehensive control of common G.I. helminths and mite infection acquired by the piglets born from parasite free pregnant sows on or after 35th to 40th days after birth, were also treated with the same chemical and herbal anthelmintic and miticidal control packages respectively. Haemato biochemical study revealed significant ($P < 0.01$) decrease in the values of Hb, PCV TEC and Ca, P, Zn, Cu, TSP and Albumin before treatment. Group-I treated chemical anthelmintic and miticide completely recovered of piglets from G.I. helminths was observed on 10th DPT onwards and negative for *Sarcoptes scabiei* infestation from 15th DPT. In group-II, treated with herbal anthelmintic and miticides package complete cure of piglets from G.I. helminths was observed on 25th DPT onwards and negative for *Sarcoptes scabiei* infestation from 15th DPT. In both treatment groups restoration of haemato- biochemical parameters on were recorded in different days post treatment. Chemical anthelmintic and miticide drugs and herbal anthelmintic and miticide package were also found very effective for a long time sustainable and comprehensive control of endo and ectoparasite, these animals were treated at intervals with the same drugs as and when reinfection appeared so that animals could be kept parasite free up to the entire period of observations.

Keywords: Piglet, helminths, mange, DPT, haemato-biochemical, Chemical drug, Herbal package.

Introduction

In Jharkhand, pig rearing has remained a traditional occupation of tribals and socio-economically backward people. Several endo and ectoparasites have been observed to undermine the health and production capability of the animals at all stages of production causing heavy economic losses to the industry. *Fasciolopsis*, *Ascaris*, *Strongyloides*, *Oesophagostomum* and other G.I. parasites are the major health hazard while lice and mange mites are the commonest ectoparasites affecting health and production of pigs. A variety of chemical and herbal antiparasitic agents have been used to control the parasitic infections in pigs. But these parasites are still a problem of economic importance in both intensive and semi-intensive system of swine rearing. Therefore, there is an urgent need to develop suitable packages for the comprehensive control of common endo as well as ectoparasites so that maximum economic return may be obtained from the enterprise. Recently, some of the chemical drugs have been used to control the gastro-intestinal helminths and ectoparasites by Prasad *et al.* (2001) [1]. But the chemical drugs have many side effects. Therefore, it is essential to develop suitable parasite control package having minimum side effects for the host but highly effective against gastro-intestinal helminths and ectoparasites. Therefore, the present study has been planned to achieve a long term effective control against gastro-intestinal helminths, lice and mange infections in pigs by the application of suitable chemical and herbal control packages.

Material and Methods

Sustainable comprehensive control of common G.I. helminths and mite was achieved by giving suitable chemical and herbal anthelmintic and miticidal packages to naturally infected growing piglets aged about 2½ months, pregnant sows and their litters maintained at Ranchi Veterinary College Piggery Unit on normal balanced feeds. Any other erroneous infections were managed therapeutically. Detail experimental schedule followed were as shown in tables 1.

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Table 1: Schedule for the comprehensive control of common G.I. helminths and mite by chemical and herbal control packages in growing Deshi piglets

Groups (No. of animals)	Nature of infection	Drugs used, doses and route of admn.	Day of treatment	Period of observations
I(6)	<i>A. suum</i> , <i>T. suis</i> , <i>O. dentatum</i> , <i>Strongyloides</i> spp. and <i>S. scabiei</i> .	Fenbendazole + Praziquantel 200 mg /30 kg body weight, once, orally + Cypermethrin 2 ml /litre of water, topical, twice in a week + Supportive drugs	0 (Day on infection detected)	10 months
II(6)	-do-	Herbal anthelmintic Pure Mercury, Pure sulphur, Ajmod, Bayavidanga, Pure Kuchla, Palas seed, Pumpkin seed, Cumin, Arecanut and Black til, 500 mg/kg b. wt., twice daily for 7 days. + Herbal miticide: Neem oil, Karanj oil, Camphor and Sulphur. Topical daily for 5 days + Supportive drugs	-do-	10 months
III(6)	(-do-)	No treatment		10 months

Supportive drugs – Liver stimulants, antidiarrhoeal, appetizers, minerals, vitamins, antibiotics and other drugs were given as per requirements.

Pre and post treatment EPG twice weekly up to 20 days, on 25th day and then fortnightly upto 10 months, live and dead mite counts on every 3rd day upto 15th DPT and then at monthly interval upto 10 months were recorded. Hb, PCV and TEC noted on zero day before treatment and then fortnightly upto 3 months and then monthly upto 10 months. Ca, P, Zn, Cu, TSP and albumin estimated on zero day before treatment and then on 20th day post treatment (DPT). Body weight gain - Pre and post treatment fortnightly till the end of experiment.

Drugs Used

i) For common G.I. helminths:	
a) Fenbendazole 150 mg and Praziquantel 50 mg.	
b) Herbal anthelmintic consisting of:	
Pure mercury	100 mg
Pure sulphur	200 mg
Ajmod (<i>Trachyspermum roxburghianum</i>) seed powder	300 mg
Bayavidanga (<i>Embeliaribes</i>) seeds powder	400 mg
Pure Nux-vomica (<i>Strychnos nux-vomica</i>) seed powder	400 mg
Palas (<i>Butea monosperma</i>) seed powder	600 mg
Pumpkin (<i>Cucurbita maxima</i>) seed powder	3000 mg
Jira (<i>Cuminum cyminum</i>) seed powder	4000 mg
Arecanut (<i>Areca catechu</i>) powder	3000 mg

Total 12 gm

The above raw herbal ingredients were procured from the local market and sun dried, then all ingredients were ground up in mixer grinder separately to make it fine powder and mixed in the ratio indicated above.

ii) For mite control:

a) Dermeez® consisting of Cypermethrin high-cis 100 gm/litre.

b) Herbal miticide:

Neem (<i>Azadirachtaindica</i>) oil	–	50 ml
Karanj (<i>Pongamia glabra</i>) oil	–	50 ml
Camphor (<i>Camphor officinarum</i>)	–	10 gm
Sulphur	–	10 gm

The commercially available oil of Neem and Karanj were mixed in 50:50 ratio and to this camphor (10 g) and Sulphur (10 g) added to make a suspension mixture. This herbal acaricide was applied with cotton or soft cotton cloth on the whole body of animals. Statistical analysis was done as per the methods described by Snedecor and Cochran (1968) [2].

Result and discussion

The first group of growing piglets having natural common G.I. helminths and mite infestation were treated with chemical anthelmintic i.e. Fenbendazole + Praziquantel and chemical miticide as Cypermethrin. All the animals were completely cured from G.I. helminths on 10th day post treatment onwards which indicated that the chemical anthelmintic was found to be highly effective against common G.I. helminths. Similarly, these animals also became negative for *Sarcoptes scabiei* from 15th day post treatment with the chemical miticide. For the comprehensive control of common G.I. helminths and mite infection acquired by the piglets born from parasite free pregnant sows on or after 35th to 40th days after birth, were also treated with the same chemical anthelmintic and miticidal control packages. The infected piglets also became negative for both endo and ectoparasites after application of the drugs. For a long time sustainable and comprehensive control of endo and ectoparasite, these animals were treated at intervals with the same drugs as and when reinfection appeared so that animals could be kept parasite free upto the entire period of observations. If the results of G.I. helminths control package given to different age group of pigs were compared with the findings of others, it was evident that the results of the present investigations were in general agreement with the reports of earlier workers [1, 3, 4, 5, 6, 7]. Likewise, the results of the chemical miticidal control package applied to the pigs of different ages were almost similar to the observations of [1, 8, 9, 10, 11, 12, 13]. The perusal of literature indicated that only limited references were available for the long term sustainable comprehensive control of both endo and ectoparasites simultaneously with chemical anthelmintic in pigs, the findings of the present study were almost similar to the observations of Prasad *et al.* (2001) [1]. Hence, there is need to carry out similar trials of comprehensive sustainable control of both types of parasitic infections on larger population of

pigs at different ages under different farming situations for confirming the results of the present study. The second set of experiment was conducted to control G.I. helminths and mite infections in growing piglets with herbal anthelmintic and miticidal control packages. The findings obtained indicated that the herbal miticidal agent was found to cure all the animals by 15 DPT whereas the herbal anthelmintic could eliminate most of the G.I. helminths by 25th DPT. There was lack of information on the use of herbal anthelmintic for the control of internal parasites in pigs. Though the herbal anthelmintic was found a slow acting medicine but the preparation could be an alternative anthelmintic for the poor farmers residing in remote rural areas especially in Jharkhand where such herbal plant products are abundant in villages surrounded by forests. The control of mange mites in pigs by herbal miticides have also been reported earlier worker [13, 14, 15] in pigs. Their results were almost similar to the findings of the present study. The present study, however, showed that the treatment of mange mites in pigs with herbal ingredients available in villages could be an effective, economical and convenient control measures useful for the pig farmers in rural village conditions. Piglets born from parasite free pregnant sows were found to acquire infection of both endo and ectoparasites from 35th to 40th days after birth were also treated with the same herbal anthelmintic and miticidal control packages. The observations indicated that all the piglets became free from both the infections upto 98 percent and above. Due to unavailability of literature about comprehensive control of parasitic infections from early life in growing piglets, the present results could not be comparatively discussed. However, the application comprehensive control measures from early stage of life of piglets appeared very useful.

Haematological observations during chemical and herbal anthelmintic and miticidal control packages applications in pigs

Haematological profiles of growing piglets during common G.I. helminths and mite infestation and chemical and herbal anthelmintic and miticides treatment were carried out to monitor the health status of the infected and treated animals. The findings of the studies showed that for assessing the effectiveness of chemical and herbal anthelmintic and miticides against common G.I. helminths and Sarcoptic mite infestation in pigs. The variation in haematological parameters also indicated that the harmful substances produced by G.I. helminths and mite probably caused significant decrease in the values of Hb, PCV and TEC before treatment but these values however, were found to return almost towards the normal ranges on different days post treatment observations. Almost similar results were also

reported [1, 13, 14, 16, 17] in helminthes and mite infected pigs and subsequently treated with respective drugs. The marked reduction in Hb, PCV and TEC value in G.I. helminths and mite infested pigs were also supposed to have occurred due to the suppressive effects of the toxic substance secreted or excreted by the G.I. helminths and sucking of blood and tissue fluid by the mite and the decreased feed intake due to constant irritation caused by mites leading to deficiency of essential nutrients needed for normal haemopoiesis [1, 17].

Biochemical observations during chemical and herbal anthelmintic and miticidal control packages application in pigs

Biochemical changes of growing piglets, pregnant sows and piglets born from parasitized and parasite freed pregnant sows during common G.I. helminths and mite infestation and treated with chemical and herbal anthelmintic and miticides control packages were studied in respect of Ca, P, Zn, Cu, TSP and Albumin. The values of these were found to remain at reduced levels during infections in all the experimental animals but they got significantly ($P < 0.01$) improved on 20th day post treatment in growing piglets and pregnant sows and on 60th day post birth (DPB) treatment in piglets born from parasite freed pregnant sows. Similar observations were also reported by earlier workers [14, 17] in mange affected pigs and Rajguru *et al.* (2002) [17] and Lakra *et al.* (2007) [17, 18] in G.I. helminths infected goats. The reduced biochemical profiles observed in the present study could be due to harmful effects caused by the parasites on the host in the form of direct damage of intestinal mucosa resulting in malabsorption and interference in the uptake of micro and macro elements and then increased values of the same parameters after treatment indicated the stoppage in release of the harmful substances produced by the common G. I. helminths and mite. The estimations of different haemato biochemical parameters during parasitic infections and subsequent treatments could also be useful in determining the appropriate line of treatments with specific and supportive drugs in time for keeping the farming animals in good health and optimum production.

Conclusion

The chemical and herbal helminths and mite control packages were found very suitable and useful for long term comprehensive control of common endo and ectoparasites in Deshi pigs. The long term chemical and herbal endo and ectoparasitocidal control packages were found very encouraging for maintaining optimum health and economical production characters in Deshi pigs. However, the present findings need more replicated trials in different cross-bred and pure bred animals under different farming conditions.

Table 2. Efficacies of Fenbendazole + Praziquantel and herbal anthelmintic parasite control packages against common G.I. helminths* infecting growing Deshi piglets

Groups (No. of animals)	Drugs used	Dosage	Average pre-treatment EPG (0 day)	Average post treatment EPG and efficacies (%)						
				3 rd day	7 th day	10 th day	14 th day	17 th day	20 th day	25 th day
I (6)	Fenbendazole + Praziquantel + supportive drugs	200 mg/30 kg body weight, orally, single dose	1950 ±147.8	500 ±57.7 ^a (74.35)	216.6 ±30.7 ^a (88.89)	00.00 (100)	00.00 (100)	00.00 (100)	00.00 (100)	00.00 (100)
II (6)	Herbal anthelmintic + Supportive drugs	500 mg/kg body weight, twice daily for 7 days	1816.66 ±230.1	1125 ±130.2 ^b (38.08)	700.0 ±81.7 ^b (61.45)	333.30 ±49.4 ^a (81.65)	86.00 ±15.28 ^a (95.25)	56.33 ±8.18 ^a (96.90)	27.50 ±3.5 ^a (98.48)	00.00 (100)
III (6)	-	-	1850 ±99.1	2133.33 ±111.68 ^c	1950 ±99.2 ^c	2200 ±121.13 ^b	2300 ±148.3 ^b	2350 ±201.2 ^b	2516.66 ±117.83 ^b	2402 ±105.25
CD value				311.52	229.80	191.48	258.50	350.44	309.41	

*Common G.I. helminths – *A. suum*, *T. suis*, *O. dentatum*, *Strongyloides spp.*, *F. buski*, *S. suis* and others.

Table 3: Efficacies of Cypermethrin and Karanj oil + Neem oil + Camphor + Sulphur packages against mite infesting growing Deshi piglets

Groups (No. of animals)	Drugs used	Dosage	Average pre-treatment mite count in 6 cm ² area (0 day)	Average post-treatment mite count and efficacies (%)				
				3 rd day	6 th day	9 th day	12 th day	15 th day
I(6)	Cypermethrin + supportive drugs	2 ml/litre of water, topical, twice in a week	110.33 ±5.27	77.5 ±3.74 ^a (29.73)	53.16 ±2.63 ^a (51.80)	33.16 ±1.64 ^a (69.93)	3.16 ±0.47 ^a (97.13)	00.00 (100)
II(6)	Herbal miticide + supportive drugs	Topical daily for 5 days	116.5 ±4.65	101.16 ±3.68 ^b (13.13)	64.16 ±2.71 ^b (44.89)	35.00 ±1.41 ^a (69.95)	12.00 ±0.78 ^b (89.69)	00.00 (100)
III(6)	-	-	108 ±7.34	120.5 ±10.32 ^c	117 ±8.96 ^c	99.66 ±6.61 ^b	106.66 ±3.90 ^c	126.66 ±4.77
CD value				17.68	20.14	12.11	6.96	8.30

Table 4: Comprehensive sustainable therapeutic control of common G.I. helminths and mite infestation in growing Deshi piglets

Groups (No. of animals)	Nature of infection	Drugs	Mild (+ to ++) reinfection appeared on DPT						Treatments repeated on	Status of infection
I (6)	Common G.I. helminths	Fenbendazole + Praziquantel + Supportive drugs	80 th	170 th	260 th				Next day of reinfection	Completely cured, stool negative for EPG
	Mite	Cypermethrin + Supportive drugs	105 th	190 th	270 th				-do-	Completely cured, Skin scraping negative for mite
II (6)	Common G.I. helminths	Herbal anthelmintic+ Supportive drugs	65 th	140 th	235 th				-do-	Completely cured, stool negative for EPG
	Mite	Herbal miticide + Supportive drugs	80 th	150 th	220 th				-do-	Completely cured, Skin scraping negative for mite
III (6)	Common G.I. helminths		EPG						-	++ to +++ remained during period of observation
			65 th	80 th	140 th	170 th	235 th	260 th		
	Mite		Mite count							
			80 th	105 th	150 th	190 th	220 th	270 th		-do-
			125 ±7.8	150 ±5.2	130 ±4.3	140 ±5.3	153 ±4.8	158 ±7.9		

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