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Impact of Herbal and Chemical Miticidal Treatments in Growth Performance in Pigs Infested with *Sarcoptes scabiei*

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The study evaluated the efficacy of two treatments – Ivermectin and a herbal mixture comprising Neem oil (50 ml), Karanj oil (50 ml) and Camphor (10 gm) – on the growth performance of pigs infested with *Sarcoptes scabiei*. Eighteen pigs with confirmed Sarcoptic mange were divided into

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three groups of six each. Group A received Ivermectin Group B was treated with the herbal mixture and Group C served as an untreated control. The long term application of Ivermectin and the herbal mixture (Neem oil-50 ml + Karanj oil-50 ml + Camphor -10 gm) control packages in pigs naturally infested with *Sarcoptes scabiei* were found to have significantly positive bearing on the growth performance of the ectoparasite control package (ECP) treated animals. The observations clearly revealed the corresponding increase in body weight of 8 kg and 8.66 kg in the Ivermectin and the herbal mixture treated pigs, respectively as compared to the infected untreated pigs. Both treatment groups exhibited significant improvements in growth rates compared to control groups.

Keywords: Pigs; Sarcoptes scabiei; ectoparasite control package; ivermectin.

1. INTRODUCTION

In India, Pig farming play a major role in improving the socio- economic status of weaker rural community in remote countryside. Among the various skin diseases affecting pigs, *Sarcoptes scabiei* infestation has been found to cause marked reduction in their health condition and production capability (Dalton and Ryan, 1988; Prasad et al., 2001; Ronald et al., 2005 & Laha, 2021). Conventional treatment of scabies involves oral/ injectable/ topical application of chemical anthelmintics which involves limitations of toxicity, onest of parasitic resistance,residual effect and environmental contamination (Bernigaud et al., 2019). Herbal remedies are currently widely widely being used in folkfore medicine to combat these shortcomings. Neem oil extracted from *Azradirachta indica* has a wide range of therapeutic properties including acaricidal effect against mange mites (Gopinath et al., 2018; Pasipandya et al. 2021). Karanj oil is a product from of seeds of tree Pongamia glabra found abundantly in India possessing insecticidal and acaricidal activities. Showing tremendous prospect of use as bio-pesticides (Kumar et al., 2005).

Also there is lack of information on the economic losses caused by the ectoparasites. Therefore, the present experimental trials were undertaken to know the economic impact of mite infestation in pigs and its control by herbal and chemical miticidal agents.

2. MATERIALS AND METHODS

Eighteen growing pigs of about 2-3 months having natural infection with *Sarcoptes scabiei* were selected after skin scraping examination (Sen & Fletcher, 1962; Soulsby, 1982). They were maintained separately in three groups having six animals in each. The group I pigs were treated with single injection of Ivermectin @ 300 µg /kg body weight subcutaneously and the Group IInd animals were applied five times topically with Neem oil (50ml) + Karanj oil (50 ml) + Camphor (10gm) on alternate days and Group IIIrd pigs were kept as infected untreated control to compare the observation on the body weight gain/loss in growing pigs during mite infestation and simultaneous treatment with two different miticidal packages. The growth performance of all the pigs was recorded at monthly interval up to 210 days post- treatment (DPT). All the pigs were maintained on usual feeds and fodders. In the treated groups supportive drugs like liver stimulant, mineral mixture and haematinics were also given as and when needed. The body weight gained by animals in each group was used to calculate the net profit per animal in rupees by accounting Rs 60 as the cost of per kg live weight. The data was analysed by ANOVA (Snedecor & Cocharan, 1994) and the means having significant differences were ranked as per Duncan's multiple range test (Duncan, 1955).

3. RESULTS AND DISCUSSION

The observation taken (Tables 1 & 2) on the body weight gain/loss (kg) in pigs during mite infestation and simultaneous treatment with Ivermectin and the herbal mixture of Neem oil + Karanj oil + Camphor revealed 8 kg (480.00) and 8.66 kg (519.60) net gain / animal respectively on 210th DPT. The average body weight gain of infected untreated control pigs (Group III) was found to be significantly lower than the control packages treated pigs. Dalton and Ryan, (1988) have also observed increased growth rate after Ivermectin treatment of mite infested pigs. Hence, for the comparative discussion of the observations on the body weight in other animals infested with *S. scabiei* have also been included. The decreased body weight gain due to mite infestation and the subsequent weight gain after treatment of mite infestation have also been reported by (Kirkwood, 1980; Salma et al., 2021) in sheep and Hannan et al., (2001) in goats. Thus, the results of the present

Table 1. Average body weight of growing pigs during *Sarcoptes scabiei* infestation and simultaneous treatment with mite control package (MCP)

Observation periods (days)	Group I (6) (Kg)	Group II (6) (Kg)	Group III(6) (Kg)
0	9.00 ±0.47[a]	8.66 ± 0.33[a]	8.83 ± 0.29[a]
30	13.16 ±0.62[a]	12.83 ± 0.45[a]	12.00 ± 0.40[a]
60	17.83 ±0.80[a]	17.33 ± 0.57[a]	16.00 ± 0.57[a]
90	22.50 ±1.19[a]	23.50 ± 0.69[a]	20.50 ±0.65[a]
120	28.83±1.02[b]	29.66 ± 0.87[b]	25.16 ± 0.92[a]
150	37.66±1.08[b]	38.33 ± 0.95[b]	32.66 ± 1.05[a]
180	49.00±1.13[b]	49.83 ± 0.83[b]	42.66 ± 1.38[a]
210	61.33 ±1.26[b]	62.00 ± 0.94[b]	53.33 ± 1.79[a]

Gr I – Ivermectin treated Gr II- Neem oil (50 ml)+ Karanj oil (50 ml)+ Camphor (10 gm) treated
Gr III Infected untreated control
Figures under the same superscripts in a row do not differ significantly

Table 2. Economics of productions during *Sarcoptes scabiei* infestation and simultaneous treatment mite with control packages

Groups	Total weight (kg)	Total gain body weight gain (kg)	Economic value taking Rs 60/kg live weight	Cost of treatment	Approx profit/ 6 animals (Rs)	Approx profit /animal (Rs)
Gr I (Ivermectin treated)	368 (61.33 x6)	48 Gr I – Gr III	2880.00	170.00	2710.00	451
Gr II (Neem oil + Karanj oil+ Camphor treated	372 (62 x6)	52 (Gr II –Gr III)	3120.00	169.00	3051.00	505
Gr III (Infected treated)	320 (53.33 x6)	-	-	-	-	-

experiment showed that the considerable economic losses in respect of slaughter weight could be minimized by the long term application of either chemical or herbal ectoparasite control packages against mite infestation in pigs.

4. CONCLUSION

These findings suggest that both Ivermectin and the herbal mixture (Neem oil, Karanj oil and Camphor) are effective in mitigating the adverse effects of sarcoptic mange on pig growth performance. The herbal treatment offers a viable alternative to conventional chemical acaricides, potentially reducing reliance on synthetic drugs and contributing to sustainable livestock management practices.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that generative AI technologies such as Large Language Models etc have been used during the writing or editing of manuscripts. This explaination will include the name version, model and source of the generative AI technology and as well as all input prompts provided to the generative AI technology.

Details of the AI usage are given below:

1. AI (Chatgpt) was used for paraphrasing purposes only.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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