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ENHANCEMENT OF IMMUNITY OF SHEEP POX VACCINATIONS WITH LEVAMISOLE AND BIOPLEX

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ABSTRACT

In order to find out the efficacy of Levamisole and trace minerals on the enhancement of sheep pox, A study was conducted in different flocks of 49409 sheeps during 2013 and 2016. The sheeps were divided into 3 groups as **A**, **B** and **C**. In group **A**, no medication but only vaccinations were conducted and in group **B** medication and vaccinations were done. In group **C**, the affected only provided with medication twice, with 4 day apart were done. It is observed that the sheep in **B** and **C** were in good weight, and active. it was further observed that sheep in group **C** had more than 2 years of protection compared to group **A** and **C**

Key words - sheep pox, Levamisole, micro minerals, immunity.

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Introduction

Vaccination comprises the use of attenuated, killed, or recombinant organisms for stimulation of the body's immune response that recognizes the injected organism as a foreign antigen, resulting in clearing the antigen and developing memory cells in the body. Vaccination is the cheapest, reliable, effective, economical, affordable and suitable alternate for prevention of diseases in [1]. Live vaccines comprise a virulent virus whose pathogenicity has been weakened through consecutive cultures in living cells but the virus maintains its immunogenic antigenicity for stimulating the body's immune response; this whole process is commonly known as attenuation [2]. Killed vaccines comprise viruses whose pathogenicity has been inactivated through the use of physical and chemical means, but the protein coat structure has been maintained, which acts immunogenic. Vaccination of animals does not always induce an effective immune response several factors have been reported to affect the immune response following vaccination (nutritional status, stress, weather extremes, passive transfer of maternal antibodies, vaccination route, vaccine handling). Nutritional status, and particularly mineral levels, has been demonstrated to impact livestock health and performance (3, 4). Trace minerals such as Zinc, Manganese, Copper, and Selenium are important for optimal immune function (6, 7, 5)

So, there is dire need to enhance immunity by employing some agents called immunostimulants or immunopotentiators (8) which are biological or synthetic agents initiating both humoral and cell mediated defense mechanisms through activation of macrophages, neutrophils, natural killer cells, T lymphocytes and production of lymphokines

In veterinary medicine, immunostimulant agents are most commonly used for treatment and prevention of infectious diseases and also used to improve immunosuppression caused by nutritional deficiency, physiological and environmental stress (9, 10, 11, and 12).

Levamisole, an imidazole-thiazole group derivate, is an effective and safe broad spectrum anthelmintic commonly used in veterinary and human medicine (13). It is an immunomodulator and exerts an immunostimulant action in different animal species when administered at repeated doses of 2.5 mg/kg prior to vaccine being administered. Immunostimulating effects are not well understood. It is believed that an immunomodulator restores cell mediated immune function in peripheral T-lymphocytes and phagocytosis by monocytes (14,15). Stella et al 2014. (16) Demonstrated the immune stimulating effect of levamisole on BT vaccination in sheep due to an improvement in their general condition with a decrease of helminthic infestation and a direct effect on immunocompetent cells.

Zinc is an important trace element in all organisms and plays role as a cofactor in

more than 300 enzymes having influence on different organ functions. Zn is necessary for normal growth and function of immune system. It influences both innate and acquired immunity (17)A zinc deficiency results in atrophy of the thymus(18) and an increase in leukocyte count (evidence of infectious disease) with a reduced number of lymphocytes. Immature (band) neutrophils are also elevated in zinc-deficient animals. Because the thymus is important in T-cell formation, the effect of zinc on this phase of the immune system has received considerable research attention in recent years (19).Manganese functions as a component of a number of enzymes, including hydrolases, kinases, transferases, and decarboxylases, Pyruvate carboxylase, a Manganese dependent metalloprotein, plays a role in normal lipid and carbohydrate metabolism (20), and in the mitochondria, a Manganese-Superoxide dismutase, assists in the protection of cells from free radicals (21).

Materials and methods

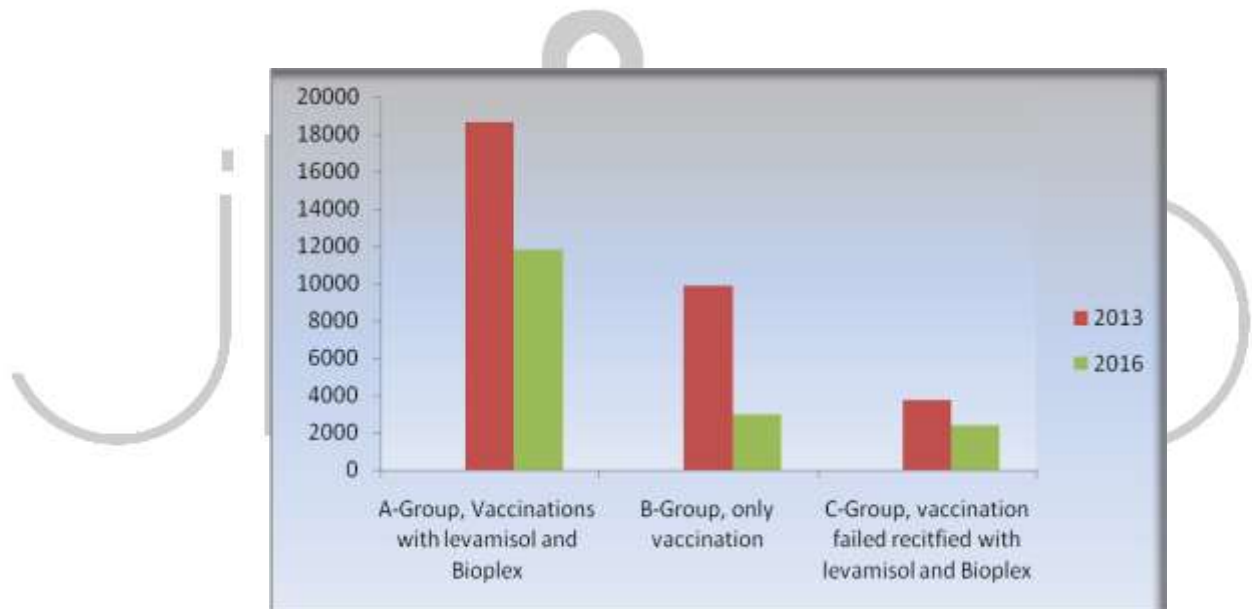
Fifty three shepherds with the flock strength of 49,409 sheeps approached Sreepathi veterinary services, kadapa to protect their flock against the sheep pox and treat the sheep pox due to complication and failure of vaccinations during 2013 and 2016.The experimental sheep were grouped as A,B,and C groups.(Table 1)

The vaccine was purchased from Indian immunologicals limited, Hyderabad. Bioplex High Seven Boli (a brand name of Alltech, Bangalore with Zinc 360 mg, Manganese 143 mg, Copper 60mg Iodine 14.5 mg, Cobalt 6.25 mg ,Selenium 1.5 mg and Chromium 1.68 mg). Vetramed (a brand product of Curvet formulations, Hyderabad, containing 30 % levamisole hydrochloride, were also procured. Ten boil of Bioplex were soaked in one litre of drinking water over night and 50 grams of levamisole were added to the litre and stirred up thoroughly. This mixture was drenched with help of a disposable syringe @ 10 ml per adult and 5 ml per lamb one day before or one day after the vaccinations in group a sheep's only for once. The same mixture was administered twice with 4 days apart to Group C sheep and antibiotic coverage was given severely affected sheep for 3 days consecutively.

Table 1. Treatment for different groups of sheep

S.No	Year	A-group vaccinations with Levamisole and Bioplex	B-group Only vaccinations	C-group Vaccinations failures rectification with Levamisole and Bioplex	Remarks
1	2013	18642	9865	3755	Failure due to cold chain either at distributor or at vaccinator
2	2016	11780	2986	2381	

Figure: 1. Graphical representation of treatment provided to different groups of sheep



Observations

It is observed that there is no ill effect of drenching levamisole and micro minerals together in group **B**, The sheep were healthy and active than those in group **A**. The vaccinated groups were followed up for 3 years. There is no recurrence of "

disease in group **B** for 2 years. In **A**, in the group **A** the sheep pox reoccurred in from 8 to 12 months. In group **C**, the virulence of infection, reduced and the affected sheep responded to antibiotic treatment. After second drenching of the mixture, the pox infection was brought to normal; the sheep

in group **c** improved, put on weight gain and were active.

Discussion

The performance in group **B** and **C** were due to synergistic effect of Levamisole and micro minerals and due their immune potentiating action. Samanta et al. (23) found out that, vitamin E supplementation in the diet of calves might enhance the humoral immunity of them against *Pasteurellamultocida* whole cell antigen. Levamisole stimulated the increase in IgM levels and zinc stimulated the increase in IgG levels without inducing adverse effect and the increase in antibody production resulted in the enhancement of humoral immune response to enterotoxemia vaccine. Kizil and Gul (24) administered vitamin AD3E with Foot and Mouth Disease (FMD) vaccine to a group of cattle. The result was a good protection against FMD. Naimi et al. (25) studied the effect of vitamin AD3E on performance and humoral immune response in broiler chicks and concluded that vitamin AD3E has enhanced humoral immunity probably due to the role of vitamin E which has increased lymphocyte activity. Oral supplementation with 75 mg organic zinc significantly increased the persistence of anti-rabies antibody titers in sheep, and it improved the vaccine coverage of the primary vaccination. (26)

Conclusion

It is concluded that Levamisole and micro minerals enhanced the immunity profile of sheep pox vaccinations significantly in supplemented sheep than unsupplemented ones. The supplemented sheep had weight gain and sound health than unsupplemented ones.

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