IMMUNOTOXIC EFFECTS OF INSECTICIDES IN SHEEP

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Incresed pesticide use has resulted in environmental contamination and their residues in most food stuffs including cereals, vegetables, oils, eggs, milk and meats. The continuous intake of low levels of pesticides by man and animals may cause various deleterious effects in body including immunotoxic, carcinogenic,neuropathic etc. To study the effects of chronic low dose level exposure of four commonly used insecticides in sheep, 20 lambs of about 6 months of age were randomly divided into 5 groups of 4 lambs in each group. One group was kept as control and four groups were given orally lindane (1.25 ppm), monocrotophos (0.025 ppm), carbofuran (2.5 ppm) and fenvalerate (1.25 ppm) daily for six months. All the lambs were vaccinated with *Brucella melitensis* rev. I at day zero and day 90. Blood samples were taken at 10 days interval and analysed for various immunological and hematobiochemical parameters.

No apparent clinical signs were noticed in lambs of any of the group throughout the period of study. In pesticide fed groups, there was leukopenia, lymphopenia and reduction in delta optical density of ConA and PHA stimulated lymphocyte culutures from peripheral blood as well as spleen and mesenteric lymphonodes, which indicate the suppression of cellular immune response. Reduction in cell-mediated immune response was further confirmed by decreasd DTH reaction, fewer NBT positive macrophages and decreased bactericidal activity of peritoneal macrophages in lambs exposed to insecticides as compared to control lambs. The total serum protein, serum

globulin, serum albumin and gamma globulins were decreased in pesticide fed groups in comparison to control group. The enzyme serum cholinesterase was found reduced in lambs treated with monocrotophos and carbofuran. Antibody titre against *Brucella melitensis* was also significantly lowered in lambs administered insecticides as measured by ELISA and SAT, indicating the suppression of humoral immune response.

The necropsy examination revealed decreased splenic weight in lambs treated with insecticides. Histopathological examination resulted the depletion of lymphoid cells in spleen and mesenteric lymphnodes of animals exposed to insecticides, while liver did not show any histological alteration. Electron microscopy revealed the necrotic changes in the mature and dividing lymphocytes in lymphoid organs of pesticide fed lambs. Kidneys of the lindane fed group revealed degenerative and inflammatory changes with infiltration of mononuclear cells along with deposition of immune complexes in glomeruli.

The present study concludes that the organochlorine compounds are most immunotoxic followed by organophosphate, carbamate with synthetic pyrethroid being the least immunotoxic in sheep.