EFFECT OF *OCIMUM SANCTUM* DRY LEAF POWDER ON IMMUNE RESPONSE IN BROILERS FED OCHRATOXIN

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ABSTRACT

A study was conducted to evaluate the immunomodulatory property of *Ocimum Sanctum* dry leaf powder in ochratoxin supplemented fed broilers. Day old, 108 broilers were distributed into nine groups in duplicate. Serum was collected on day 15th, 25th and 35th and humoral immunity in broilers towards New castle disease was measured. Significantly lower titer against NDV was observed in broilers receiving ochratoxin, on 15th, 25th and 35th day. Broilers receiving 4 g *Ocimum Sanctum* dry leaf powder / kg feed showed highest NDV titer followed by broilers receiving 2 g *Ocimum Sanctum* dry leaf powder / kg feed. Significantly ($P<0.05$) improved haemagglutination inhibition titer was observed in group fed 4 g *Ocimum Sanctum dry* leaf powder / kg feed along with 4 ppm ochratoxin on 15th and 35th day in comparison to broilers fed only ochratoxin.

KEY WORDS: *Ocimum Sanctum*, Humoral immunity, haemagglutination inhibition

INTRODUCTION

Ochratoxin three times more dangerous than aflatoxin. It is reported to be nephrotoxic, hepatotoxic, teratogenic and immunosuppresive, causing a drastic reduction in the lymphoid cell population. As a natural contaminant of poultry feed stuff it produces detrimental effects on the immune and other systems of broiler chicks (Elissalde *et al.*, 1994). Its level in suspected feed and ingredients ranges from <0.2 to 16 ppm. *Ocimum Sanctum* have wide geographic distribution, is easily procured and economical. In Ayurveda *Ocimum Sanctum* leaves are described as “rasayana” as they posses anti-inflammatory, antioxidant, antistress, antimicrobial, immunomodulatory and antitoxigenic properties (Renzulli et al., 2004). Similarly a herb *Mentha Piperita* was found effective in reducing the adverse effects of 2 ppm ochratoxin on some biochemical parameters (Nayak *et al*., 2014). In vitro studies have reported inhibitory effect of essential oils of *Ocimum Sanctum* on *Aspergillus ochraceus* growth and ochratoxin production. So, the present study was designed to evaluate “in vivo “effect of *Ocimum Sanctum* on the immune response in broilers fed ochratoxin.

MATERIALS AND METHODS

The study was conducted in the Department of Veterinary Microbiology, College of Veterinary Science and Animal Husbandry, Jabalpur, Madhya Pradesh. *A. ochraceus* NRRL 3174 culture was obtained from the Microbial Type Culture Collection and Gene Bank, Chandigarh. Ochratoxin was produced in cereals according to the method described by Trenk *et al*. (1971). Quantification of ochratoxin was performed at Animal Feed Analytical and Quality Control Laboratory (A.F.A.Q.C.L.) Veterinary College, Namakkal (Tamil Nadu). The medicinal plant *Ocimum Sanctum* was obtained from Department of Aromatic and Medicinal plants, College of Agriculture, Jawaharlal Nehru Krishi Vishwa Vidalaya, Jabalpur. Day old 108 broiler chicks of either sex were procured from M/S Phoenix Hatcheries, Jabalpur and chicks were randomly assigned to Nine groups in duplicate as below.

Table 1:	Experimental group
Groups	Treatments
Group I control	Only broilers ration (Standard Feed)
Group II	Standard Feed+2 ppm Ochratoxin
Group III	Standard Feed+4 ppm Ochratoxin
Group IV	Standard Feed+2g Ocimum Sanctum / Kg feed
Group V	Standard Feed+ 4g Ocimum Sanctum / Kg feed
Group VI	Standard Feed+ 2 ppm Ochratoxin + 2g Ocimum Sanctum / Kg feed
Group VII	Standard Feed+ 2 ppm Ochratoxin + 4g Ocimum Sanctum / Kg feed
Group VIII	Standard Feed+ 4 ppm Ochratoxin + 2g Ocimum Sanctum / Kg feed
Group IX	Standard Feed+ 4 ppm Ochratoxin + 4g Ocimum Sanctum / Kg feed

Humoral immunity towards New castle disease was measured on 15th, 25th and 35th day by the Haemagglutination inhibition test according to the method of Office International Des Epizooties (2005). Means were obtained and the differences between treatments and within each treatment were tested statistically for their significance (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The mean haemagglutination inhibition (HI) titer of broiler chicken fed ochratoxin along with Ocimum Sanctum are mentioned in Tables 2.

Table 2 : Mean values of haemagglutination inhibition test (HI) in broiler chickens fed ochratoxin with and without Ocimum Sanctum (on 15th, 25th and 35th day)

Groups	Treatments	HI titer ($\log_{10}$)		
		15th day	25th day	35th day
I	control	1.956^{c}	2.107^{c}	2.558^{c}
II	2 ppm OT	1.505^{e}	1.354^{d}	1.204^{e}
III	4 ppm OT	1.204^{f}	0.930^{f}	0.450^{g}
IV	2g *Ocimum Sanctum*	4.063^{a}	4.364^{a}	4.966^{a}
V	4g *Ocimum Sanctum*	3.612^{b}	3.762^{b}	4.515^{b}
VI	2 ppm OT + 2g *Ocimum Sanctum*	1.655^{d}	1.956^{c}	2.107^{c}
VII	2 ppm OT + 4g *Ocimum Sanctum*	1.540^{d}	1.505^{cd}	1.806^{d}
VIII	4 ppm OT + 2g *Ocimum Sanctum*	1.655^{d}	1.354^{d}	1.204^{e}
IX	4 ppm OT + 4g *Ocimum Sanctum*	1.505^{e}	1.204^{de}	0.752^{f}
CD SE	$P < 0.05$	0.3283 0.0987	0.2997 0.0866	0.3460 0.1000

Values bearing similar superscripts in the same column do not differ significantly (P>0.05)

The birds receiving only 2 ppm and 4 ppm ochratoxin showed the minimum titer compared to all groups, including the control at all three intervals of 15th, 25th and 35th days. OT administration decreased HI titre during all the treatment interval in linear trend ,however the decrease was highest on 35th day of treatment .The birds receiving only 2g of *Ocimum Sanctum* leaf powder / Kg feed recorded the highest titer among all groups followed by 4g *Ocimum Sanctum* / Kg feed. Ocimum Sanctum when administered to birds along with ochratoxin, showed an improvement in HI titer compared to the toxin when given alone. However, increase in the titer was noted by addition of 2 g was higher compared to addition of 4 g *Ocimum Sanctum* / Kg feed to the toxin. The immune response in birds administered ochratoxin alone in feed showed a drastic reduction in titer, with 4 ppm ochratoxin the HI titre was low as compared to 2 ppm of the toxin.

Decrease in immune response due to ochratoxin fed to birds has also been reported by Kalorey *et al.* (2005). Ochratoxin is reported to cause a regression of lymphoid organs, depletion of lymphocytes and reduction in the immunoglobin IgA, IgG and IgM. Creppy *et al.* (1983) attributed the suppressed immune response to inhibition of protein synthesis caused by the toxin. Ocimum Sanctum leaf powder also increased the titer with 4.0 g of leaf powder but giving a higher titer at 2.0 g / Kg feed. At higher dose of essential oil of Ocimum Sanctum birds showed some toxic effects as evidenced by hemorrhages on thigh muscles (Gupta and Charan, 2005), this could be the reason for higher titer at 2.0 g/ Kg feed in comparison to 4.0 g of leaf powder.

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