

STUDIES ON FREE AMINO ACID CONTENT IN CESTODE INFECTED WHITE LEG HORNS (*GALLUS GALLUS*) TREATED WITH PETROLEUM ETHER EXTRACT OF *BUTEA FRONDOSA* (MODUGA-T)

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ABSTRACT:

In the present investigation the effect of the plant [Butea frondosa (MODUGA-T)] petroleum extract for the elimination of cestode parasites from the common white leg horns (Gallus gallus) was done. The plant extract was Buteasol is obtained by using petroleum ether and designated as Butea / PET. The final therapeutic dose was 1200 mg/kg/ body weight; this was quite effective in controlling helminthic infection in general and cestodial infection in particular. The investigation was concentrated on quantitative estimation of free amino acid content in the selected tissues like heart, liver, small intestine. When compared to the controlled and treated birds the levels of free amino acid are decreased in infected birds.

Key words: *Butea-frondosa, Gallus gallus, birds, Free amino acids, Cestode.*

INTRODUCTION:

Helminth infections are widespread worldwide; one third of world's inhabitants contains them, but is more frequent in tropical and subtropical countries with lesser personal and ecological hygiene (1). In developing countries they create an enormous hazard to public health and add to the occurrence of malnutrition, anaemia, undersized growth and increased resistance to other diseases, mainly in children. Even though a large number of frequency of helminth infections are normally restricted to tropical zones, they moreover transpire to travellers who have visited those regions and several of them can extend in temperate climates (2). Besides human, domestic animals are very vulnerable to helminth infections which append the financial burden of developing countries and also a hitch for cultivation in various developed countries (3). The helminths which infect the intestine are cestodes e.g. tapeworms (*Taenia solium*), nematodes e.g. hookworm (*Ancylostoma duodenala*), roundworm (*Ascaris lumbricoids*) and trematodes or flukes (*Schistosoma mansoni* and *Schistosoma haematobolium*) (3). Escalating inconvenience of resistance growth in intestinal helminths in opposition to synthetic anti-helminthics drugs have led to the application of

medicinal plants for their anti-helminthic activity. The resistance against synthetic anti-helminthics drugs for gastrointestinal worms is a global dilemma of sheep, goat and pig breeding major in substantial economic losses (4). Diseases due to these infections persist to be the most constraint in sustainable livestock production worldwide, mainly due to rapid evolution of drug resistance in these parasites to all classes against synthetic anti-helminthics. Hence, there is an increasing need towards natural anti-helminthics. A number of medicinal plants have been conventionally used in Indian subcontinent to treat diverse helminth infections in animals and humans (5, 6).

Butea frondosa (Moduga . T) is commonly seen growing in India and was in use as an anti-helminthic plant since ages . The fresh seeds are said to be effective anti-helminthic against *Ascaris*. It has been reported by (7) Mukerji and bhaduri (1947) that *Butea* and *embelia* have decided ascaricidal properties. Pharmacological studies with the seeds of *Butea frondosa* aqueous extract gave significantly effective results against *A.galli* at 1.08 gm/kg body weight (8). In an another experiment (9) experimented the efficiency of decoction, aqueous and ethanol extract of *B. frondosa* seeds and reported that the drug inhibited motility of *A. Galli in vitro* and the decoction effected the maturation of embryonated ova. Alcoholic extract of seeds of *Butea frondosa* eliminated 71.2 % of worms (10). Hence, the present study was under taken to show how these worm infestation i.e.,(Cestodial) alters the levels of free amino acids and the effect of the these plant products on cestode parasites.

MATERIAL AND METHODS:

Plant extract:

Butea frondosa plant seed extract was selected in experimentation to test the anthelmintic properties. The Petroleum ether (PET) extract was procured from Prof. G.Srimannarayana, Department of Chemistry, Osmania University, Hyderabad. The extract of this plant was called as Buteasol which may contain palasitrin, sulfurin, coreopsin, butin, butein.

Animals:

A total of 100 birds of one day old chicks are collected from the local hatchery and reared up to eight weeks under the deep litter system. They were prone to natural infection. By faecal examination, the birds are divided into two groups controlled and infected. Then the drug Buteasol was administrated in different grades to the infected birds to extricate the parasites. The decided dose was 1200 mg/kg body weight and autopsy was done on the 9th day. During the experiment a constant vigil was maintained to study the behaviour of the birds.

Institutional animal ethics committee (IAEC) approved the experimental protocol and care of the animals was taken as per guidelines of CPCSEA Department of animal welfare, Govt. of India.

Biochemical study:

The infected birds were weak assuming metabolic disorders. To find out the metabolic disorders in birds, biochemical investigations were carried out in three groups of birds like control, infected, treated. The selected tissues like heart, liver and small intestine were dissected out in cold conditions. The tissues were homogenized in 10%TCA and centrifuged at 3000 rpm and supernatant was used for the estimation of total proteins. Total proteins were quantitatively estimated by the method of Lowry et al, 1951[11] (results not shown in this paper) and Free amino acid content was estimated by using the method of Hyman Rosen, 1957 (12).

RESULTS AND DISCUSSION:

In the three groups of birds like controlled, Infected, treated. The quantitative alterations in protein profiles in the selected tissues were under the influence of parasitic stress are expressed as average \pm SD of six observations. Significant at 5 % level (Tables, 1, 2, 3). The infected birds were weak assuming that metabolic disorders resulting in poor growth, lower egg production and lower efficiency of feed utilization. Metabolic disorders cause immense stress to the birds resulting in production losses. There was a general decrease in total proteins (results not shown here) in infected birds. The parasites depend on their host for the supply of the amino acids or capable of synthesizing these amino-compounds by using *de novo* pathway. Campbell J.W.[13] identified eighteen compounds as free fractions and seventeen amino acids as combined fractions in the form of amino compounds in the organisms.

Table 1: Estimation of free amino acids in heart tissue of fowl (white leg horn) expressed in milligrams per 100 mg wet weight of the tissue. These values are significant at 5 % level.

S.No	Controlled	Infected	Treated with <i>Butea fronsdosa</i>
1	8.600	2.680	8.170
2	8.170	2.666	8.514
3	7.998	2.494	7.654
4	7.396	2.752	6.966
5	7.568	3.452	7.224
6	7.224	3.096	6.450
X ⁻	7.826	2.823	7.496
SD	0.521	0.320	0.770
SE	0.213	0.130	0.314

Table1A: 't' Values for Heart free amino acid content

S.No	Name of the group	t-Value	Probability	Remarks
1	Controlled/Infected	8.542	0.05	Significant
2	Infected/Treated	7.013	0.05	Significant

± = SE (Mean) These values are significant at 5% level.

Table-2: Estimation of free amino acids in liver tissue of fowl (white leg horn) expressed in milligrams per 100 mg wet weight of the tissue. These values are significant at 5 % level.

S.No	Controlled	Infected	Treated with Butea-fronsdosa
1	6.450	2.924	6.450
2	6.450	2.924	6.450
3	6.622	3.096	6.622
4	7.396	2.494	7.310
5	7.568	2.236	7.396
6	6.794	1.806	7.052
X ⁻	6.880	2.580	6.880
SD	0.473	0.495	0.428
SE	0.193	0.202	0.174

Table 2A: 't' Values for liver free amino acid content

S.No	Name of the group	t-Value	Probability	Remarks
1	Controlled/Infected	6.841	0.05	Significant
2	Infected/Treated	7.012	0.05	Significant

Table-3: Estimation of free amino acids in Intestinal tissue of fowl (white leg horn) expressed in milligrams per 100 mg wet weight of the tissue. These values are significant at 5 % level.

S.No	Controlled	Infected	Treated with Butea-fronsdosa
1	5.160	2.322	5.160
2	5.160	2.408	5.160
3	4.988	2.408	5.074
4	4.816	2.064	4.644
5	4.128	1.720	4.472
6	3.784	1.806	4.214
X ⁻	4.672	2.123	4.787
SD	0.579	0.306	0.402
SE	0.236	0.124	0.164

Table 3A: 't' Values for Intestinal free amino acids content

S.No	Name of the group	t-Value	Probability	Remarks
1	Controlled/Infected	4.248	0.05	Significant
2	Infected/Treated	4.964	0.05	Significant

Proteins are essential for living bodies in a more important way than carbohydrates and lipids. They are major constituents of the soft tissue in the animal body. For growth, egg production and repair of tissue wear and tear, a continuous and adequate supply of proteins in the diet of chicken is essential. Transformation of dietary proteins into the egg and body proteins is a very important part of the body nutrition processes. Varying physiological aspects of protein metabolism was reviewed by [14-16]. Protein syntheses in birds are required to a very rapid rate not for compensating the broken tissues of the adult body but also for the production of eggs. The infected birds were weak assuming metabolic disorders resulting in poor growth, lower egg production and lower efficiency of feed utilization. Metabolic disorders cause immense stress to the birds resulting in production loss. Arms et al., (1969)(6) observed the fluxes of Amino acid between the rat and symbiote.

Conclusion:

The plant extract was Buteasol is obtained by using petroleum ether and final therapeutic dose was 1200 mg/kg/ body weight; this was quite effective in controlling helminthic infection in general and cestodial infection in particular. Further work is needed to isolate the bioactive principle involved in these extract for the making new sustainable synthetic drugs against these infection.

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