

A case study on novel natural remedy (*Trichosanthes dioica* Roxb.) against bacillary white diarrhea in broiler chickens

Abstract

The bacillary white diarrhea disease is one of the most threaten disease in poultry birds especially broilers, caused by *Salmonella pullorum*. The major sign of this disease are white diarrhea, in appetite, depression, ruffled feathers, closed eyes, loud chirping, vent pasting, gasping, and lameness. The *Trichosanthes dioica* (family: Cucurbitaceae), commonly known as “Sespadula & Pointed gourd” in English, “Parwal” in Hindi and “Kovakka” in Tamil, is widely grown throughout India. The leaves of this plant have also been used in traditional system of medicine for overcoming problems like constipation, fever, skin infection, wound healing and also in gastric ulcer. In the present study, fine paste of leaves of *T. dioica* was evaluated for its anti bacillary white diarrhea disease on broilers by four days medication. Amoxycillin (10mg/kg of body weight of broiler) was used as the standard drug (T0). Different concentrations (0.5 to 2gm/kg: each concentration of treatment was given once and twice per day- as T1-T6 respectively) of *T. dioica* were administrated with sterile water. The treatment results revealed that the T4, T5 and T6 treatment doses were shown better curing activity (100%) against bacillary white diarrhea. Further, it simultaneously increases the feed intake rate (as T4: 129.9gm, T5: 152.6gm T6: 153.3gm) and gradually increase weight of broiler chicken (as T4: 129.9gm, T5: 152.6gm T6: 153.3gm) than T2 & T3 and results are almost similar with the result of T1 (standard). In conclusion, the present study provides preliminary records on anti bacillary white diarrhea potential of fresh leaves pastes of *T. dioica*.

Keywords: natural medicine, *T. dioica*, antibacillary, *S. pullorum*, diarrhea

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Introduction

The bacillary white diarrhoea disease caused by one of the two poultry-adapted strains of *Salmonella* bacteria, *Salmonella pullorum*, this usually causes mortality in birds only up to 3 weeks of age of broilers. Occasionally it can cause losses in adult birds and brown-shell egg layers.¹ It affects broiler chickens most commonly, but also infects turkeys, game birds, guinea fowls, sparrows, parrots, ring doves, ostriches and peafowl. It still occurs worldwide in commercial systems and non-commercial poultry system. Morbidity is 10-80%; mortality is increased in stressed or immune compromised flocks and may be up to 100%.² The route of infection is oral or via the navel/yolk. Transmission may be transovarian or horizontal mainly in young birds and may sometimes be associated with cannibalism. The bacterium is fairly resistant to normal climate, surviving months but is susceptible to normal disinfectants.¹ The major symptoms of this disease are white diarrhea, in appetite, depression, ruffled feathers, closed eyes, loud chirping, vent pasting, gasping, and lameness.³ Medicinal plants are the foundation of many important drugs of the modern world. In nature many plants and plants seed provided source of medicine at the earlier times. Plants have proven to be the most useful in curing diseases and provide an important source of pharma and medicine for human and livestock animals and birds.⁴ *Trichosanthes dioica* Roxb. (family: *Cucurbitaceae*),

commonly known as “Sespadula & Pointed gourd” in English, “Parwal” in Hindi and “Kovakka” in Tamil, is widely grown throughout India.⁵ Fruits of this plant are used as vegetable in Indian traditional food system from time immemorial. Besides fruits, other parts of the plant, such as the leaves and tender shoots, have also been used in the traditional system of medicine since ancient times.⁶ some specific medicinal properties have been identified, viz., hypocholesterolemic, hypoglyceridemic, and hypophospholipemic when shade-dried fruits were mixed in the food of non diabetic animals.^{6,7} Recently, its seeds and leaves have also been found as anti diabetic agents by Prashant Kumar Rai^{8,9} It also serves as a rich source of vitamin C.⁶ Hence several pharmacological studies have been carried out in different parts of *T. dioica*. Despite, the various claims on *T. dioica* medicinal uses, particularly its potential to heal bacillary white diarrhea diseased broiler chicken, no attempt has been made to our best knowledge. Based on these considerations, a case study was conducted to evaluate the efficiency of *T. dioica* as herbal medicine on bacillary white diarrhoea diseased broiler chicken caused by *Salmonella pullorum*.

Material and methods

Selection of diseased 15 days old broiler chicken

The bacillary white diarrhea diseased broiler chicken was collected from broiler farm of Venkateshwara poultry ltd and

reared in the separate shed. The disease was confirmed by veterinarian doctor of Thiyagadurgam Government veterinary hospital, Kallakurichi, Villupuram district of Tamilnadu, based on their sign of disease white diarrhea, inappetance, depression, ruffled feathers, closed eyes, loud chirping, vent pasting, gasping, and lameness.

Preparation of *Trichosanthes dioica* for treatment

The leaf of *Trichosanthes dioica* plant were freshly collected from the field and washed it with clean water and grinded it to get paste. This paste was dissolved in different concentration with clean water for treatment.¹⁰

Trichosanthes dioica treatment

There was no alteration on broiler diet, i.e as usual standard company feed is fed for all diseased broilers. The commercial drug Amoxicillin was used as a control. Different dose of fine grinded paste was dissolved in pure water as follows for treatment.

The treatments are:

T0: Amoxicillin (10mg/kg of body weight of broiler) as standard

T1: 0.5gm leaf paste of *T. dioica* in 15ml of sterile water at once a day

T2: 0.5gm leaf paste of *T. dioica* in 15ml of sterile water at twice a day

T3: 1gm leaf paste of *T. dioica* in 15ml of sterile water at once a day

T4: 1gm leaf paste of *T. dioica* in 15ml of sterile water at twice a day

T5: 2gm leaf paste of *T. dioica* in 15ml of sterile water at once a day

T6: 2gm leaf paste of *T. dioica* in 15ml of sterile water at once a day

For each treatment three bacillary white diarrhoea diseased broiler chickens were taken and the treatments were triplicated and the total treatment period was 4 days.

Parameters of performance

All the chickens under the study were weighed pre and post treatment and calculated amount of feed consumed. Further disease recovery percentage (%) on day basis (4 days) was measured, based on recovering gradually from white diarrhea, depression, freshness of feathers, healthy eyes, slowly reduced loud chirping, vent pasting, gasping and lameness.

Results and discussion

The results of this study were clearly tabulated on Table 1. It clearly states that the fresh leaf paste of *T. dioica* with different

concentration/dose on bacillary white diarrhea diseased broiler chicken shows different level of results on disease recovery swiftness, feed intake range and chicken lived and changes in weight after treatment. The treatment with T4 & T5 shows effective result on disease curing (100%) and gradually increase the feed intake by diseased broiler (129.9 and 152.6 gm respectively) and it was comparable with the treatment of control (144.7 gm). Further the weight of the chickens was also increased progressively as 370.4 and 378.6 gm on T4 and T5 treatment respectively. However the increase dose of T6 treatment twice per day was also showing similar range of result on bacillary white diarrhea infected broiler by *S. pullorum*. Gang Zhou used and reporter as maggot antimicrobial peptides are effective against *S. pullorum* diseased chicken.¹ The results of the present treatment states that the 2gm (T4 & T5) of fresh leaf paste is optimized range (administrated twice and once per day respectively) for curing the disease and gradually increase the feed intake and not essential of providing increase quantity of fresh paste of *T. dioica*. These results also states that, plant simultaneously increases the feed intake and digestibility nature of broiler under medication, hence it's steadily improve the feed intake by broiler chickens with disease curing. Salaheen et al.¹¹ were carried out similar type of work with different plant sources and revealed that the byproducts of berry juice can be used as alternative and natural inhibitors for *Salmonella gallinarum* and *Salmonella pullorum* on chickens.¹¹ The T1 treatment results were ineffective, since the chickens were died in the middle of treatment. Further, the T2 and T3 concentration treatments were less effective on disease curing (65&80%), feed intake (53.4 &71.3gm) and weight enhancement (320.2 & 358.4 gm). The bacillary white diarrhea disease curing activity of this *T. dioica* plant leaf paste fully depends on the phytochemical property of the plant. This statement was acceptable with the finding of various researchers on *T. dioica*.^{12,13} They declared that the presence of various phytoconstituents like tannins, saponins^{12,14}, flavonoids, alkaloids, vitamin A & C and triterpenoids¹⁵ of *T. dioica* responsible for therapeutic nature to various disease. Thus it can be suggested that presence of saponins and flavonoids may be responsible for *T. dioica* antiulcer activity.¹⁶

Before Treatment, A.T. After treatment. #: Recovering gradually from white diarrhea, depression, freshness of feathers, healthy eyes, slowly reduced loud chirping, vent pasting, gasping and lameness.

Further, this plant was reported by several researchers for its antihelminthic,¹⁷ antihyperglycaemic,¹⁸ antioxidant, hepatoprotective and wound healing activity,¹⁵ anti diabetic¹⁸, antipyretic and cholesterol-lowering activity^{19,20}. Similar kind of study was performed and documented by Ahmad Ziarlarimi et al.¹⁰ has reported that the medicinal plants such as *Allium cepa*, *Mentha* spp and *Allium sativum* instead of using antibiotics to control the infection of *Escherichia coli* (Colibacillosis) in broiler chickens.¹⁰ But there was no research report available

among the research community about medicinal use of *T. dioica* against bacillary white diarrhea disease on broiler chickens caused by *S. pullorum*.

Table 1 The mean weight of chicks at before and after treatment and mean feed intake during treatment (4 days treatment)

S.No.	Treatment	Mean weight of chickens (B.T.) in gram	Chickens lived after treatment (out of 3 No.)	Disease recovery percentage (%) on day basis (4 days). based on#				Mean chickens weight (A.T.) in gram	Mean feed intake (gm)
				1	2	3	4		
1	T0	359.8	3	15	35	80	100	365.2	144.7
2	T1	353.6	0	0	0	0	0	0	0
3	T2	355.3	1	05	20	45	65	320.2	53.4**
4	T3	357.9	2	10	25	60	80	358.4	71.3*
5	T4	354.5	3	14	30	75	100	370.4	129.9
6	T5	353.3	3	17	35	80	100	378.6	152.6
7	T6	355.9	3	17	35	80	100	382.6	153.3

** : 2 chickens were died during 2nd day of treatment. * : 1 chicken was died during 3rd day of treatment.

Conclusion

Based on this case study, the efficiency of fresh leaves paste of *T. dioica* on bacillary white diarrhea of broiler chickens caused by *S. pullorum*, are concluded that the fresh leaf paste of *T. dioica* at 2gm dose with sterile water may effectively cure the disease with four days of continuous medication. Further this study conclude that this plant simultaneously may induce the feed digestibility, feed intake and helpful to increase the weight of chicken gradually. This preliminary data may useful to carry out further research on it against *S. pullorum* infections on broiler chickens.

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Conflict of interest

The author declares that there is no conflict of interest.

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