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REGRESSION EQUATION AND TREND OF GROWTH IN BROILER CHICKENS SUPPLEMENTED WITH HERBAL LIVER STIMULANTS

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ABSTRACT

Three research coded herbal liver stimulants were supplemented in broiler diets at the rate of 500, 500 and 250 g/ton feed respectively. The average body weight at six weeks of age were found to be significantly (P<0.01) higher in treated groups than in control. Linear equation did not give a good fit however quadratic trend of growth was observed in broiler chickens. All the regression coefficients were found highly significant.

INTRODUCTION

Optimum growth during various stages of age is of considerable importance for economic production of commercial broilers. The body weight is a direct reflection of growth and it influences production and reproduction traits of the animals. The present investigation was carried out to establish the growth curves by fitting linear and quadratic equations.

MATERIALS AND METHODS

Four hundred, day-old broiler chicks of Vencob strain were wing banded, weighed individually and randomly divided into four groups of one hundred each under deep litter system. The groups were designated as T_1 (Control), T_2 (Control + herbal liver stimulant 'B' @ 500g/ton of feed), T_3 (Control + herbal liver stimulant 'C' @ 500g/ton of feed) and T_4 (Control + herbal liver stimulant 'D' @ 250g/ton of feed). The composition of liver stimulants in shown in Table 1. Effect of these liver stimulants on body weight of broiler chicks was observed and growth curves were fitted from first week to sixth week of age for all the four treatment groups. The chicks were fed standard practical broiler starter ration for first three weeks (with 22.2% crude protein and 2800 Kcal ME/kg diet) and finisher ration (with 20.0% crude protein and 2900 Kcal ME/Kg diet) for remaining three weeks of study. The liver stimulants were provided by Dabur Ayurved Limited, Ghaziabad for experimental purpose. Feed and water were provided *ad libitum* to the chicks. The data on weekly body weights upto 6 weeks of age for all the four experimental groups were recorded and analysed as per Snedecor and Cocharan (1980) using 't' test.

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The growth curves were fitted from first week to sixth week of age for all the four treatment groups. The linear equation $Y= a_0 + ax$ gave a good fit for some data but was irrelevant for other. Hence, the growth curves were established for each treatment group by fitting quadratic equation $Y = a_0 + a_1x + a_2 x^2$

where a_1 and a_2 are the coefficients of x and x^2 respectively

a_0 was a constant

x= weekly body weight of the broilers from 1^{st} to 6^{th} week.

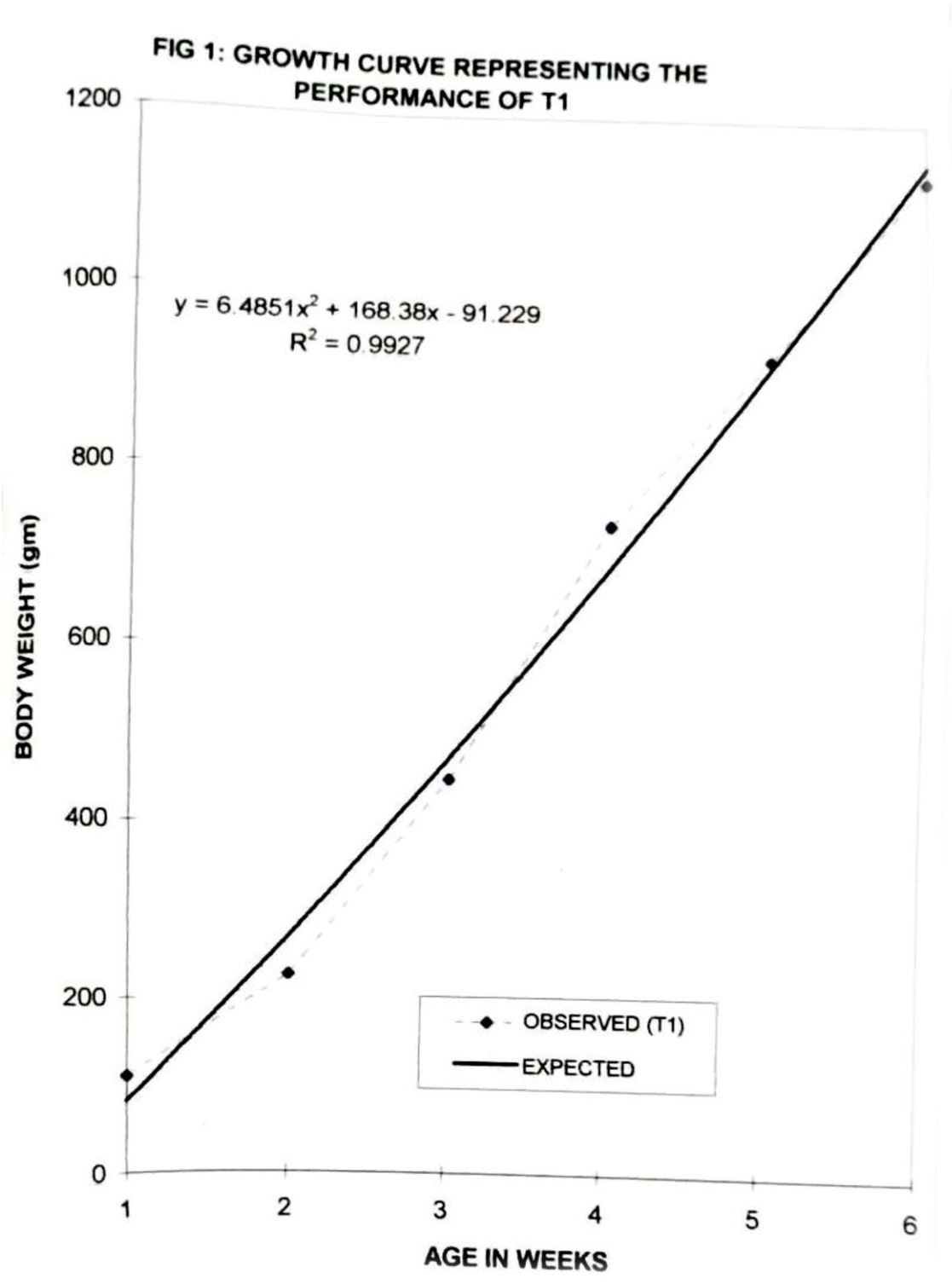
The appropriateness of the fit was tested by the coefficient of determination values (multiple R).

RESULTS AND DISCUSSION

Body weight: The average body weight (g) of broilers from 1^{st} to 6^{th} week of age is presented in Table 2. In broiler chicks fed with liver stimulants, a significant ($P<0.01$) higher body weight was observed at six weeks of age. The highest average body weight was observed in T_3 followed by T_2, T_4 and T_1 groups.

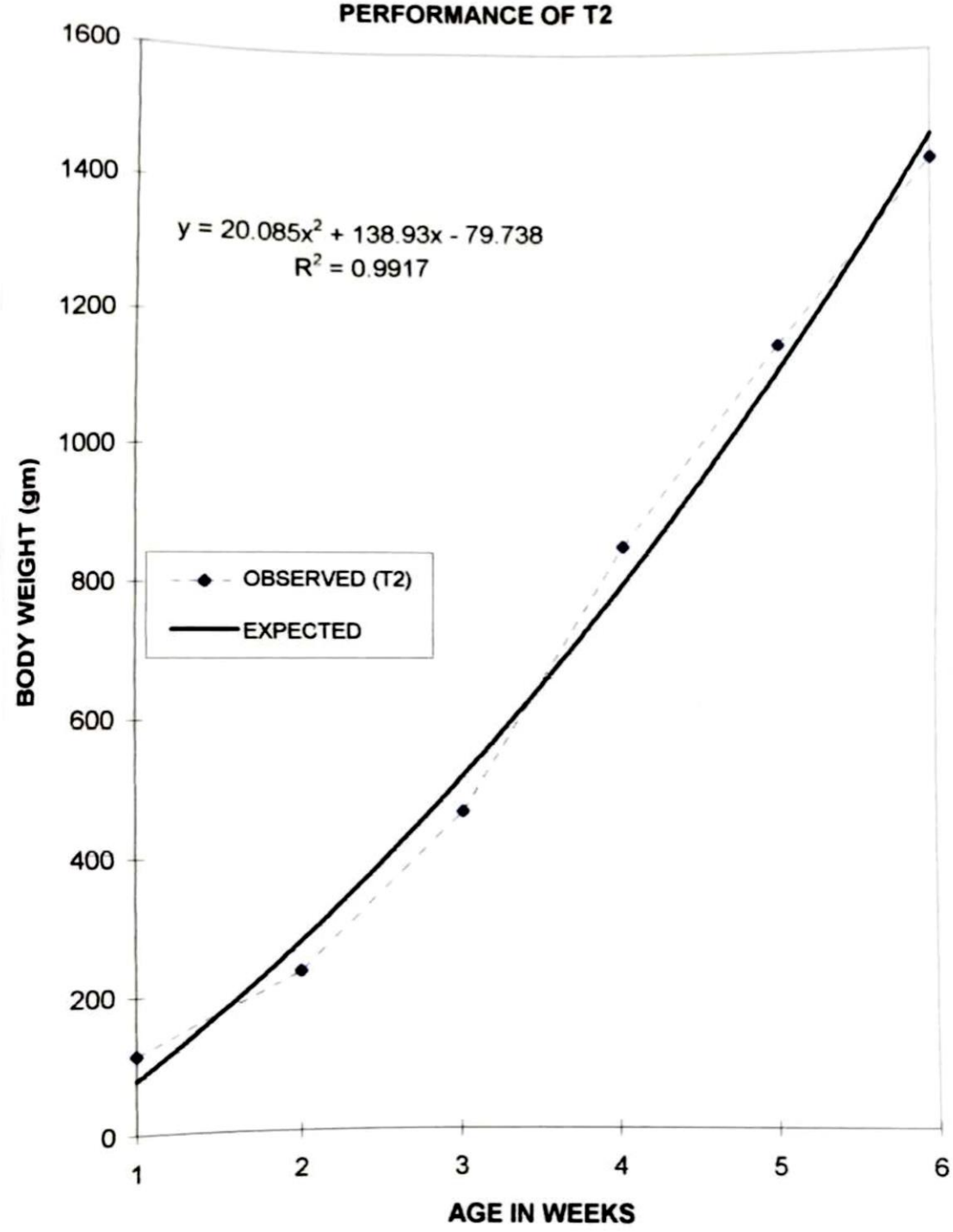
Equations of Growth curve: The growth curve equations from 1^{st} to 6^{th} weeks of age in different treatment groups are presented in Table 3. It is evident from the Table 3 that the regression coefficients in all the treatment groups are highly significant and their corresponding coefficient of determination values (multiple R) were almost equal to 100% showing that effect of age on body weight followed a quadratic trend.

The control group (Fig. 1) had a slightly lower value of body weight than the expected value upto age of 3.3 weeks. At 3.5 weeks of age, the observed and expected values were same. Then the curve went up and obtained the peak at the age of 4.2 weeks. At this stage, the values were much higher than the expected. After this period upto 5 weeks, the curve almost went higher or equal to the expected value. By the end of sixth week, the observed value was slightly lower than the expected value.



In case of T_2 group (Fig. 2), the growth in the initial stages, i.e. upto the age of 3.5 weeks was lesser than the expected value and it is after this period, the growth increased and was much more than the expected value upto 5.5 weeks. By 6^{th} week, the growth was almost equal to the expected value.

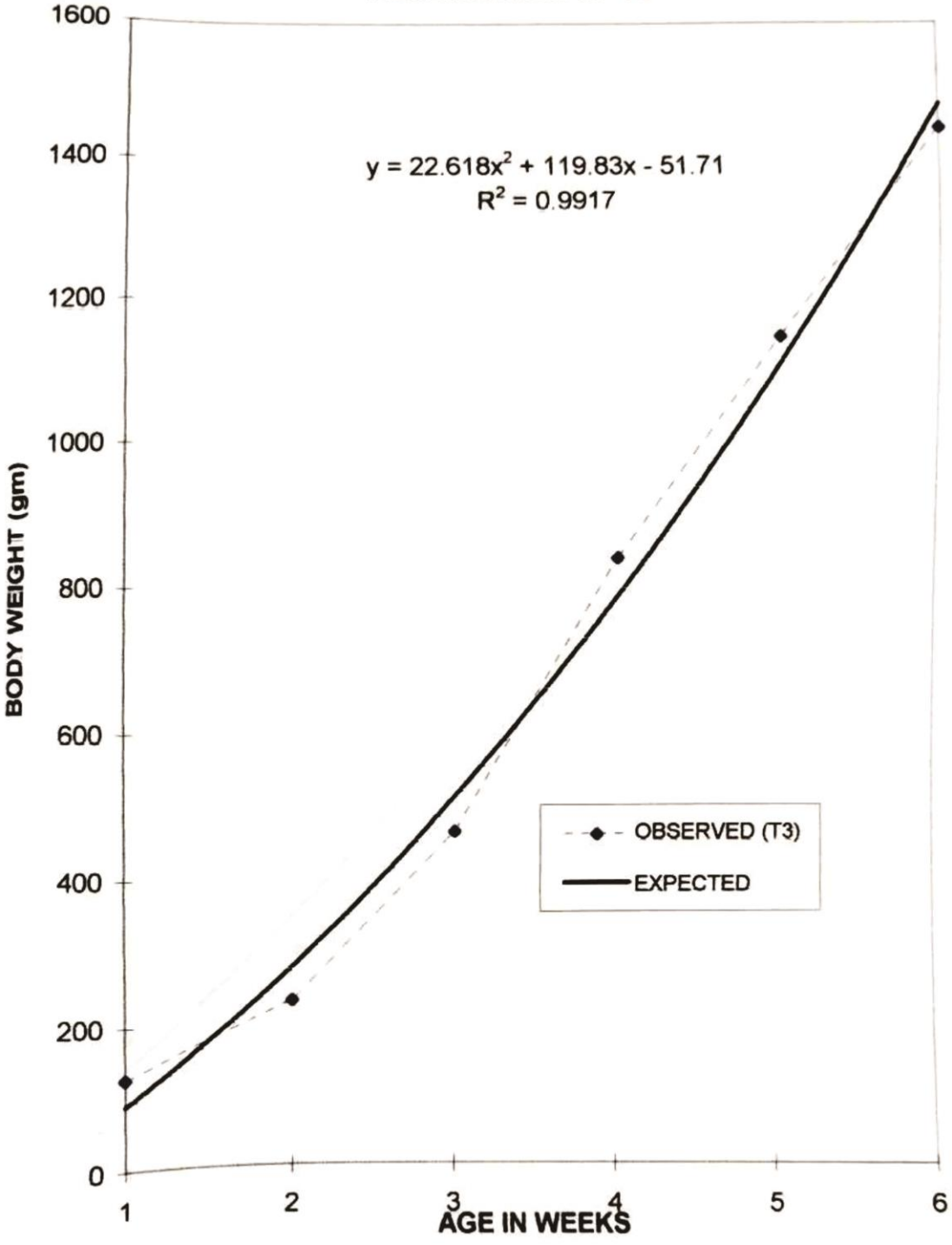
FIG 2: GROWTH CURVE REPRESENTING THE PERFORMANCE OF T2

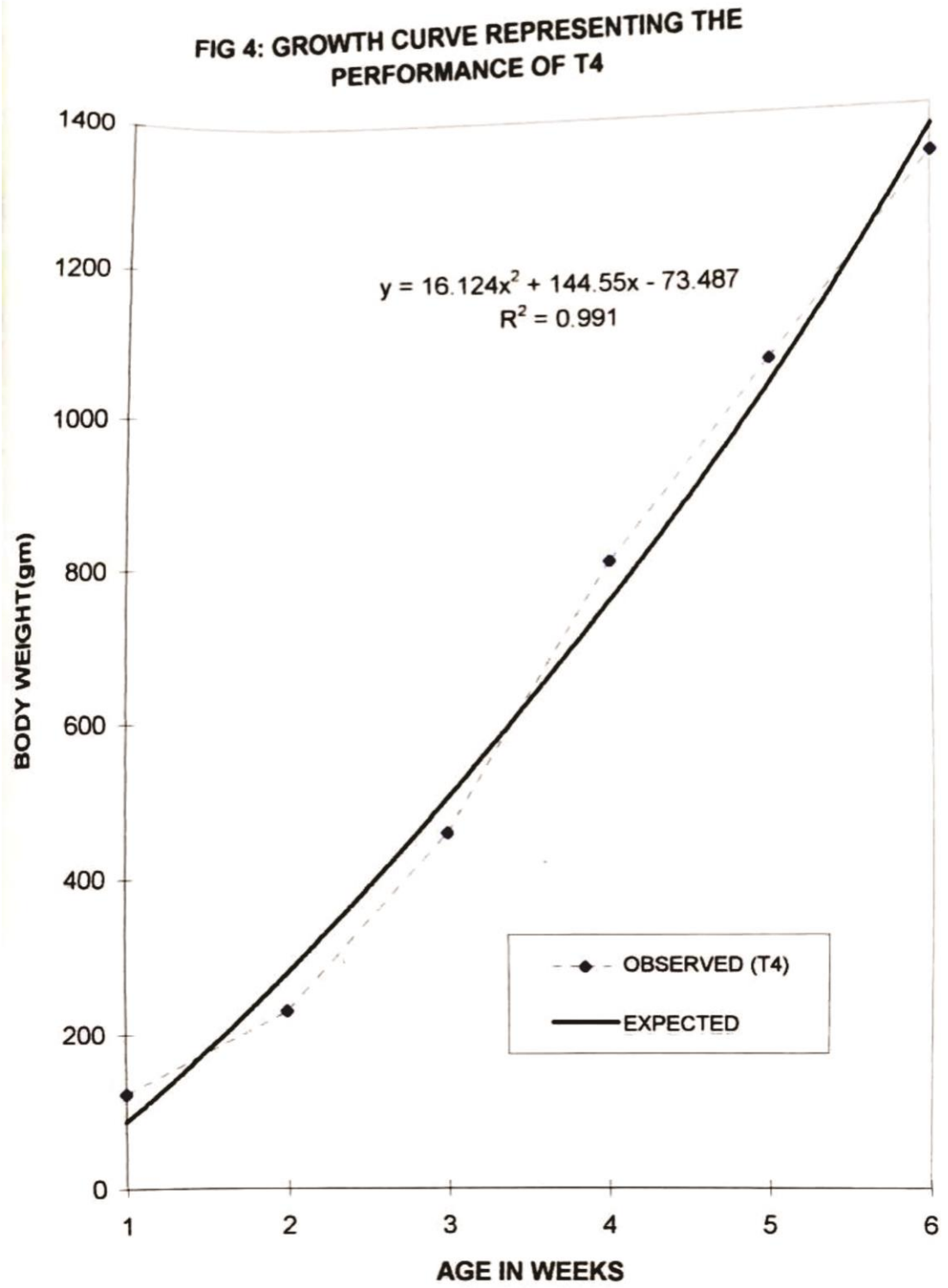


T_3 group also showed the same trend like that of T_2 group (Fig. 3) and with regard to trend of growth, these two groups almost behaved in the similar way. The performance of T_4 group (Fig.4) was also similar to T_2 and T_3, but the observed values went on higher side than the expected values as early as 3.2 weeks, and then after this, the curve behaved like that of T_2 and T_3 groups. Thus, it was observed that the expected body weights and observed body weights as per the

regression equation were almost very close to each other. Thus, it is concluded from the present investigation that for all the four treatment groups upto the age of 6 weeks, the growth pattern followed a quadratic trend. The present findings in this investigation are in close agreements with the reports of Vikas *et al.* (2001) who reported similar trend of growth in broilers supplemented with herbal liver stimulants.

FIG 3: GROWTH CURVE REPRESENTING THE PERFORMANCE OF T3





The comparative evaluation of all the four treatment groups (Fig.5) revealed that group T_2 and T_3 were almost similar pertaining to trend of growth. However, group T_4 was slightly lower, and group T_1 showed the least performance. Such results were expected as group T_1 was not supplemented with any herbal treatment. Perusal of the data relating to growth studies of broilers during 0-6 weeks period presented in tables indicated that the treatments T_2, T_3 and T_4 i.e. control diet plus herbal growth promoters in the ration of broilers had best performance in terms

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of body weight and weight gain. As regards the efficacy of herbal liver stimulants on body weight of broiler chickens our results are in close agreement with the results of Devegowda et al. (1989), Narahari (1995), Prajapati (1997) who reported the increase in growth of broilers fed with herbal products.

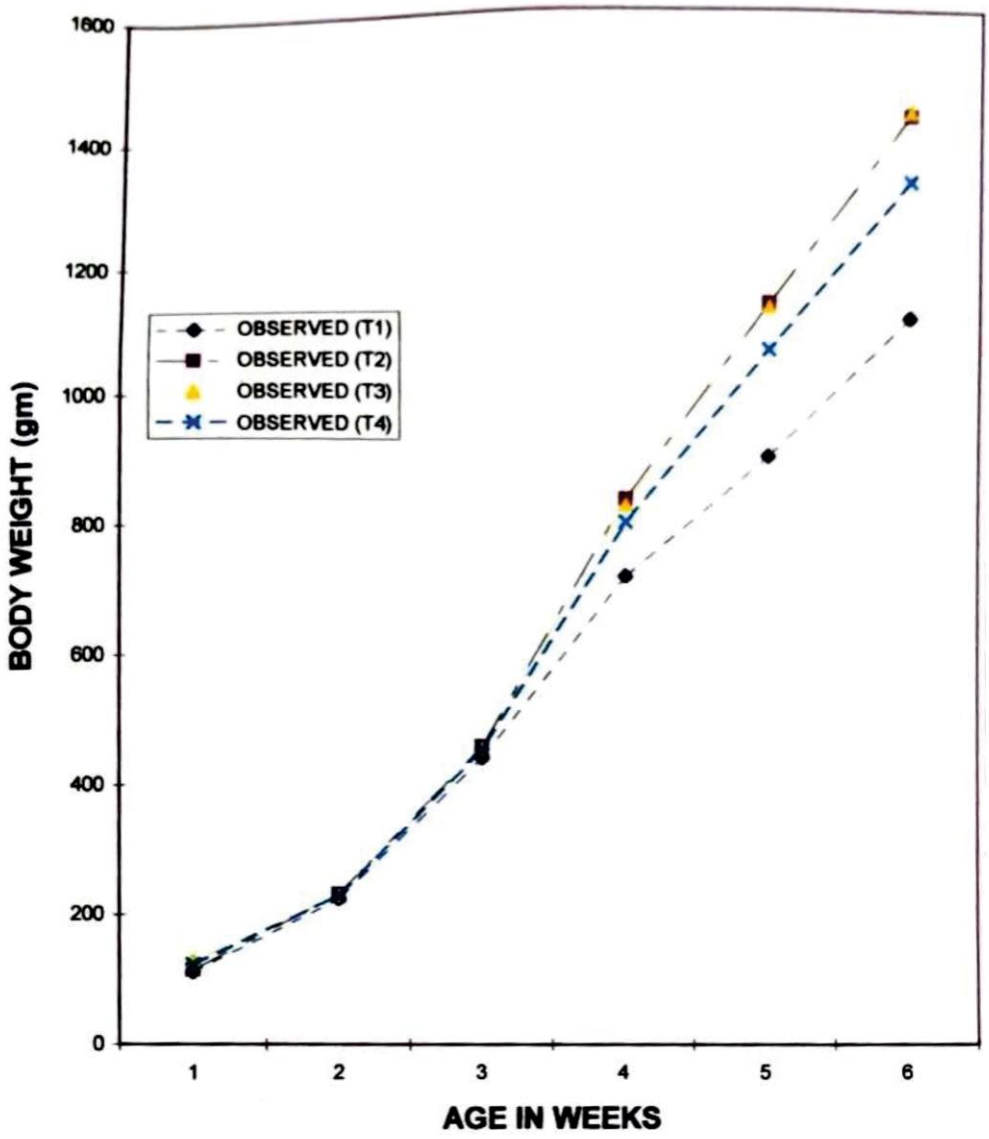

FIG 5: GROWTH CURVE REPRESENTING THE COMPARATIVE PERFORMANCE OF TREATMENT GROUPS

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Table 1. Ingredients of coded liver stimulants

Liver stimulants	**Composition**
B & C*	Amalaki (*Emblica officinalis*) Arjuna (*Terminalia arjuna*) Harikari (*Terminalia chebula*) Nimba (*Azadirachta indica*) Katurohinee (*Picrorhiza kurroa*) Kalmagh (*Andrographis paniculata*) Makoi (*Solanum nigrum*) Punarnava (*Boerrhavia diffusa*) Guduchi (*Tinospora cordifolia*)
D	*Spirulina* and above mentioned ingredients of B & C

* The quantities of ingredients are different in each formulation

Table 2. Effect of feeding liver stimulants on average (±SE) weekly body weight (g) of broilers

Treatment	**Liver stimulants**	**Average weekly body weight (g)***					
		1st	2nd	3rd	4th	5th	6th
T1	Control	112.40^{c}	227.57	448.58	731.80^{c}	922.08^{c}	1128.62^{c}
T2	B	115.40^{c}	235.07	465.81	852.45^{a}	1155.78^{a}	1442.33^{a}
T3	C	127.83^{a}	232.01	462.34	843.95^{ab}	1151.08^{a}	1447.17^{a}
T4	D	123.95^{b}	231.82	461.36	816.47^{b}	1085.83^{b}	1342.42^{b}

* Treatment means within a column superscribed by same letter do not differ significantly. All other differ significantly ($P<0.01$).

Table 3 Growth curve equations from day old to six weeks of age in different treatment groups

Specifications	**Equations**	**Multiple R**
Treatment 1	$y=(-91.229 + 168.38\ x + 6.4851x^2)$	99.27%
Treatment 2	$y= (-79.738 + 138.93\ x + 20.085\ x^2)$	99.17%
Treatment 3	$y= (-51.71 + 119.83\ x + 22.618\ x^2)$	99.17%
Treatment 4	$y= (-73.487 + 144.55\ x + 16.124\ x^2)$	99.1%