Volume-3, Issue-11, Nov-2014 • ISSN No 2277 - 8160

Research Paper Veterinary

Effect of Bael (Aegle Marmelos) and Giloy (Tinospora Cordifolia) Alone and in Combination on Growth and Feed Conversion of Broiler Chicks.

Singh Ajay	Department of Animal Nutrition, College of Veterinary and Animal Science, Bikaner, Rajasthan University of Veterinary and Animal Sciences, Bikaner
Kaushik, P.K.	Department of Livestock Production and Management, P.G.I.V.E.R., Jaipur, Rajasthan University of Veterinary and Animal Sciences, Bikaner.
Yadav, P.K	Department of Veterinary Microbiology, P.G.I.V.E.R., Jaipur, Rajasthan University of Veterinary and Animal Sciences, Bikaner.
Yadav Poonam	Department of Animal Nutrition, P.G.I.V.E.R., Jaipur, Rajasthan University of Veterinary and Animal Sciences, Bikaner.

ABSTRACT

In an attempt to determine effect of incorporation of herbs i.e., Bael (Aeglemarmelos) and Giloy (Tinospora cordifolia) alone and in combination at different levels in the ration of broilers to assess the effect of feeding of herbs alone and in combination as feed additive on growth and feed conversion of broilers, a feeding trial of six weeks was conducted, using Bael, Giloy and their combination at 0.5, 1.0 and 1.5 % levels, using 300 broiler chicks (cobb-400) in completely randomized block design. The experimental starter and finisher rations contained 22.40 and 21.10% C.P, respectively. The body weight, body weight gain, feed consumption, feed conversion ratio, were recorded for all ten treatment groups.Significant effect of dietary treatments i.e., incorporation of Bael, Giloy and their combination at different levels on body weight, body weight gain were observed whereas on feed consumption, feed conversion ratio the effect was revealed to be non significant.The findings of present study in respect of all parameters included in the study indicated that incorporation of Bael and Giloy alone and in combination could be effective in the ration of broiler chicks without any adverse effect on growth and feed conversion. The optimum level adjudged from present study for growth and efficient feed conversion are 1.0-1.5% for Bael, 0.5-1.0% for Giloy and 1% for Bael and Giloy combination.

KEYWORDS :

Introduction

The poultry industry in the country in present era has grown rapidly on account of its low capital investment, early assured returns, short generation intervals and limited land requirements. Feed additives are commonly described as non-nutrient substances which accelerate growth, efficiency of feed utilization, beneficial for health or metabolism of the animals (Church and Pond, 1988). Supplementations of these agents in respect with nutrition are mainly aimed to improve digestibility and bioavailability of various nutrients, thereby, enhancing economic gains by reducing the input costs. Feed supplement or additive is a substance or mixture used in minor quantity other than basic feed in order to complement certain nutrients for improving performance of birds (Narhari, 1992).

Use of herbal plant is considered to be safe without having side effects for enhancing the performance of birds. Realizing this, a number of herbs have been identified for their use as feed additive including Bael (Aegle marmelos)and Giloy (Tinospora cordifolia) which in turn may improve the performance of birds.

Aegle, also known as Bael, is member of the tribe Clauseneae in the subfamily Aurantioideae. Fruits are also used in diarrhea, gastric troubles, constipation, laxative, tonic, digestive, stomachic, dysentery, brain and heart tonic, ulcer, antiviral, intestinal parasites, gonorrhea, epilepsy (Veerappan et al., 2000). The ripe fruit promotes digestion and is helpful in treating inflammation of rectum. The ripe fruit extract showed antiviral activity against ranikhet disease virus (Mazumdar, 1995). Fine powder of unripe fruit showed significant effect on intestinal parasites and also effective against Entamoeba histolytica and Ascaris lumbricoides (Trivedi et al., 1978).Ithas been used in ethno medicine to exploit its medicinal properties including astringent, antidiarrheal, antidysenteric, demulcent, antipyretic and anti-inflammatory activities (Maity et al., 2009).Abdelsamie et al., (1983) and Oke and Oke (2007) revealed that saw dust (Aegle marmelos) is a good source of dietary fibre in poultry.

Tinospora, also known as Giloy, is a member of the family Menispermaceae in the genus Tinospora.Tinospora is a native plant from IndiaIt is well known Indian bitter and prescribed in fever, diabetes, dyspepsia, jaundice, urinary problems, skin diseases and chronic diarrhoea and dysentery (Misra et al., 1969). Tinospora has also been indicated useful in the treatment of heart diseases, leprosy, helmenthiasis and rheumatoid arthritis (Misra et al., 1969, Kirtikar et al., 1933, Sharma, 1969, Shah and Nighantu, 1969).

Material methods:-

The present research was carried out with three hundred day-old, unsexed, apparently healthy broiler chicks (Cob-400 strain) procured from commercial hatchery (Ajmer). Routine vaccination against Ranikhet disease (F1 strain) and Infectious Bursal Disease were carried out on 7th and 14th day of procurement of chicks.

All the chicks were wing banded, individually weighed and randomly divided into ten groups of 30 chicks each having almost similar average body weight. Each group of 30 chicks was further subdivided into two groups having 15 chicks each and were reared in 20 separate, clean and disinfected deep litter brooder houses.

Fresh and dry wheat straw was used as bedding material. Identical standard managemental practices regarding brooding, feeding, watering and disease control etc. were followed for each group during the course of study. Commercially available readymade broiler starter and broiler finisher rations were procured and feed additives such as Bael (Aegle marmelos) and Giloy (Tinospora cordifolia) were supplemented.

Experimental starter rations were offered upto 3 weeks of age and thereafter experimental finisher rations were offered upto 6 weeks of age as per the treatments to the respective groups and group-wise feed consumption and body weight was recorded at weekly intervals.

Data collected during the present investigation were subjected to statistical analysis by adopting appropriate methods of analysis of variance as described by Snedecor and Cochran (1994). Wherever, the variance ratio (F-values) were found significant at 5 per cent and 1 per cent levels of probability, the significance of mean differences were

tested by Duncan's New Multiple Range Test (Duncan's Range Test) as modified by Kramer (Kramer 1956).

Results and Discussion

The objective of present study was to determine the Effect of Bael (Aegle marmelos) and Giloy (Tinospora cordifolia) alone and in combination in the diet of broilers and their effect on the performance of broiler chicks reared in arid zone of Rajasthan.

Body weight

The body weight and weight gain could be considered as one of the important biological response of the body and could be used as indicator for vitality, well being and overall performance of broiler chicks. Hence, in the present study, this parameter has been considered to assess the effect of feeding of Bael (Aegle marmelos) and Giloy (Tinospora cordifolia) at different levels alone and in combination on body weight and weight gain of broiler chicks.

The statistical analysis of data shown in table 4.1 (a) revealed highly significant (P<0.01) effect of incorporation of Herbs at II, III, IV, V and VI weeks.at II week showed highest mean body weight in B3 which was though comparable with B2 and G3 but significantly higher than rest of the groups.At III week highest mean body weight was recorded for B3 and lowest was recorded for control which was lowest among all the groups.From IV week onwards upto VI week B3 group showed highest body weight and control group showed lowest body weight.

The significant improvement in body weight on account of supplementation of Tinospora cordifolia (Giloy) has also been reported by Gujral et al., (2002), Kumar et al., (2006). Significant improvement in body weight recorded in B1, B2 and B3 as a result of Bael supplementation in present study corroborate well with the finding of Yadav et al., (2010) supplemented Bael in starting, growing and finishing diets and noticed increase in body weight in comparison with control. The results obtained in study in text are also in accordance with the findings of Abdelsamie et al., (1983), Oke and Oke (2007). The results of study in text also get support from the findings of Dwivedi (2013) recorded improvement in body weight on account of incorporation of herb Shatavari as feed additive in the diet of broiler chicks.

Table 4.1 Effect of Bael and Giloy on Body Weight (g) at different weeks

Main effects	0	I	II	III	IV	V	VI
B1	44.80	164.62	288.83ab	673.83c	1060.83b	1449.03b	1838.72b
B2	44.85	169.24	326.66c	736.00e	1212.00fg	1692.00g	2172.90f
B3	45.20	172.13	329.83c	775.00f	1241.20g	1709.70g	2184.70f
G1	44.90	170.46	298.83b	735.37e	1178.00f	1623.30e	2071.10e
G2	44.87	169.00	295.33b	702.83d	1132.00de	1568.79d	2008.66d
G3	44.83	169.23	319.33c	708.67d	1105.00cd	1505.20c	1907.83c
B1G1	44.76	168.00	293.68b	637.21a	1077.00bc	1522.00c	1969.04d
B2G2	44.93	167.23	291.00ab	659.17bc	1149.37e	1644.53f	2159.17f
B3G3	44.70	168.13	295.00b	671.20c	1082.00bc	1494.00c	1908.80c
C	45.30	166.00	274.68a	635.00a	1005.00a	1380.00a	1762.96a
SEM	0.504921	6.232875	10.41474	13.96182	22.45137	25.7454	27.17238

a, b, c, d, e, f, g - Means superscripted with different letters within a column differ significantly from each other.

Table 4.1 (a)Analysis of variance for Body Weight at different weeks

Source of Variation	DF	Age in Weeks MEAN SQUARES						
		0	I	II	III	IV	V	VI
Herbs	9	1.082315	135.7313	9451.611**	62376.52**	154466.9**	339689.9**	632518.3**
Remainder		2.540454 (260)	388.4873 (285)	1084.660 (285)	1949.325 (285)	5040.638 (285)	6628.256 (284)	7383.384 (284)

* = Significant (P < 0.05)

** = Highly Significant (P < 0.01)

Figures in parenthesis are the error degree of freedom

Body weight gain

The Statistical analysis of data shown in table 4.2(a) revealed significant effect of inclusion of herbs Bael and Giloy alone and in combination on body weight gain of chicks across weeks except for I week as well as on total body weight gain. At II week highest body weight gain was recorded in B3 which was comparable with B2 and G3 but significantly higher than rest of the groups. At III week highest body weight gain was recorded in B3 and lowest in B1G1 group. From IV week onwards highest body weight gain was recorded in B2G2 upto VI week and lowest gain was recorded in control group. The mean body weight gain recorded for entire period of experiment i.e. for VI weeks was highest for B3 and lowest for control group. The highest mean body weight gain recorded for B3 was statistically comparable with B2 and B2G2 but significantly higher than rest of the groups, also exhibited significant variations from each other.

The results regarding use of Bael (Aegle marmelos) revealed significant effect on body weight gain are in accordance to the observations of Abdelsamie (1983), Oke and Oke (2007), Yadav et al., (2010), likewise use of Giloy (Tinospora cordifolia) revealed significanct effect on body weight gain and are also in line to the observations of Rajeshwari et al., (2012), Bharadwaj et al., (2012), Kulkarni et al., (2011), Bharadwaj et al., (2011). The results obtained in study in text are also in accordance with the findings of Dwivedi (2013), Rekhate, et al., (2010) used using shatavari and Aloe vera herb, respectively and recorded improvement in weight gain in broilers.

Table 4.2 Effect of Bael and Giloy on Body Weight Gain (g) at different weeks

Main effects	0-I	I-II	II-III	III-IV	IV-V	V-VI	I-VI
B_1	119.76	124.21^b	385.00^{cd}	387.00^{ab}	388.21^{ab}	389.66^a	1793.86^b
B_2	124.39	157.42^a	409.33^f	476.00^e	480.00^{de}	480.96^e	2128.05^f
B_3	126.33	157.70^a	445.16^g	466.20^e	468.50^d	475.00^e	2139.50^f
G_1	125.56	128.37^b	436.53^g	442.63^d	445.30^c	447.80^{cd}	2026.20^e
G_2	124.13	126.33^b	407.50^e	429.17^{cd}	439.59^c	439.86^{bc}	1937.27^d
G_3	124.40	150.10^c	389.33^{de}	396.33^{ab}	400.20^{ab}	402.63^a	1863.00^c
B_1G_1	123.29	125.66^b	341.53^a	441.78^d	445.00^c	447.035^{cd}	1924.32^d
B_2G_2	122.30	123.77^b	368.17^{bc}	490.20^e	495.16^e	514.63^f	2114.23^f
B_3G_3	123.43	126.87^b	376.20^{bcd}	410.80^{bc}	412.00^b	414.80^b	1864.10^c
C	120.75	108.66^a	362.32^b	368.00^a	375.00^a	382.96^a	1717.71^a
SEM	6.240771	8.471699	11.54625	18.13219	15.44145	18.9314	30.83009

a, b, c, d, e, f, g - Means superscripted with different letters within a column differ significantly from each other.

Table 4.2 (a) Analysis of variance for Body Weight Gain at different weeks

Source of Variation	DF	Age in Weeks MEAN SQUARES						
		0-I	I-II	II-III	III-IV	IV-V	V-VI	I-VI
Herbs	9	133.7715	7601.922**	31290.66**	47335.6**	47340.95**	53630.87**	603156.3**
Remainder		389.4722 (285)	717.6969 (285)	1333.16 (285)	3287.765 (285)	2584.382 (284)	3563.978 (284)	9504.946 (285)

* = Significant (P < 0.05)

** = Highly Significant (P < 0.01)

Figures in parenthesis are the error degree of freedom

CONSUMPTION

The statistical analysis of data as depicted in 4.3 (a) revealed no significant effect of incorporation of Bael and Giloy alone and in combination at different levels as feed additive in the ration of broilers except in V week where on comparison of means a significant improvement in feed consumption was recorded on account of inclusion of herbs i.e. Bael and Giloy alone or in combination at different levels except for B2G2 group in which feed consumption was at par with that of control.

The results obtained in study in text corroborate well with the findings of Gujral et al., (2002), Sarag et al., (2001) recorded increase in feed intake due to inclusion of Giloy in the diet of broiler chicks as well as Sinurat et al., (2003), Mushtaq et al., (2011), Appusamy (2012), Dwivedi (2013) also noticed improvement in feed consumption as a result of inclusion of Aloe vera, W. somnifera andShatavari herbs in

the diet of broilers.

Table 4.3 Effect of Bael and Giloy on Feed Consumption (g) at different weeks

Main effects	0-I	I-II	II-III	III-IV	IV-V	V-VI	I-VI
B1	160.00	303.30	537.10	759.50	773.60c	783.30	3316.80
B2	185.00	370.00	679.65	735.00	798.00c	805.00	3572.65
B3	173.00	356.65	478.13	731.20	743.20b	785.10	3267.28
G1	168.00	320.50	541.87	704.80	741.20b	789.50	3265.87
G2	164.00	308.33	467.67	756.66	760.80c	781.70	3239.16
G3	175.00	363.33	550.00	769.00	739.60b	751.23	3348.16
B1G1	168.30	321.65	538.35	700.00	836.40d	840.38	3405.08
B2G2	169.00	321.66	615.00	663.30	565.60a	674.10	2998.665
B3G3	170.00	326.65	466.70	800.00	841.00d	853.20	3457.55
C	165.00	308.00	535.00	741.70	562.00a	778.60	3090.30
SEM	14.24	21.70	29.05	24.08	25.09	26.00	124.50

a, b, c, d - Means superscripted with different letters within a column differ significantly from each other.

Table 4.3 (a)Analysis of variance for Feed Consumption at different weeks

Source of Variation	DF	Age in Weeks						
		MEAN SQUARES						
		I	II	III	IV	V	VI	I-VI
Herbs	9	94.93	1184	8820	3061	19973.9*	4809	49635
Remainder	10	2029	4708	8438	5797	6295	6758	137186

* = Significant (P <0.05)

** = Highly Significant (P < 0.01)

Figures in parenthesis are the error degree of freedom

FEED CONVERSION RATIO

The statistical analysis of variance of data (table 4.4 a) revealed non-significant effect of supplementation of Bael and Giloy alone and in combination at I, II, III, and in total mean FCR of I - VI weeks but at IV, V and VI weeks significant effect was observed. Further, the comparison of means revealed significant differences among different treatment groups with lowest FCR in B2G2 and highest FCR in control group at IV week and in B3G3 at V and VI week.

The result obtained in present study fall in line with the findings of Yadav et.al., (2010) recorded improvement in FCR with inclusion of Bael as feed additive in the diet of broilers and Gujral et al., (2002) on inclusion of Giloy in diet of broilers. The results of study in text i.e. increase in FCR with increase in level of Giloy also get support from the study of Sarag et al., (2001) recorded improvement in FCR with decrease in level of Giloy supplemented in the diet of broilers.

Table 4.4 Effect of Bael and Giloy on Feed Conversion Ratio (FCR)at different weeks

Main effects	0-I	I-II	II-III	III-IV	IV-V	V-VI	I-VI
B1	1.34	2.44	1.40	1.96bc	1.99c	2.01b	1.86
B2	1.48	2.35	1.66	1.54a	1.66b	1.67ab	1.73
B3	1.37	2.50	1.08	1.61ab	1.63b	1.70ab	1.65
G1	1.34	2.50	1.24	1.59ab	1.66b	1.76b	1.68
G2	1.32	2.44	1.15	1.76bc	1.73b	1.78b	1.70
G3	1.41	2.42	1.41	1.94bc	1.85b	1.86b	1.82
B1G1	1.36	2.56	1.58	1.58ab	1.88bc	1.88b	1.81
B2G2	1.38	2.59	1.67	1.35a	1.12a	1.31a	1.57
B3G3	1.38	2.58	1.24	1.95bc	2.04c	2.05b	1.87
C	1.37	2.83	1.48	2.01c	1.50ab	2.03b	1.87
SEM	0.115	0.158	0.074	0.056	0.058	0.058	0.075

a, b, c - Means superscripted with different letters within a column differ significantly from each other.

Table 4.4 (a)Analysis of variance for Feed Conversion Ratio (FCR) at different weeks

Source of Variation	DF	Age in Weeks						
		MEAN SQUARES						
		0-I	I-II	II-III	III-IV	IV-V	V-VI	I-VI
Herbs	9	0.00437	0.03591	0.08706	0.10215**	0.14211**	0.09838**	0.02182
Remainder	10	0.13261	0.24983	0.0542	0.03201	0.03408	0.03351	0.0565

* = Significant (P < 0.05)

** = Highly Significant (P < 0.01)

Figures in parenthesis are the error degree of freedom

supplemented in the diet of broilers

Summary And Conclusions

The broilers subjected to feeding of feed additives i.e. Bael and Giloy alone and in combination at different levels, with starter and finisher ration was adjudged by assessing body weight gain, feed consumption, feed conversion ratio. At the beginning of experiment the average weight of the broiler chicks subjected to various treatment groups were more or less similar and ranged between 44.70 to 45.30 g with statistically non-significant differences from each other.

Therefore, it could be concluded that inclusion of Bael alone at 1.0-1.5% level, Giloy 0.5 to 1.0% level and combination of both herbs i.e. Bael and Giloy at 1% level is quite effective and could be viable proposition for lucrative rearing of broilers for meat production. Though the results are concrete and suggestive but replication of feeding trials with large no. of broilers are recommended prior to final recommendation for incorporation of Bael and Giloy alone and in combination in the broiler ration for well being of broiler industry.

REFERENCES

Abdelsamie, R.E., Ranaweera, K.N. and Nano, W.E. (1983). The influence of fibre content and physical texture of the diet on the performance of broilers in the tropics. British Poultry Science, 24(3): 383-90. | Appusamy, J. (2012). Effect of supplementation of Aloe vera extracts on growth performance in commercial broilers. Noto-are : 14995877: Agriculture. 2012-06-10. www.notoare.com/index.php/index/explorer/getPDF/14995877 | Bhardwaj, U., Tiwary, B.K., Prasad, A. and Ganguly, S. (2011).Use of Tinospora cordifolia as poultry feed supplement. An International Journal of Bio Medical and Life Science Research 1 (1). | Bhardwaj, U., Tiwary, R.K., Prasad, A. and Ganguly, S. (2012). Effect of Tinospora cordifolia extract on immune response and serum biochemical profile in broilers. Indian Journal of Animal Sciences 82 (4) 379-381. | Church, D.C. and Pond, W.G., (1988). In: Basic Animal Nutrition and Feeding.3rdEdn. John Wiley and Sons, Toronto, 267-275. | Dwivedi, A. (2013). Effect of Feeding Shatavari (Asparagus racemosus) and Yeast (Saccharomyces cervisiae) Alone and in Combination on the Performance of Broiler Chicks. M.V.Sc. thesis, RAJUVAS, Bikaner. | Gujral, D., Jogi, S., Kumar, A., Bais, R.K.S. and Vikas (2002). Liver stimulant(composed of amalaki (Emblica officinalis), arjuna (Terminalia arjuna), harikari (Terminalia chebula), nimba (Azadirachta indica), katurohinee (Picrorhiza kurroa), kalmagh (Andrographis paniculata), makoi (Solanum nigrum), punarnava (Boerrhavia diffusa) and guduchi (Tinospora cordifolia) supplementing to broiler having more feed consumption and efficient feed conversion ratio. Indian Journal of Animal Research. 36(1): 43-45. | Kramer, C.Y. (1956). Extension of multiple range tests to group means with unequal numbers of replications. Biometrics, 12: 307-10. | Kulkarni, R.C., Mandal, A.B., Munj, C.P., Dan, A., Saxena, A. and Tyagi, P.K. (2011). Response of coloured broilers to dietary addition of geloi (Tinospora cordifolia) during extreme summer.Indian Journal of Poultry Science. 46(1) 70-74. | Kumar, P., Tiwary, B.K., Singh, S.K., Pallav, S. and Shee, N.C. (2006). Effect of an adaptogenic herbal preparation on humoral immune response and on some economic traits in broiler chicks. Journal of Research, Birsa Agricultural University.18(2): 295-300. | Maity, P., Hansda, D., Bandyopadhyay, U. and Mishra, D.K., (2009). Biological activities of crudeextracts and chemical constituents of bael, Aegle marmelos (L.) Correa. Indian Journal of Experimental Biology, 47: 849-861. | Mazumdar, B.C. (1995). Stability of Rough Journal Bearings Using Nonlinear Transient method. Journal of Tribology, 117(4), 691-695. | Misra, B. andNighantu, B.P., (1969). Vol (Hindi commentary by K C Chunekar) Chowkhamba Vidya Bhavan, Varanasi), 1969, 269. | Mushtaq, M., Durrani, F.R., Imtiaz, N., Sadique, U., Hafeez, A., Akhtar, S. and Ahmad, S. (2011). Effect of Administration of Withania somnifera on Haematological and Immunological Profile of Broiler chicks. Pakistan Veterinary Journal, 32(1): 70-72. | Narhari, D. (1992). Performance promoting ability of Active Forte in broilers. Poultry Advisor. 25 (7) 37-38. | Oke, D.B. and Oke, M.O. (2007). Effects of feeding graded levels of sawdust obtained from Daniellia ogea tree on the performance and carcass characteristics of broiler chickens. Research Journal of Poultry Sciences, 1(1): 12-15. | Rajeswari, P.R., Velmurugan, S., Babu, M.M., Dhas, S.A., Kesavan, K. and Citarasu, T. (2012). A study on the influence of selected Indian herbal active principles on enhancing the immune system in Fenneropenaeus indicus against Vibrio harveyi infection. Aquaculture International 20(5) 1009-1020. | Rekhate, D.H., Ukey, S., Mangle, L.N. and Deshmukh, B.S. (2010). Effect of dietary supplementation of Shatavari (Asparagus racemosus wild) on heamatobiochemical parameters of broilers. Veterinary World, 3(6): 280-281. | Sarag, A.N., Khobragade, R.S., Rekhate, D.H. and Dhok, A.P. (2001). Supplementation of T. cordifolia(0.5%) and L. reticulate(0.5%) has positive effects on liveweight gain and feed efficiency of broilers.Punjabrao Krishi Vidyapeeth Research Journal. 25(2): 114-115. | Shah, B. and Nighantu (1969). Adarsh Vol.1, (hindi translation), (Chowkhambha Vidya Bhavan,Varanasi), 1969, 680. | Sharma, P.V. (1969). Dravya Guna Vigyan, Vol.2, (Chowkhambha Vidya Bhavan,Varanasi) 1969, 680. | Sinurat, A.P., Purwadaria, T., Togatorop, M.H. and Pasaribu (2003). Utilization of plant bioactives as feed additives for poultry. The effect of Aloe vera gel and its extract on performance of broiler. Indonasia Journal of Animal & Veterinary Science, 8 (3). | Snedecor, G.W. and Cochran, W.G. (1994). Statistical methods, 8th Edn. The Iowa State University Press, Ames, Iowa, U.S.A. | Trivedi, V.P., Nesamany, S. and Sharma, V.K. (1978). Ayurvedic herbs: a clinical guide to the healing plants of traditional medicine. Journal of Research in Indian Medicine, Yoga and Homoeopathy, 28:13. | Veerappan, A.K.S. and Renganathan, D. (2000). Cardiotonic effect of Aegle marmelos Corr. On amphibian heart in situ preparation, Proc. 6th Internet World Congress for Biomed. Sci. | Yadav, G.B., Kadam, A.S., Pachpande, A.M., Lambate, S.B., Lonkar, V.D., Maini, S. and Ravikanth, K. (2010). Post Hatch Histo-morphological Studies of Small Intestinal Development in Chicks Fed with Herbal Early Chick Nutritional Supplement .International Journal of Poultry Science 9 (9): 851-855, 2010. |