Layers's blood profile changes after consumption of designer diet and holy basil (*Ocimum Sanctum)* leaves

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ABSTRACT

A biological experiment of six weeks duration, followed by several laboratory investigations were carried out to study the effect of designer layer mash (DLM) containing full fat flaxseed, oil rich sardine fish, Holy Basil leaf meal (BLM), vitamin E and Organic selenium (Sel-plex), on haematology of layers. Both designer diet and BLM had significant effect on haematology of layers. They also exhibited a synergistic effect. The RBC levels in hens were significantly increased both by the DLM and BLM supplementation. The WBC count was increased significantly by DLM alone, but not due to BLM. The Hb level was not influenced by any of the dietary treatments.

Keywords: designer layer mash, haematology, RBC, WBC

Recently, scientists are incorporating various unconventional feedstuffs and herbs in the hens' feed; with the objective of incorporating their active principles into the egg; so that the egg will become a versatile food cum medicine.

No significant influence of 10% flaxseed in the diet, on the amount of blood cells and haemoglobin in 9 to 18 weeks old pullets. Literature is not available on the effect of designer diet and basil leaves on the haematology of hens (Ritcher *et al.*, 1997). Hence this work was undertaken to find out the effect of flax seed, oil rich sardine fish and basil leaves in the hens' diet on their haematology. In this study we have incorporated Holy basil leaves, flax seed and sardine fish to diet and analysed the effects on haematology levels.

Holy basil has a strong anise-like, slightly musky and lemony taste with a camphoraceous aroma (Uhl, 2000).The dominant aroma component in holy basil is eugenol. This herb also has been used by Asian people in traditional medicine. It is used for most stomach disorders, cramps, diarrhea, headaches, whooping cough and head colds. Many Indians consume small quantities of the young leaves either as an offering after divine worship in temples or as a food additive (Archana and Namasivayam ,2002).

MATERIALS AND METHODS

This is a 2 x 3 factorial experiment consisting of two types of layer feeds namely, standard layer mash (Control) and special designer egg layer mash (DLM); each with three levels of basil leaf meal (BLM) i.e. 0, 1 and 2g/kg levels. Four replicates were randomly assigned to each of the six dietary treatments; with six hens per replicate, involving a total of 144 hens of 30 weeks of age. These single comb White Leghorn hens (SCWL) were placed in individual cages at the university Poultry Research Station, Chennai, India. One week before starting the experiment, all birds were wormed with Levamisole hydrochloride; followed by vaccination against Newcastle Disease with Lasota vaccine through drinking water; for better immunity development. Details of the six dietary treatments are, T1-Control-standard layer mash, T2- Standard layer mash + 1 g/ kg BLM (C-BLM 1g), T3 - Standard layer mash + 2 g/ kg BLM (C-BLM 2g), T4 - Designer egg layer mash (DLM), T5- DLM + 1 g/ kg BLM (DLM - BLM 1g), T6 - DLM + 2 g/ kg BLM (DLM - BLM 2g).

Samples of flaxseed, sardine fish and BLM used in the experimental feeds were assayed in duplicate (AOAC, 1990) for accurate feed formulation. The analysed compositions of these three feedstuffs are shown in Table 1. Based on these values the feeds were formulated and depicted in Table 2.

Table 1: Analysed chemical composition of flaxseed, sardine fish and BLM (g/kg)

Component	Flaxseed	Sardine	BLM
Moisture	48	125	131
Crude Protein	233	380	180
Ether Extract	377	220	70
Crude Fibre	130	1.7	99
Total Ash	31.2	207	101
Sand and Silica	8.5	7.1	19.9
Calcium	1.0	59	3.0

Feed Analysis

Representative samples of six experimental diets were also assayed in duplicate for their proximate composition, calcium and phosphorus levels according to the methods of AOAC,1990. Based on the values of NRC (1994) and Narahari (1997) the ME, levels were calculated. Regular layer feed, such as T1-T3 have Crude protein-178.2 g/kg, ME -11.57MJ/kg, EE – 61.0 g/kg, Calcium – 35.3 g/Kg, Total Phosphorus – 5.0 g/kg, Lysine – 8.1 g/kg, Methionine – 3.1 g/kg. Enriched layer feed, such as T4-T6 have Crude protein-180.2g/kg, ME -10.82 MJ/kg, EE – 21.7 g/kg, Calcium – 35.2 g/Kg, Total Phosphorus – 5.8 g/kg, Lysine – 8.8 g/kg, Methionine – 4.4 g/kg.

Basil leaves Analysis

Random samples of basil leaves could be collected and extract the Total phenolic content were extracted, as per the method cited by Wangcharoen and Morasuk

Table 2: Ingredient composition of the experimental layer feeds (g/kg)

Ingredient	Control feed (T_1 - T_3)	DLM feed (T_4 - T_6)
Corn	300	300
Pearl millet	270	220
Sunflower meal	127	130
Soya meal	200	70
Sardine fish	—	100
Flaxseed	—	100
Dicalcium phosphate	15	—
Shell grit	80	73
Salt	3	1.7
Sodium bicarbonate	2	2
Trace mineral premix[1]	1	1
Vitamin premix[2]	0.5	0.5
Choline chloride 60%	1	1
Vitamin E 50%	—	0.4
Sel-plex (organic selenium)	—	0.2
Ethoxyquin	—	0.1

1. At the level added, the "trace mineral premix" supplied, Manganese: 100mg, Zinc: 80mg, Iron: 60mg, Copper: 5mg and Iodine: 1mg/kg diet.
2. At the level added, the "vitamin premix" supplied Retinol: 3.6mg, Cholecalciferol: 62.5mg, Menadione: 1.5mg, µ-Tocopherol: 20mg, Thiamine: 3mg, Riboflavin: 5mg, Niacin: 35mg, Pantothenic acid: 15mg, Pyridoxine: 10mg, Folacin: 0.5mg and Cyanocobalamine: 20g/kg of feed.

(2007). Basil leave extract have 3.05 mg/mL Total Phenolic compound, 0.14 mg/g of Isothymusin (in dry matter basis), 0.19 mg/g of Carnosic Acid (in dry matter basis), 0.70 mg/g of Eugenol (in dry matter basis), 0.54 mg/g of Sinapic Acid (in dry matter basis), 0.25 mg/g of Rosmarinic Acid (in dry matter basis), and Ursolic Acid is not detected.

Haematology

The blood samples taken from one bird per replicate with anticoagulant were used for estimation of Haemoglobin, total RBC and WBC counts as well as differential count of WBC as per the techniques of Twisselmann (1939).

Statistical analysis

All the data collected were subjected to analysis of variance for significance according to the procedures of Snedecor and Cochron (1989), for a 2 x 3 factorial design. Wherever necessary, the per cent values were converted to ÖArcsin values and some numerical values were converted into their log values, before analysis of variance. The significance was tested using Duncans' multiple range test Duncan (1955).

RESULTS AND DISCUSSION

Haematology

The effect of dietary treatments on blood RBC, WBC counts, Hb level as well as the differential count of WBC are shown in Tables 3 & Table 4. The RBC & WBC levels in hens were increased.

The RBC levels in hens were significantly ($P<0.05$) increased both by the DLM and BLM diets independently and a synergistic effect is also noticed. The WBC count was increased significantly ($P<0.05$) between diets and treatments, but not due to the herbal level. DLM alone had elevated the WBC count, but not the BLM. The Hb level was not influenced by any of the treatments.

In the designer diet fed group, the heterophil count was increased, with proportionate reduction in the eosinophil count. Except lymphocytes, other WBC, namely heterophils, eosinophils and monocytes showed significant ($P<0.05$) variations between treatments. The basophils were not detected in the field, during counting. No significant influence of 10% flaxseed in the diet of pullets, on the amount of blood cells and Hb (Ritcher *et al.*, 1997).

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