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Chemical composition of locally available coriander (*Coriander sativum*) seed powder in Chhattisgarh used as feed supplements in poultry

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Abstract
The use of antibiotic as growth promoters in poultry has been banned due to concern about their residues in tissue and induction of bacterial resistance. Due to these concerns, recently many feed additives have been investigated for alternatives to feed antibiotics. The aromatic plants may increase feed intake and may improve secretion of endogenous digestive enzymes. It has been shown that the dietary incorporation of herbs like coriander seed powder may provide beneficial effect on poultry performance and health due to the antimicrobial activity of their phytochemical components. Phytobiotics feed additives like coriander both in powder and oil form have gained increasing interest as natural growth promoting feed additives in broiler production in recent years. In present investigation is is found that coriander seed The nutrient composition as DM, CP, CF, EE, NFE, TA, Ca and P of coriander (*Coriander sativum*) seed powder in present study is 93.10, 13.76, 25.01, 19.30, 33.39, 8.55, 0.81 and 0.26 percent respectively. It is recommended to supplement about 1-2 % in poultry feed without any adverse effect.

Keywords: DM- dry matter, CP-coriander seed powder, CP-crude protein, EE-ether extract

Introduction
India with a population of 1.30 billion people is highly focusing on “Development” i.e. good food, better health & living conditions for everyone. With the increase in the incomes, people can now afford better nutrition and hence, since poultry industry has transformed from a mere backyard activity into a major commercial activity in just four decades. India is now the world's 3rd largest egg producer and the 5th largest producer of broilers. The Indian poultry market witnessed an increasing trend over the past five years, and looking forward exhibiting at a Compound Annual Growth Rate (CAGR) of 14% (DAHD, 2021) [2]. Poultry sector in India is broadly divided into two sub-sectors – one with a highly organized commercial sector with about 80% of the total market share (Rs. 136800 crore) and the other being unorganized with about 20% of the total market share of Rs. 1,71,00 Crore. (DAHD, 2021) [2]. The Indian poultry market, consisting of broilers and eggs was worth INR 1,710 billion in 2021. The market is further projected to reach INR 4,340 billion by 2024, growing at a CAGR of 10.5% during 2022-2027. (Indian Poultry Market Forcast, 2022-27) [3].

Poultry production in India has become a profitable and most popular income generating sector for the educated unemployed youth. The use of antibiotic as growth promoters in poultry has been banned due to concern about their residues in tissue and induction of bacterial resistance. Due to these concerns, recently many feed additives has been investigated for alternatives to feed antibiotics. It is reported that aromatic plants may increase feed intake and may improve secretion of endogenous digestive enzymes. It has been shown that the dietary incorporation of herbs may provide beneficial effect on poultry performance and health due to the antimicrobial activity of their phytochemical components. Phytobiotics have gained increasing interest as natural growth promoting feed additives in broiler production in recent years. These have wide range of medicinal properties with no residual side effects and are best alternatives to antibiotic growth promoters. Beneficial effects of these substances in poultry nutrition are due to their high content of pharmacologically active compounds stimulating appetite and feed intake, improving endogenous digestive secretion and activating immune responses (Nouzarian *et al*., 2011 and Toghyani *et al*., 2010) [6, 10].

Material and Method

The grinded coriander seed powder were procured from local market of Raipur, Chhattisgarh for quality analysis. Overall data will be analysed as per the standard procedure given by Snedecor and Cochran, 1994 [8].

Proximate analysis

The representative coriander seed powder sample were analyzed for various proximate principles *viz*., moisture, total ash, crude protein, ether extract and crude fiber as per the method of AOAC, 2005.

1. Dry matter (DM)

About 5-10 g of sample were taken in pre weighed moisture cup. Samples were dried at 100±0.5 °C in hot air oven for 12 hours. The loss in weight of samples due to evaporation of moisture gave rise to dry matter content of the diet and excreta.

2. Crude protein (CP)

Nitrogen content in the feed and excreta samples was estimated by Kjeldahl's method (AOAC 2005). The nitrogen content in sample was multiplied by the factor 6.25 to arrive at crude protein content of diet and excreta.

3. Ether extracts (EE)

About 5.0 g dried powdered samples of diet and excreta were taken in a readymade thimble and crude fat was extracted from samples continuously for 60 minutes with petroleum ether (boiling point 40-60 °C) in a modified Soxhlet extraction apparatus (Socs plus-Pelican India Ltd, Chennai). The EE content was calculated by difference of weight of oil flask before and after extraction and % ether extract was calculated as usual.

(wt. of EE/ wt. of sample*100)

4. Crude fiber (CF)

About 5-8 g fat free dried sample were taken in a one liter capacity of spoutless tall beaker. It was boiled with 200 ml 1.25% sulphuric acid for 30 minutes. Thereafter it was filtered through a muslin cloth and repeatedly washed with hot water till it became acid free. Then it was transferred into the same beaker containing 200 ml 1.25% NaOH solution. Boiling was done for 30 minutes. It was then made alkali free through continuous washing with hot water. The residue left was transferred to the previously weighed silica crucible. It was dried at 100± 0.5 °C in hot air oven for 12 hours. The dried material was ignited in the muffle furnace at 600 °C for 30 minutes. The loss in the weight of residue was considered as crude fiber content of sample.

5. Total ash (TA)

About 5-10 g dried sample was taken in previously weighed silica crucible and charred on a low flame of the gas burner. Thereafter it was ignited in furnace at 600 °C for 30 minutes. After cooling it in desiccators it was weighed to constant weight. The ignited material left in the crucible was considered as total ash.

6. Nitrogen free extract (NFE)

Nitrogen free extract was calculated by subtracting the sum percentage of crude protein, crude fiber, ether extract and total ash from 100.

NFE (%) =100 – (CP % + CF % + EE % + Total ash %)

7. Calcium (Ca)

The percent calcium content in experimental diets and excreta samples was determined by the precipitation method (Talpatra *et al*., 1940) on DM basis. Calcium was precipitated in acidic medium as insoluble calcium oxalate by adding saturated ammonium oxalate solution in the mineral extract. The precipitate was dissolved in dilute sulphuric acid (1:9) and the oxalic acid thus released was titrated against N/10 potassium permanganate solution in warm condition. The % Ca content in diet and excreta was calculated using the formula:

$$\text{Calcium (\%)} = \frac{\text{ml N/10 } KMNO_4 \text{ X 0.002 X volume of mineral extract prepared}}{\text{Weight of sample taken for ashing X aliquot of precipitate}} \text{X 100}$$

8. Phosphorus (P)

The phosphorus content of experimental diets and excreta was determined by precipitation method (Talpatra *et al*., 1940).

Result and Discussion

The nutrient composition as DM, CP, CF, EE, NFE, TA, Ca and P of coriander seed powder in present study is 93.10, 13.76, 25.01, 19.30, 33.39, 8.55, 0.81 and 0.26 percent respectively (table 1).

Table 1: Chemical Composition of Coriander powder (on % DM basis)

Parameters	Coriander seed powder (%)
Dry Matter (DM)	93.10
Crude Protein (CP)	13.76
Crude Fiber (CF)	25.01
Ether Extract (EE)	19.30
Nitrogen Free Extract (NFE)	33.39
Total Ash (TA)	8.55
Calcium (Ca)	0.81
Phosphorus (P)	0.26

The dry matter content of coriander seed powder was 93.10 % and same type of result was reported earlier (Nadeem *et al*., 2014) however, Hesam *et al*., 2014 [5], found 88.0% Dry matter in coriander seed powder. The protein content in present study was 13.76. Kamali *et al*., 2019 [4], minimum protein content was observed in the freeze dried coriander leaf powder (15.65%) whereas Hesam *et al*., 2014 [5] found Crude protein 15.27%, and lower chemical value (11.49%) by Nadeem *et al*., 2014. The crude fibre contain in coriander seed powder is 25.01% and higher value observed by Hesam *et al*., 2014 [5] and Nadeem *et al*., 2014. This finding is on the positive note as Mensah *et al.* (2014) reported that, crude fibre cleanses the digestive tract by removing potential carcinogens from the body and prevents the absorption of excess cholesterol.

The fat content in the coriander seed powder is 19.30% and similar finding observed by Hesam *et al*., 2014 [5] and Nadeem *et al*., 2014. The fat content in the coriander seed powder of shade dried coriander leaf sample was maximum (7.75%) followed by freeze dried coriander leaf powder samples (7.67%). The lowest fat content was obtained in hot air oven dried samples (5.05%) (Kamali *et al*., 2019) [4]. Low fat content in food samples enhance storage life due to reduced chance of lipid peroxidation. Dried leaves with low fat content observed in the present study have an advantage of a long shelf life without the formation of rancidity (off-

flavour) than those with high fat value. In present finding the total ash content is 8.55 % and sililar finding reported by Hesam *et al*., 2014 [5] with 9.50% ash. Kamali *et al*., 2019 [4], in his experiment found Maximum ash content in shade dried coriander leaf powder (5.28%) followed by sun dried coriander leaf samples (5.01%). The lowest ash content was obtained from hot air oven dried coriander leaves samples (4.49%). The calcium and phosphorus content is 0.81 and 0.26 percent respectively in present finding whereas, lesser value found by (Budvari., 1996) as calcium (0.08%), phosphorus (0.44%).

Conclusion

Overall, it can be concluded that the coriander seed powder is good source of crude protein, either extract and total ash and it can be supplemented in broiler diet as phytogenic feed additive without adverse effect.

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