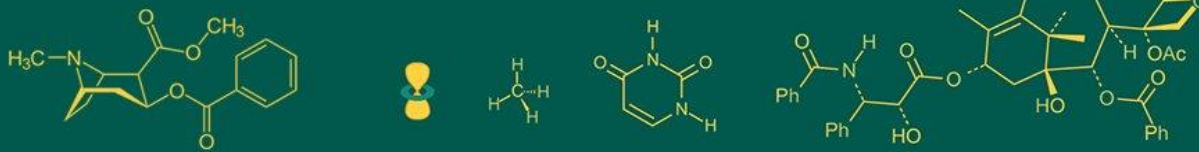


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## Evaluation of antioxidant activity of phytogetic feed additives

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### Abstract

The present study was designed to determine *in-vitro* antioxidant activity of six herbal feed additives (Black pepper, Fennel, Turmeric, Black cumin, Ginger, Bay leaf) in terms of DPPH scavenging activity. It was observed that these phytogetic feed additives possess substantial radical scavenging power. In terms of DPPH activity, highest antioxidant power was observed for Black cumin while lowest was observed for Ginger extract. The results of antioxidant property of these herbal additives suggested their potential use as growth promoters in animal feed industry which can be further explored in order to gain optimum productivity.

**Keywords:** Additive, antioxidant, DPPH, herbal

### Introduction

The use of herbs for both prophylactic and therapeutic treatment purposes has been well documented for centuries in Ayurveda. Several medicinal plants or their parts possess numerous beneficial properties which facilitate their use for various purposes in animal production system (Brenes and Roura, 2010) [1]. Though antibiotics have revolutionized the poultry or livestock feed industry as growth promoting agent but their indiscriminate use has led to long term health issues like multiple drug resistance in consumers. The objective to enhance animal performance which is also economic has put immense metabolic stress on animals. To cope with stress, whether environmental or physiological, the antioxidant status of animal should be improved. The herbs or spices like Black pepper, Fennel, Turmeric, Black cumin, Ginger, Bay leaf have been traditionally used for ethno-veterinary practices or preventive measures for many decades. These have been reported to exhibit anti-inflammatory, antimicrobial, antioxidant and growth promoting effects in many research studies. The aim of the current study is to determine the *in-vitro* antioxidant activity of these herbs so that their potential as feed additive could be further investigated.

### Materials and Methods

The dried samples of Black pepper seeds, Fennel seeds, Black cumin seeds, Turmeric rhizome, Ginger rhizome, Bay leaf were ground and crude extract were prepared by Soxhlet extraction method using methanol. Powdered sample of these herbs (5 g) were placed in Soxhlet apparatus and extracted using methanol for 24 hrs or until the solvent in siphon tube of the extractor become colorless. The extracts were then concentrated in pre weighted vials on a rotary evaporator below 50 °C. Dried extracts were weighed and reconstituted with a known volume of solvent and were stored in vials at 4°C for further estimation. The antioxidant activity of herbal extract was measured in terms of hydrogen donating or radical scavenging ability using the stable DPPH (2,2-diphenyl-1-picrylhydrazyl radical) method as modified by Sanchez-Moreno *et al* (1998) [7]. A methanolic solution (0.1 ml) of the sample at various concentrations (upto 150 µg/ml) were added to 2.9 ml of DPPH (60 µM) solution. When DPPH reacts with an antioxidant compound that can donate hydrogen, it gets reduced and the resulting decrease in absorbance at 517 nm was recorded at 10 min intervals up to 30 min using a UV-Vis spectrophotometer and the mean values were obtained from triplicate experiments. The remaining concentration of DPPH in the reaction medium was calculated from a calibration curve. Scavenging activity was calculated as:

$$\left( \frac{\text{Absorbance of control sample} - \text{Absorbance of sample with herb extract}}{\text{Absorbance of control sample}} \right) * 100\%$$

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## Results and Discussion

The radical scavenging activity (DPPH) of methanolic extracts of Black pepper, Fennel, Turmeric, Black cumin, Ginger, Bay leaf has been presented in Table 1. Highest antioxidant activity has been observed for Black cumin followed by Black pepper, Turmeric, Bay leaf, Fennel and Ginger, respectively. In accordance with current findings, DPPH inhibition of 79.0 and 64.6 % had been estimated for Ginger and Turmeric extract (Maizura *et al.*, 2011) [5]. Black cumin has been reported rich in phenolic compounds which is responsible for its antioxidant power as studied by Mammad *et al.* (2017) [6] who reported DPPH free radical activity of black cumin extract in terms of IC<sub>50</sub>=12.256 mg/ml as against ascorbic acid (IC<sub>50</sub>=0.097 mg/ml). On the other hand, Gulcin (2005) [4] demonstrated scavenging activity of Black pepper extract as 55±4.16% which is lower than that of alpha tocopherol (78±4.78%). Further, the methanolic extract of fennel seeds showed scavenging activity of 71.61% at 240g/ml concentration (Chatterjee *et al.*, 2012) [2]. Also, Elmastas (2006) [3] suggested effective reducing power of Bay leaf extract at various concentrations. The radical scavenging activity of these herbs is might be due to presence of several active principles such as flavanoids, propanoids, phenolic compounds, terpenes and cymenes. Most of the antioxidants from spices and herbs act by reacting with free radicals created during the initiation stage of autooxidation while others form complexes with metal ions.

Concluding these results we can say that these phytogetic growth promoters exhibited considerable antioxidant activity which can directly or indirectly improve the antioxidant status of animals, enabling them to cope up with various kind of stress. This property of herbs can be further explored to use them as an alternative to antibiotic growth promoters in animal nutrition for safe and better production.

**Table 1:** Radical scavenging activity (DPPH) of some herbal extracts

S. No.	Herbal extracts (Methanolic)	Scavenging activity (%)
1	Black pepper	68.07
2	Turmeric	61.17
3	Fennel	52.58
4	Bay leaf	57.36
5	Black cumin	70.69
6	Ginger	44.83

## Conclusion

The above findings show the potential of these phytogetic feed additives to be use in poultry ration.

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