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Study on the nutrient composition of local variety of turmeric (*Curcuma longa*)

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Abstract

A study was conducted to estimate the level of the bioactive component (curcumin) and proximate composition of Turmeric (*Curcuma longa*) using standard procedures. The results of the present study showed that the curcumin content of local variety of turmeric of Assam was found to contain 3.00% on dry weight basis. The results of the proximate analysis showed that it contain 11.80% moisture content, 8.30% ash, 9.40% crude protein, 2.50% crude fibre, 11.00% fat and 68.80% nitrogen free extract.

Keywords: Turmeric, bioactive, curcumin, proximate

Introduction

Turmeric (*Curcuma longa*) is one of such perennial herbs which belong to the member of Zingiberaceae family. The rhizome of turmeric is widely used as spices and medicine and cultivated in tropical region (Durrani *et al.*, 2006) [6]. Turmeric powder contained a large number of biologically active components such as curcumin, dimethoxycurcumin and bisdemethoxycurcumin (Wuthi-Udomler *et al.*, 2000 and Mashhadani, 2015) [19, 12]. Curcumin is the main important bioactive ingredient responsible for biological activity of *Curcuma longa* (Lal, 2012; Hussein, 2013 and Qasem *et al.*, 2015) [11, 8, 17] and this range from 2 to 5% of the turmeric (Bagchi, 2012) [2]. Borah *et al.* (2015) [4] found the curcumin content of turmeric to be ranged from 1.06-5.70% in Assam. Another variety of Turmeric in Dibrugarh district of Assam was estimated and found to contain curcumin upto 8.00% (Panda, 2005) [13]. Curcumin (diferuloylmethane) is a hydrophobic polyphenol, belonging to the group of curcuminoids, which are natural phenols responsible for yellow color of turmeric. Curcumin, a potent antioxidant is believed to be the most bioactive and soothing portion of the herb turmeric and posses the antioxidant, anti - inflammatory, anti - platelet, cholesterol lowering, antibacterial and antifungal effects (Peter, 2000) [15]. The leaves are known as great source of vitamin and minerals (Chattopadhyay *et al.*, 2004) [5]. There is a need to investigate turmeric scientifically so that it would not be used only traditionally but industrially in food and drug production. This study will give an insight of the nutritional, properties of turmeric plant which could be a gate way to different ways in which turmeric could be used. The objectives of this work are to determine the proximate compositions of turmeric plant and to determine the content of active curcumin of turmeric rhizome.

Methods and materials

The present work on the “Study on the nutrient composition of local variety of turmeric (*Curcuma longa*)” was conducted in the Department of Animal Nutrition & Department of Veterinary Biochemistry, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati- 781022.

Local variety of raw turmeric rhizomes were procured from Beltola market of Guwahati city of Assam. The turmeric rhizomes were first washed thoroughly to make it free from dirt and dust. Then these rhizomes were sliced into thin long pieces. Then the rhizomes were boiled in hot water for 30 minutes. Boiling process softens the rhizomes due to gelatinization of starch and thus dries faster. It also removes the raw odor from turmeric and ensures a uniform color for the powdered turmeric. From a health stand point, boiling will kill any harmful germs present in the soil which can get into the powder. After boiling the turmeric rhizomes were allowed to sun dried for 15 days till it became completely dry. The dried substances were ground and sieved (300 micron sieve) to obtain the dry turmeric powder and were stored at room temperature for use in the purposed experiment.

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The proximate analysis of the turmeric sample was done as per standard procedures. Moisture, dry matter, protein and crude fibre contents were determined by the method described by James (1995) [9]. Total ash was determined by AOAC (2000) [1]. Fat content of the sample was determined by Pearson (1976) [14].

The curcumin content of local variety of turmeric was estimated following a standard procedure described in an article entitled as "Extraction of Curcumin from Turmeric Roots" by Ashok Kumar Popuri and Bangaraiah Pagala (*International Journal of Innovative Research & Studies*, Volume II, Issue 5, May, 2013, PP 289-299). Curcumin is the main coloring substance in *Curcuma longa* and it is a liposoluble compound and can be extracted from turmeric root with organic solvents such as ethanol or acetone. Dried turmeric powder (100 g) was treated with suitable solvent like acetone of about 100 ml. It was performed by heating the mixture up to the boiling point of the solvent (boiling point of acetone is 56 °C). The filtrate was then separated known as oleoresin and was further subjected to washes with hexane (HPLC grade). After this it leaves out a powdered purified food color known as curcumin.

Results and discussion

The result in Table 1 shows that the turmeric contains 11.80% moisture content, 8.30% ash, 2.50% crude fibre, 11.00% fat and 68.80% nitrogen free extract. It also contains 9.40% crude protein which implies it could be good source of protein. The 8.30% ash content of turmeric shows that turmeric will contain reasonable amount of mineral. The fibre (2.50%) presents in turmeric will help to cleanse the digestive tract of its consumer by removing potential carcinogens from the body and prevents the absorption of excess cholesterol. Fibre also adds bulk to the food and prevents the intake of excess starchy food and may therefore guard against metabolic conditions such as hypercholesterolemia and diabetes mellitus (Bamishaiye *et al.*, 2011) [3].

Table 1: Nutrient Composition of Turmeric Powder

Nutrient composition	Turmeric powder
Dry matter (%)	88.2
Crude protein (%)	9.40
Ether extract (%)	11
Crude fibre (%)	2.5
Nitrogen free extract (%)	68.8
Total ash (%)	8.3

The amount of curcumin powder obtained was 3g/100 g turmeric powder and thus the curcumin content of the turmeric used for the experiment was 3.00% on dry matter basis. Reema *et al.* (2006) [18] also reported the curcumin content to be about 3.14% in turmeric obtained from Asian Indian continent. Geethanjali *et al.* (2016) [7] showed the curcumin content ranged between 0.12 to 2.35% in turmeric sample from different parts of India. Jha and Deka (2012) [10] found that Lakadong turmeric mostly produced in Jaintia hills to be best quality owing to its high curcumin content.

Conclusion

The result obtained showed turmeric to be a potential natural ingredient containing important bioactive components which can be effectively use as preventive or therapeutic purpose in both human and animal health. It proved to contain essential components which would be effective against innumerable

diseases as well as for better growth performance of both human and animals. In livestock, turmeric powder could be supplemented as feed additive for better performance and production benefits. Further it also ruled out the ill effect of antibiotics resistance caused due to indiscriminate use of antibiotics for treatment purpose and can be used as potent natural growth promoter.

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