



Original Article

Biochemical Analysis and Nutritional Composition of Fenugreek Extract

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ABSTRACT

Fenugreek is important herb because of their high phytochemical content, dietary fibre level, and nutritional value. Fenugreek have a wide range of nutritional and physiological benefits and its value added products have been provided in this study. **Objective:** To characterize the Fenugreek seeds powder for its nutritional and chemical profile. **Methods:** Fenugreek was analysed for its chemical contents i.e. moisture, crude fibre, ash, crude fat and protein, minerals and antioxidants was quantified according to their procedures. **Results:** The results showed fenugreek had higher values of proximate testing and other nutrients like minerals. The results showed fenugreek had higher antioxidants. **Conclusions:** In conclusion, Fenugreek outperform most chemical, nutritional, vitamin, and outstrip Fenugreek antioxidants criteria. It is convincingly suggested that Fenugreek be included in a diet-based treatment for rheostat lifestyle-related illnesses.

INTRODUCTION

Trigonella foenum graecum is referred to as "Methi" and is frequently used as a spice in food. In India, Egypt, the Middle East, and North Africa, fenugreek is grown [1]. Traditional treatments for ailments like gastrointestinal problems, gout, inflammation, hyperlipidemia, and diabetes have included the usage of the plant's seeds. Its seeds are utilised for their tonic, aphrodisiac properties. The seeds and leaves of *Trigonella foenum graecum* are also claimed to have anti-diabetic properties [2]. It has

attracted a lot of scientific interest recently. One of the many chemical components of fenugreek is steroid sapogenins. It has been established that the fenugreek embryo, which is oily, contains diosgenin. Trigonelline, mucilage, tannic acid, are all found in Fenugreek seeds [3]. Diosgenin content in fenugreek seeds ranges from 0.1% to 0.9% and is extracted commercially. It has been demonstrated that fenugreek plant tissue cultures can yield up to 2% diosgenin and lesser amounts of trigogenin

and gitongenin when cultivated in the right conditions [4]. Seeds (fenugrin B) contain the saponin as well. Numerous alkaloids and a range of coumarin compounds have been found in fenugreek seeds by researchers. Trigonelline undergoes a substantial conversion to related pyridines and nicotinic acid during roasting. The majority of fenugreek seeds' bioactive ingredients are most likely polyphenolic compounds [5]. The fenugreek is well suited to the agricultural system and agro-climatic conditions of the area. Their nutritional value and therapeutic qualities, as well as their genetic variety, have not yet been thoroughly investigated. We previously described the antioxidant capabilities, phytochemical content, and nutritional value of fenugreek seeds [6]. The goal of the current investigation was to assess the fenugreek seeds' antioxidant qualities, phytochemical concentrations, and approximate chemical makeup.

METHODS

Fenugreek extract used in this study was purchased from a local Lahore market and then sealed in a bag to prevent contamination until it was further analysed in the University of Lahore's Institute of Diet & Nutritional Sciences laboratory. Fenugreek extract were analysed for its chemical contents i.e. moisture, crude fiber, ash, crude fat and protein was quantified according to their relevant procedures [7]. The nitrogen-free extract (NFE) was calculated by difference method. A sample was collected from fenugreek extract and it was analysed for their moisture contents through making use of an air forced draft oven (Memmet Germany) at $105\pm 5^{\circ}\text{C}$ temperature according to the method No. 44-15A. [8]. Samples should be taken and the protein nutritive value of fenugreek extract samples was tested using Kjeldahl's method (method No 46-10) [9]. The fat content was observed and sample was taken for the determination of fat content. The instrument was used is Soxhlet apparatus in accordance with method No. 30-25 [10]. Fenugreek extract samples was taken for crude fibre analysis by adopting the procedure mentioned in Method No. 32-10 [11]. Ash content in fenugreek and garlic was calculated by following method No. 08-01 [12]. By subtracting the percentages of crude fat, moisture, protein, crude fibre, and total ash from hundred, the nitrogen-free extract (NFE) was obtained. Iron, sodium, copper, zinc, magnesium, potassium and calcium are usually determined by two methods that are flame photometer and atomic absorption spectrophotometer [13]. The effect of Fenugreek seeds and Garlic Powder, on the glutathione content of rats will be determined by following the protocols described by Sultan et al., [14]. Similarly, lipid peroxidation will be measured according to the methods reported by Sultan et al., [14]. Furthermore,

the antioxidant enzyme assay will be included in the estimation of concentrations of superoxide dismutase (SOD) and catalase. The measurement of SOD will be based on the methods described by Sultan et al., [14].

RESULTS

By a number of elements, influence the suitability of a given application. Moisture content, protein content, crude fibre, ash content, and total dietary fibre, for example, are quality parameters that directly or indirectly affect product quality, as assessed by various chemical tests [15]. The chemical characteristics of fenugreek extract were investigated, and the results are presented below in Table 1. The moisture content of fenugreek extract was $9.3\pm 1.22\%$, ash $7.1\pm 1.1\%$, protein $5.2\pm 0.7\%$, fat $3.1\pm 1.7\%$, fiber $4.9\pm 1.2\%$ and NFE $79.7\pm 1.2\%$ evaluated by the results.

Table 1: Proximate composition (%) of fenugreek Extract

Composition	Fenugreek
Moisture	9.3 ± 1.22
Ash	7.1 ± 1.1
Protein	5.2 ± 0.7
Fat	3.1 ± 1.7
Fiber	4.9 ± 1.2
NFE	79.7 ± 1.2

Micro nutrient insufficiencies are considered as "hidden hunger" are main public dominant threat to human health [16]. Iron insufficiency is ranked tenth among the 26 most harmful extortions now in use. Investigation of indigenous, affordable, and easily accessible sources can alleviate the threat of prevalent hidden hunger. This was replacement for expensive nutrient supplementation package. All herbs have different amount of minerals in different manner and are bound with nicotianamine. Table 2 have shown different mineral content of Fenugreek. The results showed fenugreek had higher values of minerals, vitamins. Fenugreek had higher potassium (770 mg/100g), phosphorus (515 mg/100g), magnesium (191 mg/100g), zinc (2.08 mg/100g), iron (11.19 mg/100g) content. Presence of potassium, calcium, and low level of sodium that are beneficial for heart health. Presence of iron make it good for anemia. Zinc is also present that is important for immune functioning [13].

Table 2: Mineral composition of fenugreek extract (mg/100g)

Minerals	Fenugreek
Calcium	84.17 ± 1.28
Iron	11.19 ± 0.92
Magnesium	191 ± 0.2
Manganese	0.1 ± 0.22
Phosphorus	515.7 ± 2.4
Potassium	770 ± 4.2
Sodium	67 ± 3.3
Zinc	2.08 ± 0.33

Fenugreek extract were analyzed for its antioxidant potential through different tests including total phenolic contents (TPC), DPPH (2, 2-diphenyl-1-picrylhydrazyl) assay, 2, 2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) ABTS assay, Ferric Reducing Antioxidant Power Assay (FRAP), total antioxidant content and total flavonoids content. Radical scavenging activity is exhibited by fenugreek seed extract when combined with methanol, ethanol, dichloromethane, acetone, hexane, and ethyl acetate (Table 3).

Table 3: Antioxidant contents of fenugreek extract

Antioxidants	Fenugreek
Total phenolic content (mg Gallic Acid/gm)	173.38±12.29
Tannin content (mg Tannic Acid/gm)	3.94±0.83
Total flavonoids content	18.5 ± 0.02
FRAP (mg Ascorbic Acid/gm)	4.89±0.21
DPPH scavenging activity	13.72±0.88

DISCUSSION

According to Chaturvedi et al., (2013), fenugreek has a protective effect against lipid peroxidation and enzymatic antioxidants [17]. According to Naidu et al., (2011), the maximum protein and saponin concentration was found in the proximate composition of fenugreek seeds, husk, and cotyledons [18]. Husk, on the other hand, contained more total polyphenols. By scavenging free radicals, fenugreek seed, husk, and endosperm extracts demonstrated 72%, 64%, and 56% antioxidant properties at a 200 µg concentration, respectively [19]. According to the study, there may be a process viability benefit to separating fenugreek seeds into their husk and endosperm as opposed to first selectively fractionating the bioactive components for successful isolation [20]. The prophylactic effect of fenugreek seeds on the formation of renal stones in rats was investigated by Laroubi et al., (2007) [21]. Fenugreek leaves can be applied topically to patients suffering from calcic urolithiasis. Fenugreek has been shown to have anti-inflammatory properties.

CONCLUSIONS

Fenugreek is generally considered to be one of the healthiest food you may consume, as they are highly nourishing and rich in minerals, vitamin and plenty of fiber. This study analyzed the nutritional and chemical profile of Fenugreek seeds powder, revealing high phytochemical content, dietary fiber, and nutritional value. Results showed higher proximate testing values and antioxidants, suggesting Fenugreek could be a valuable addition to diets for treating including rheostat-related illnesses.

Authors Contribution

Conceptualization: MKN

Methodology: FE, SH, NF, MA, SZUHZ

Formal analysis: MKN

Writing-review and editing: MKN, MOMA, TN, FH, MAI

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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