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Research Article

# Proximate Composition of Old and New *Trigonella Foenum-Graecum* Seeds

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## Abstract

Investigations were carried out for the proximate composition (Moisture content, ash content ,crude protein, crude fibers, fat content and carbohydrate) of two types of *fenugreek* seeds old and New and effect of boiling and soaking treatment proximate composition .The results of proximate composition documented that there is high moisture content of old boiled *fenugreek* seeds (10.62%) , high ash content in old boiled fenugreek seeds (2.56%), high crude protein in old raw fenugreek seeds (10.62%), high crude fibers in New boiled *fenugreek* seeds (28.85%), high fat content in old raw fenugreek seeds (14.38%) and high carbohydrate in New fenugreek seeds (54.09%). All the results in proximate composition is significant differences at probability ($P \leq 0.05$). *Fenugreek* seeds have an important nutritional contain minerals, dietary fibers, polyhedral, protein, carbohydrate useful for added to food product. The Aim of this paper: To determine the chemical composition of old and New *Fenugreek* seeds grown in Sudan. To study the effect of soaking and boiling Time on chemical composition of new and old *Fenugreek* seeds.

**Keywords:** Investigations; Proximate; Composition; Fenugreek; Seeds; Probability

## Introduction

*Fenugreek*, (*Trigonella foenum-graenum*) is an annual crop from the family of *legumes*. the seed of this plant growing in south Asia, it has been known to have health potential with the ability to lower blood glucose and cholesterol levels, and hence in the prevention and treatment diabetes and coronary heart diseases [1], the plant have greater important as ingredient in food, Medicine, cosmetics, also the plant used in foods to improve flavor, and color, they also antioxidant, antimicrobial, pharmaceutical and nutritional properties [2-4].The basic effect of plant when used in cooking and confectionary can be for flavoring , deodo ringing, Masking and coloring, [5] ,in Sudan the seed have many uses especially in folk medicine, whole seeds are swell owed as anti-acid and against dysentery and stomach disturbances [6,7] , Also especial porridges (Madidat-hilba), is made from wheat flour to which whole or ground *fenugreek* seed are added to fattening woman, it also used by lactate woman in form of thin porridges [8,9]. *fenugreek* seed contain, protein, fat, ash, crude fiber, gum and lipids it is also rich source of calcium, iron, B-carotene and other vitamins [1,10]. *fenugreek* seeds contain higher proportions of minerals including K, Mg, Zn and Mn [11]. The soaking and boiling time cause reduction in chemical composition of *fenugreek* seed [5,12-18].

## Materials and Methods

### Materials

The samples of old and new seeds (*fenugreck*) were collected from a local market in (Omdurman area –Khartoum -Sudan)

## Methods

All the proximate analyses of (Moisture, ash, fat, fiber and protein.)

Were conducted according to [19,20].

## Determination of moisture content

'2g of both (*Fenugreek*) new and old seeds were weight and placing in to pre-weighed aluminum dish and dried in a forced–air convection oven at 105˚ C unit constant weight was reached, the data reported represents by three determinations for new and old as below:

Moisture (%) = ((W2-W1)–(W3-W1))/(W2-W1) x 100

Where:

W1=weigh (g) of empty dish

W2=weigh (g) of sample and dish

W3=Weight of dish and dry sample

## Determination of fat content

'3-5g of samples was placed in to bottle that was weighed before and take it in to soxhlet , 250 ml of petroleum ether was added and heated at 80-90°C until solvent is completely evaporate . Then the bottle was transferred to cool in desiccators after that the bottle and its dried sample was weighed and calculated as:

Fat (%)=(W2-W1/W3) x100

Where:

W1=Weight of empty bottle

W2=Weight of bottle and oil

W3=Weight of sample

## Determination of fiber content

'2g of sample were weighed, 200ml of sulphuric acid was added and heated to boiling for 30 minutes and filtered. The residue was washed three times by using hot water; 100ml and 50ml of Na OH were added and heated to boiling for 30 minutes and filtered, then washed carefully three times with hot water until it was free from acid .The sample were dried under suction and transferred to an oven at 105°C, overnight and finally weighed .The residue was a shed in amuffle furnace at 550°C for three hours till alight grey ash was formed then weighed to a constant and the total crude fiber percent was calculated by the equation as below.

Crude fiber (%) = (W1-W2)/W3 X 100

Where:

W1=Weight of sample before ignition

W2=Weight of sample after ignition

W3=Original sample weight

## Determination of ash content

Ash content was determined by drying ash method when empty crucible was weighed and 2g of sample was weighed in to crucible, and heated at 550°C in furnace until the sample turns to gray after complete heating the crucible was placed in to desiccators to cool, and then the sample was weighed again and calculated as below:

Ash (%) = (W1-W2)/S) x 100

Where:

W1= Weight of crucible with sample

W2= Weight of empty crucible

S= Weight of sample

## Determination of crude protein

Kjeldahl method was used to determine the crude protein .1g of sample was placed indigestion flask; 5 g of kjeldahl catalyst and 200 ml $H_2SO_4$ was added and boiled until the solution clears and cooled, 60 m l$H_2O$ was added; the flask connected to digestions same and immersed in standard acid; 5-7 drops of mixed indicator were added, and heated until all $N_2$ was distilled after that was titrated with NaOH and calculated as equation below

Protein (%) = ((A-B) x Nx14.007x6.250)/W

Where

A=Volume (ml) of 0.2 NHCL used sample titration

B= Volume (ml) of 0.2 NHCL used in blank titration

N=Normality of HCL

W=Weigh (g) of sample

14.007= Atomic weigh of nitrogen

6.25= the protein-nitrogen conversation factor.

## Results

| Type of sample | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **A** | **B** | **C** | **D** | **E** | **F** |
| Moisture | 9.51 ± 0.02f | 9.76 ± 0.01e | 9.82 ± 0.01d | 10.40 ± 0.03c | 10.40 ± 0.02c | 10.62 ± 0.02a |
| Protein | 24.519 ± 0.01a | 19.28 ± 0.01c | 15.32 ± 0.02d | 20.90 ± 0.01b | 17.85 ± 0.02c | 10.62 ± 0.02a |
| Fat | 6.62 ± 0,02a | 3.51 ± 0.02e | 2.65 ± 0.01d | 5.30 ± 0.02b | 4.60 ± 0.02d | 14.38f |
| Ash | 3.62 ± 0.02f | 3.52 ± 0.01b | 1.78 ± 0.02e | 2.92 ± 0.01c | 2.40 ± 0.02d | 2.56 ± 0.02f |
| Fiber | 21.62 ± 0.02f | 24.70 ± 0.02e | 28.85 ± 0.02b | 25.50 ± 0.01d | 28.32 ± 0.02c | 30.65 ± 0.01a |
| Carbohydrate | 54.09 | | | 34.98 | | |
| Mean ± SD having different superscripted use on rows are significantly different (p ≤ 0.05) | | | | | | |

**Table 1:** Chemical composition of new and old soaked and boiled fenugreek sample.

1: Sample A: New *fenugreek.*

2: Sample B: New *F*. soaked in water for 24 mints.

3: Sample C: New F. boiled in water for 30 mints.

4: Sample D: old fenugreek.

5: Sample E: old *F*. soaked in water for 24 mints. 6: Sample F: old *F*. boiled in water for 30 mints.

## Discussion

### Chemical composition of fenugreek sample

As presented in table (1) chemical composition of *fenugreek* sample, the results in dictated that the chemical composition of *fenugreek* sample significantly (p≤0.05) effected by boiling time (24 and 30 mints).

### Moisture content

The moisture content of new *fenugreek* sample significantly lower (9.51) than that of old *fenugreek* sample which reported higher moisture content (10.56), this may due to effect of storage conditions which cause increase in moisture that afflicted by soaking time (24mits) and boiling time (30mits) ,the MC significantly (P ≤ 0.05) increase from 9.51 to 9.76 for soaked New F. and 10.40 to 10.5 for old F. and also significantly by boiling time (30) the M.C increase from 9.51 to 9.82 for new F. and 10.40 to10.62 for old F.S, this agree with [1,2], whom reported that soaking and boiling cause increase in moisture content of new and old F. and ranged from (9-11%) for New and old *fenugreek.*

### Protein content

The protein content of New *fenugreek* sample (A) significantly (P ≤ 0.05) higher (24.51), than that of old *fenugreek* sample (D) (20.9), this deicers in protein content in old sample may be effect of storages condition, the protein content of *fenugreek* sample significantly (P ≤ 0.05), effected by soaking time (24 mints) and boiling time (30mits) protein content significantly (P ≤ 0.05), decrease from 24.41 to19.28 for soaked new F. and 20.9 to17.85 for old F. sample, also the protein significantly (P ≤ 0.05) influenced by boiling time (30mits), the protein decrease from 24.51to15.32 for new F. sand from 20.90 to14.38 for old F.s ,the results agrees with the results reported by [5], who indicated that, the protein content of soaked and boiled F. seed sample varied from (14to25).For new and old F.

### Fat content

New *fenugreek* sample (A) significantly (6.62) higher than old *fenugreek* sample (D) (5,30) the fat content of *fenugreek* sample significantly (p < 0.05), effect by soaking and boiling time, fat content decrease from (6.62) to (3.51) for old *fenugreek* sample (D) also fat content decrease from 6.62 to 2.65 for New *fenugreek* sample (A) and from 5.32 to 2.56 for old *fenugreek* sample (F), this decrease of fat content could be due to effect of soaking and boiling time. the result agrees with the reported by [5,24], whom reported soaking and boiling and roasting time decrease the fat content of *fenugreek* seed. The result also in line of finding [1], who reported that fat content of boiled and soaked *fenugreek* sample ranged from (2-8) % [22], indicate that the fat content varied from2-9%.

### Ash content

Ash content of New *fenugreek* sample (A) significantly ($p < 0.05$) higher (3.62) than old *fenugreek* sample (D) (2.92) the Ash content significantly effect by soaking and boiling time (24,30 minutes) the Ash content decrease from3.62 to 2.52 for soaked New *fenugreek* sample (A) and from 2.92 to 2.42 for *fenugreek* sample (D), also the Ash content decrease from3.62 to1.78 for boiled New *fenugreek* sample (F) the result are in agree with the result reported by [5,25] whom state that the soaking ,boiling and roasting time decrease the Ash content of *fenugreek* seed. The result also agrees with the result reported by [1], who the Ash content of soaked, roasted and boiled *fenugreek* seed ranged from1.5 to 4.5%.

### Fiber content

Fiber content of New *fenugreek* sample (A) significantly lower (21.6) than old *fenugreek* sample (D) (25.50) ,the ash content increased from 21.65 to 24.70 for soaked New *F* sample and from 25.50 to 28.50 for old *F* sample, also the ash content decreased from 21.65 to 28.25 for boiled New *F* sample and 25.50 for boiled old sample, this increase might be due to effect of boiling and soaking time [5], the results also agrees with the results mentioned by [21-23],whom concluded that fiber content of boiled ,roasted and soaked *F* seed varied from20-32%.

## Conclusion

The chemical composition such as protein, fat, ash, fiber, of new *fenugreek* sample higher than old fenugreek sample. This might be due to storage condition, soaking and boiling time cause increase in moisture content and fiber content and cause decrease in protein, fat, ash, fiber, and carbohydrates.

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