



Comparative Proximate Analysis of Cinnamon And Lemongrass for its Nutritive Value

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Abstract

A study was conducted to evaluate the nutritive value of cinnamon and lemon grass based tea. The standard procedures of AACC, 2000 were followed to analyze the proximate composition. The caloric value was calculated from crude protein, crude fat, crude fiber, moisture and ash content. The results revealed that cinnamon contained ash (2.9%), moisture (5.6%), crude fat (4.4%), crude fiber (35%), crude protein (4%) and nitrogen free extract (249kcal/100gms). While lemongrass contained ash (5.3%), moisture (10.12), crude fat (0.52%), crude fiber (19.2%), crude protein (1.86%) and nitrogen free extract (63%). This study concluded that the tested cinnamon contained highest amount of fiber and lowest amount of ash. Similarly, the tested lemongrass contained highest amount of fiber and lowest amount of crude fat. The study was conducted to identify nutritive value of cinnamon and lemongrass and make the nutritionally acceptable and medicinally valuable.

Keywords: Proximate analysis; Cinnamon; Lemongrass; Nutritive value

Introduction

Cinnamon and Lemongrass are one of the oldest and flavored filled spices. Cinnamon is an ingredient that incorporates a kind of uses among many alternative cultures, from spicing up of foods to its anti-oxidant uses. There are two main types of Cinnamon that are unremarkably found in foods i.e. Cinnamomum verum or Cinnamomum zeylanicum and Cinnamomum cassia, additionally referred to as cassia [1]. Cinnamon is found to be a potential compound in treatment of diabetes mellitus. This insulin resistant property of Cinnamon had been discovered almost twenty years ago [2]. Many animal and human studies have elucidated Cinnamon's effect in reducing blood glucose levels [3]. First intervention to determine the effect of Cinnamon in subjects with type 2 diabetes was conducted in Pakistan [4]. Lemongrass also known as Cymbopogon citratus Stapf (Poaceae family) is an aromatic plant and widely used as a source of traditional medicine [5]. Herbal medicines showed beneficial effects on subjects with type 2 diabetes [6]. Citral is one of the main components of Lemongrass.[7] Many bioactive components are present in Lemongrass which makes it a medicinal plant and helps Bioefficacy. Lemongrass is widely used in treating many diseases and recognized as a folk medicine as compared with other plants [8]. It acts against free radicals and inhibit the reactive oxygen species [9]. In a study proximate analysis of

Lemongrass plant was done to evaluate its nutritional value. The proximate composition of Lemongrass was observed in a study which stated that Lemongrass contained 60% of carbohydrates, 20% of proteins, 5% of fat, 4% of ash and 9% of moisture [11]. The present study was therefore initiated to determine the proximate composition of both cinnamon and lemongrass.

Materials and Methods

A sample of cinnamon and lemongrass was recruited from local markets of Lahore for its proximate composition to evaluate the nutritive value.

Grinding

The bark of cinnamon and grass of lemongrass were grounded to powder form by using a grinder.

Proximate analysis

After bringing the samples to uniform size, they were analyzed for moisture, ash, crude protein, crude fat, crude fiber and nitrogen free extract by following the standard procedures of AACC2000.

Determination of moisture

The moisture content was determined by hot air oven method. 5g of sample was weighed in crucible and placed in a hot air oven (Mettler, VO 200, Heilbronn, Germany) at 100°C to 105°C for about 6 to 12 hours. The procedure was repeated until a constant weight was achieved. The china dish and sample were allowed to cool and then after that it was put in air tight desiccator for about 30 minutes. China dish was weighed again and then moisture content calculated by using following formula.[10]

$$\text{Moisture(\%)} = \frac{\text{Weight of sample(g)} - \text{weight of dry sample(g)}}{\text{Weight of sample(g)}} \times 100$$

Determination of ash

To calculate ash content Empty and clean crucible was placed in a muffle furnace at around 600°C for about one hour. After

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letting it cool the crucible was weighed then 2 gm of sample was taken and placed in crucible. Sample was charred by the help of burner. After charring the crucible was placed again in muffle furnace for about 4 hours at 550°C. The occurrence of grey and white matter showed oxidation of organic matter. The machine was turned off when done with ashing. Ash was calculated after cooling: [10]

$$\text{Ash}(\%) = \frac{\text{Wt. of ash in sample(g)}}{\text{Wt. of sample(g)}} \times 100$$

Determination of crude protein

Kjeldahl Apparatus was used to determine nitrogen percentage. A sample of 2g was taken in a flask with 25ml of conc. H₂SO₄ in it. Add digestion mixture (5 gram potassium sulphate, copper sulphate, ferric sulphate with 100:10:5 parts). The sample was then added in it and digested until it turned into green or colorless for about 4 to 6 hours. The samples were filtered and the volume was made up to 250ml in a volumetric flask. 10ml solution with 40% of sodium hydroxide with 4% boric acid was then distilled. After distillation it was titrated it with 0.1N H₂SO₄ to attain a light pink color as an end point. Following formula was used to assess crude protein: [10]

$$\text{Nitrogen \%} = \frac{\text{volume of } 0.1\text{N H}_2\text{SO}_4 \text{ used (ml)} \times \text{volume of dilution (ml)} \times 0.0014}{\text{wt. sample in g} \times \text{volume of diluted solution (ml)}} \times 100$$

Crude Protein %: Nitrogen% x 6.25*

(*factor for Cinnamon and Lemongrass)

Determination of crude fiber

Oven dried fat free sample 2g was used to determine crude fiber in a glass beaker for about 30 minutes in 200ml of boiling H₂SO₄ (1.25%). The sample was digested, filtered and washed three times with distilled water to make it acid free. The filtered sample was again digested for 30 minutes in 200ml of boiling distilled 1.25% NaOH. The sample was filtered and washed three times to make it alkali free. The filtered sample was dried in hot air oven at 105°C. The crucible was put in the muffle furnace for ash content. The percent ash was determined by the following formula: [10]

$$\text{Crude Fiber \%} = \frac{\text{Oven dried weight.} - \text{weight of the incineration in furnace}}{\text{Wt. of original sample(g)}} \times 100$$

Determination of crude fat

Crude fat was determined through Soxhlet's apparatus (J.P.SLECTA, Spain) along with hexane as a solvent. 2g of dried sample was weighed and put in extraction flask and closed with cotton plug. About 250ml ether was added in a 500ml flask and connected with Soxhlet's apparatus. Adjust 3 to 4 drops of ether to 2 to 3 drops per hour were adjusted. Removed after 6 to 7 siphons. Dry the sample in hot air oven for at 105°C for about 1 hour and then weighed. Crude fat was determined by the following formula. [10]

$$\text{Crude Fat \%} = \frac{\text{Wt. of petroleum ether extract}}{\text{Wt. of original sample(g)}} \times 100$$

Determination of nitrogen free extract

Nitrogen free extract was calculated by difference after analysis of all the other items method in proximate analysis. [10]

NFE = (100-%moisture+ %crude protein + % crude fat + % crude fiber + %ash)

Results and Discussion

The study was done to know the nutritive value of locally available cinnamon and lemongrass spice. Using standard procedures, the proximate composition of both cinnamon and lemongrass were determined and presented in table no. 1 and 2

The table no. 1 shows that the proximate analysis of cinnamon, which is locally known as daarchini and revealed that it contained (2.9%), moisture (5.6%), crude fat (4.4%), crude fiber (35%), crude protein (4%). While, Table no.2 revealed that lemongrass contained ash (5.3%), moisture (10.12), crude fat (0.52%), crude fiber (19.2%), crude protein (1.86%). This data was the average of three determinations and the result showed that cinnamon has highest carbohydrate content. It also provided dietary fiber. The moisture content is higher than the values reported by the other scientists [14]. The ash content, crude fiber, nitrogen free extract are almost close to the values reported by [14]. While, the fat content is higher as compared to the values reported by [14]. The energy content is slightly lower than the values reported by [14]. Furthermore, for lemon grass the moisture content is higher than the values reported by the other scientists [12]. The ash content is almost close to the values reported in [13], crude protein is slightly higher from the values reported in [13], crude fat is slightly lower from the values reported in [13], crude fiber and nitrogen free extract is higher when compared with values reported in [12], energy content is also higher when compared with [12]. The variation in the results is maybe due to the difference in specie used and environmental condition.

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