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Analysis of cinnamon (proximate analysis)

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Abstract

A study conducted to know the values of cinnamon in the chemistry department of UET, Lahore. The procedures were followed to analyze the proximate composition and minerals were according to the AOAC. The caloric amount was determined from moisture, crude protein, crude fat, crude fiber, and also total ash content. The Iron (Fe), Zinc (Zn), Calcium (Ca), Chromium (Cr), Manganese (Mn) and Magnesium (Mg) were determined by Atomic Absorption Spectrophotometer, and Phosphorus (P) by Spectrophotometer. The results shown that cinnamon contained moisture (5.82%), crude protein (3.56%), crude fat (4.35%), crude fiber (31.24%), and ash contents (2.67%). While the minerals determination that cinnamon contained iron (7.9 mg/g), Zinc (2.6 mg/g), Calcium (101.8 mg/g), Manganese (15.1 mg/g) and Magnesium (98.5 mg/g).

Keywords: Cinnamon; Menstruation; Asthma; Paralysis; Diabetes

Introduction

Cinnamon is one of the oldest, best-known spices with a high flavour. It belongs to the Laurel family Cinnamomum (Lauraceae) genus. It is called Darchini in Urdu, Persian and Hindi, which means "China bark."

Cinnamon has several different kinds, depending on its region and colors, but the most important is *Cinnamomum zeylanicum*, *Cinnamomum cassi*a. Cinnamon has a wide number of species. *Cinnamomum zeylanicum* is known by its characteristic as cinnamon or true cinnamon, while cassia are the Chinese species, both of which have a fragrant, sweet and warm flavour and a more sophisticated and subtle flavour. The bark of the bark is used as an oil seasoning. Cassia oil is cheaper, heavier than Ceylon, less liquid and more plentiful. The value of the cinnamic aldehyde depends on the percentage it contains [1]. Cinnamyl acetate, cinnamic acid, phenylpropyl acetate and orthocumaric aldehyde, tannic acid as well as starch are present in the medication and are an effective germicide but seldom used for this reason as a very irritant.

The health-protecting effect of cinnamon (active component) helps prevent unwanted blood-platelet clumping through inhibition of the release of an inflammatory araxidonic acid from platelet membranes and the development of an inflammatory communication molecule called thromboxane A2, which positions it in the group of 'anti-inflammatory' food that is capable of inflammation.

It is useful for treating various conditions including diarrhoea, nausea, vomiting, flatulence, spasmody, asthma, paralysis, menstruation, uterine and gonorrheal disorders. It is useful for tincture in uterine bleeding and menorrhea. It also helps to avoid influenza attacks when approaching the start of use in the rainy season. It's also a good refreshing mouth. It is used primarily to aid and taste other medicines as well.

Cinnamon allows people with type II diabetes to respond to insulin, thereby normalizing their blood sugar concentrations [2]. Not only can the body enhance its ability to use blood sugar, it will also increase the brain's activities by smelling the glorious scent of this sweet spice. In addition, it can also be used to monitor natural births.

The results of a study conducted in 2013 with 70 participants showed that taking 1 gram e g of cinnamon per day for 30 days and 60 days does not raise blood glucose levels. The authors analyzed 11 studies of cinnamon and diabetes, all producing a decrease in rapid levels of blood sugar. There have also been small decreases in studies assessing longer-term glucose, or HbA1C levels.

Materials and Methods

A sample of cinnamon was collected from the nearest native bazaars of Lahore for its further process (proximate composition) to evaluate the nutritional amount.

Grinding

The barks of cinnamon were grinded to fine powder by using a mortar and pestle first then electric grinder used to make it very fine powder.

Proximate analysis

For the proximate analysis, after getting the uniformity, they were evaluated for the moisture, crude protein, fat, crude fiber and ash by following the standard procedures explained by AOAC [4].

Determination of moisture

Hot air oven methods were used to assess the moisture content. Weighed about 5 g of sample in dish and put into a hot air oven at 105°C for minimum 1 hour. The china dish and the sample could be cooled and then placed into the desiccator (air tight) for around 10 minutes. Until constant weight was achieved, the procedure was repeated.

Determination of ash

Empty and clean crucible was put in a muffle stove about 600°C for about an hour to measure ash content. After cooling the sink was measured, About 2 gm of weighed sample placed into a pot. By the help of burner, sample was charred. The china dish was once more put in a muffle furnace at 550°C for approximately 4 hours after carbonizing. Oxidation of organic matter was seen as grey and white matter occurred. When you finish the ashing, the machine was switched off. After cooling, Ash was measured.

Determination of crude protein

To calculate the percentage of nitrogen, Kjeldahl Apparatus was used. A 2 g of sample with 2 ml of conc. was taken in a bottle. It's H_2SO_4. Add 5 gram digestion mixture (potassium sulphate, copper sulphate, 100:10:5 ratio of ferric sulphate). The sample was added and digested for around 4 hours to 6 hours, until it was green or colourless. The probes have been filtered and the volume in a volumetric flask has reached up to 250 ml. A 10 ml solution was distilled with 40% sodium hydroxide and 4% boric acid. It was titrated with 0.1 N H2SO4 after the distillation to achieve a light rose colour as an endpoint.

Figure 1 Hot air oven.

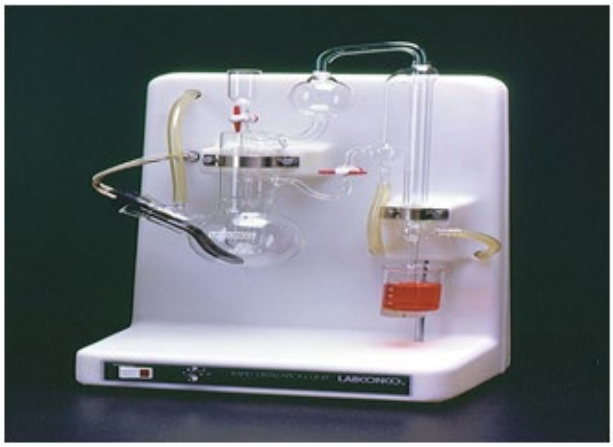

Figure 2 Kjeldahl apparatus for protein analysis

Determination of crude fiber

For approximately 30 minutes in 200 mL of boiling H_2SO_4 (1.25 percent), a dried fat-free sample of 2 g was used to evaluate the crude fiber in glass beaker. The sample was digested, filtered and washed with purified water three times to free it from acid. In 200 ml of boiling distilled 1.25 percent NaOH, the sample was again digested for 30 minutes. Three times the sample was filtered and washed to make it free of alkaline. In a heat air oven, 105°C, the filtered sample was dried. The tubing was fitted with ash content in the muffle furnace.

Determination of crude fat

Crude fat has been developed as a solvent by Soxhlet's system with hexane. 2 g of the dried sample is weighed and placed in a cotton plug extraction bottle. In a 500 ml bottle about 250 ml ether had been added and connected with the Soxhlet unit. Three to four ether drops adjusted to two to three drops every hour. After six or seven syphons, disabled. Dry the sample for approximately 1 hour in a hot air oven for 105°C then weighed.

Mineral analysis

First digested the 1 g of each sample in china dish at 60°C-70°C temperature with 10 mL of Nitric acid on a low flame burner, mix them well to make a slurry, again added conc. Nitric acid 10 ml mixed till it become slurry, then it was assimilated with distilled water 10 ml. further heat the mixture slurry until after that added about 50 ml distilled water. Transfer the assimilated clear content of sample to 100 mL titration flask and then the volume was prepared with de-ionized and double purified water and strained. By using AAS (AA240 Varian K, Australia), filtered sample solution was run. Known strength of sample for each minerals were initially run to gain calibration curve. The minerals content of cinnamon and jamun seeds were analyzed by means of the particular

Figure 3 Soxhlet apparatus.

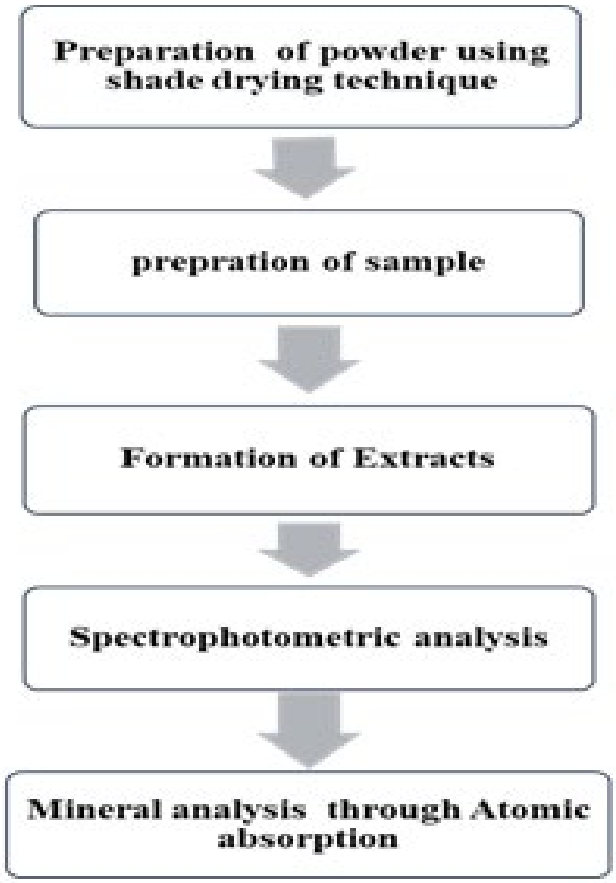

Figure 4 Flow chart for mineral analysis.

calibration curve prepared for each constituent.[4] For Na and K substances using photoelectric flame photometer (Sherwoo Flame Photometer 410, Cambridge, UK) all composition were analyzed by using the procedure describe in AOAC [5].

Results and Discussion

Table 1: Proximate analysis of cinnamon.

Proximate analysis composition	Quantity (%)
Moisture Content	5.82
Crude Protein	3.56t
Crude Fat	4.35
Crude Fiber	31.24
Total Ash	2.67

Table 2: Mineral analysis of cinnamon.

Minerals	mg/100g
Iron	7.9
Magnesium	98.5
Calcium	101.8
Zinc	2.6
Manganese	15.1

Results of table 1 revealed that proximate composition of cinnamon include moisture level about 5.82%, crude protein 3.56%, crude fat 4.35%, crude fiber 31.24%, and ash content about 2.67% [6].

Table number 2 showed the results obtained by the AAS performed in order to get the amount of minerals available in cinnamon like they are present in mg/g, amount of Iron 7.9, magnesium 98.5, calcium101.8, zinc 2.6, and manganese 15.1.

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