

Fatty Acid Analysis of *Cinnamomum Zeylanicum* (Dalchini) Bark Fatty Oil

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Abstract

The fatty oil was extracted from the crushed bark of *Cinnamomum zeylanicum*¹ (Dalchini) with pet ether (bp 60-80°C). It is soluble in hexane, benzene, chloroform and pet ether. Some properties of the oil such as acid value, Iodine value, saponification value and unsaponified matter were determined. They were found to be 13.85, 89.33, 140.60, 23.54% respectively (Table-1). The moderate Iodine value indicates that the Dalchini bark oil is non-drying in nature. Moreover, the low acid value of the oil indicates the good quality of the oil for edible purpose and low peroxide value shows its quite stable nature. The fatty acid contents of the oil were determined by glc. Identification and quantification of the individual components of the fatty acids were done by comparing the retention time of methyl esters of acid content with the reference acids. The analysis showed that the Dalchini fatty oil contained undecanoic acid (2.43%), linoleic acid (26.08), Stearic acid (47.68%), palmitic acid (15.58%), lauric acid (0.5%) and oleic acid (7.73) (Table-2).

Introduction

The bark of Dalchini tree is extensively used as spice and condiment. It is also used as a flavoring agent in liquid such as in hot punches, soups and sauces as well as cakes. In addition, the bark is used to a limited extent in medicine. It is aromatic, astringent, stimulant, expectorant and carminative. It processes the property of checking nausea and vomiting. As a stimulant it is beneficial in cramps of the stomachs, gastric irritation and paralysis of tongue. The ground cinnamon shows lipolytic activity. It is useful in diarrhoea and dysentery.² *Cinnamomum cassia* (bark) and *Cardiospermum helicacabum* (shoot + fruit) are the most effective extracts against HIV-1 and HIV-2.³ A major component of the essential oil known as eugenol obtained from the leaves of the cinnamon tree, has antiviral properties in vitro, specifically against both the HSV-1 and HSV-2 (Oral and Genital Hepes) viruses.⁴ A substance, CEppt in the cinnamon plant inhibits development of Alzheimer's in mice.⁵ CEppt, an extract of cinnamon bark, seems to treat a mouse model of Alzheimer's disease.⁶

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Cinnamon supplementation is able to significantly improve blood glucose control in Chinese patients with type 2 diabetes.⁷ It has been found that Dalchini bark contains a significant amount of fatty material. In fact, the fats are widely distributed throughout the animal plant worlds. However, when fatty matter is hydrolyzed, it gives a mixture of long chain fatty acids.

Thus for the better evaluation of fatty matter of the Dalchini bark, the study of fatty acids, the major constituents of all fatty matters are important.

Materials and Methods

The Dalchini bark was collected from a local market (Moulvi Bazaar) of Dhaka City. The collected Dalchini bark was washed thoroughly by water to remove dust particles. Thus it was ready for ether extraction. The fatty matter of the Dalchini bark was extracted by pet.ether⁸ (bp 60-80°C) according to the Scheme-1.

Acid value⁹, Iodine value^{10, 11}, saponification value¹², unsaponified matter^{12, 13}, peroxide values^{14, 15} etc. of the fatty matter were determined according to standard procedures. The results are shown in Table-1. The fatty acid contents of the oil were determined by glc^{16, 17}.

Identification and quantification of the individual components of the fatty acids were determined by comparing the retention time of the methyl esters of each component with reference acids. Percentages of fatty acid content were calculated (Table - 2). Gas liquid chromatography was conducted with a variant gas chromatograph fitted with a flame ionization detector and glass column (28 m x 0.2 cm id). A 3 % OV-225 on gas chrom-q (100/120 mesh) column was used at 200 °C isotherm with a nitrogen flow of 25 mL per minute. The fatty acid contents of the fats of Tejpata leaf and Dalchini bark were done¹⁸ by glc. The comparative data of two fats are shown in the Table-3 and Fig-1.

Sl. No.	Characteristics	Results (%)
1	Acid Value	13.85
2	Iodine Value	89.33
3	Peroxide Value	20.54
4	Saponification Value	140.6
5	Unsaponified matter	23.54
6	Free fatty acid value as stearic acid	6.925

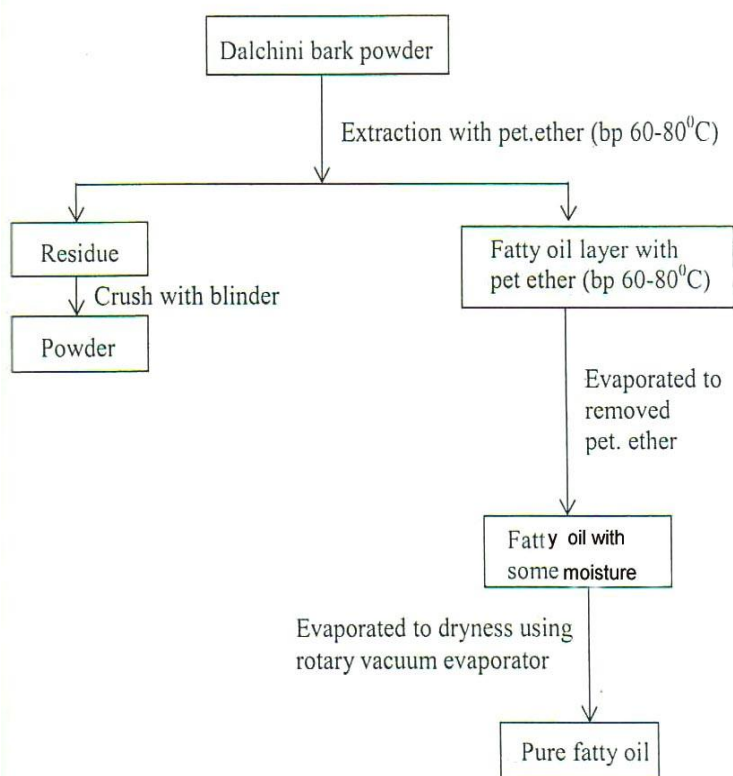
Table 1: Chemical Characteristics of Dalchini fatty oil.

Sl. No.	Retention time	Peak area	Relative percentage	Remarks
1	4.96	9505	2.43	Undecanoic
2	6.84	2118	0.5	Lauric
3	15.76	6079	15.58	Palmitic
4	19.67	101840	26.08	Linoleic
5	19.85	186420	47.68	Stearic
6	20.38	30253	7.73	Oleic

Table 2: GLC- Experimental Results of Fatty acid Composition (Dalchini bark)

Name of the fat	Palmitic acid	Stearic acid	Oleic acid	Linoleic acid	Lauric acid
Dalchini bark fat	15.58	47.68	7.73	26.08	0.5
Tejpata leaf fat	39.83	17.45	15.22	16.06	11.42

Table 3: Comparative fatty acid analysis of the two fats



Scheme-1: Extraction of Fatty Oil from Dalchini Bark

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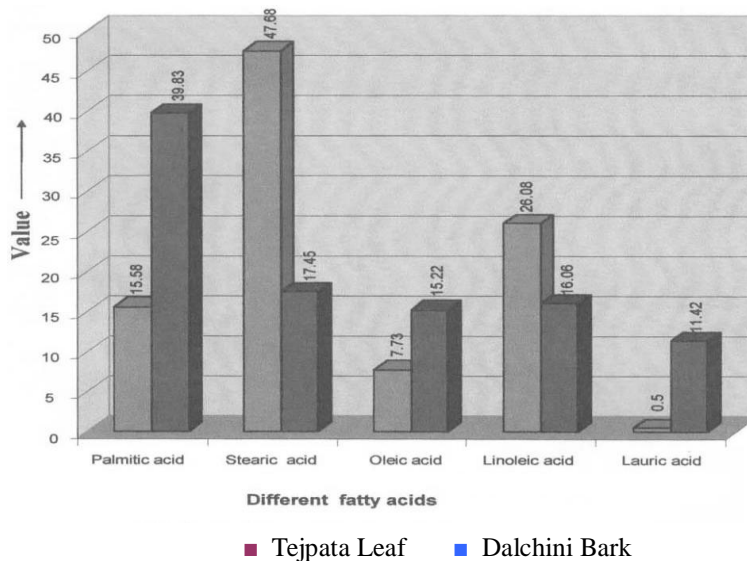


Fig-1: Comparative fatty acid analysis of the fats of Tejpata leaf and Dalchini bark

Results and Discussion

The chemical characteristics of Dalchini bark fatty oil such as acid value, saponification value, peroxide value, Iodine value and unsaponified matter content were determined by conventional methods. The acid value, saponification value, peroxide value, Iodine value and unsaponified matter were 13.85%, 140.60%, 20.54%, 89.33% and 23.54% respectively. Low acid value indicates the Dalchini bark oil is edible oil. Iodine value was found to be 89.33% which indicates that the fatty oil is non-drying. Moreover, the low saponification value of Dalchini bark oil (140.60%) indicates the presence of high molecular weight fatty acids in the oil. However, from the nutritional point of view high molecular weight fatty acids are more helpful to our health than those of low molecular weight. In that sense, Dalchini bark oil having low saponification value should be preferred. The high percentage of unsaponified matter of Dalchini bark oil was found to be 23.54%. The peroxide value of bark oil was 20.54%. The low peroxide value indicates the quite stable nature of the oil. However, it is noted that these values of the oil indicate the good quality of the oil for edible purposes.

The fatty acid analysis of dalchini bark fat was done by glc. The mole percentage of individual major fatty acids was determined and found as undecanoic acid(2.43%), Linoleic acid (26.08%), stearic acid (47.68%), palmitic acid (15.58%), lauric acid (0.5%) and oleic acid (7.73%).

Acknowledgement

The authors acknowledge their gratefulness to Mr. Gour Chandra Shah, PSO, of Chemical research Division, BCSIR Laboratory Dhaka for GLC analysis of the fatty oil.

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