



RESEARCH ARTICLE

A Review of Chemical Characteristics (Acid Value and Iodine Value) of Peanut Oil

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ABSTRACT

A groundnut/peanut (*Arachis hypogaea*) is a legume which is widely grown as a food crop. Peanut oil constitutes one of the essential components of balanced diet as good source of energy. Groundnut oil can be used for different purposes such as nutritional, medicinal and industrial only if correctly treated and selected. Since, some treatments for groundnut oil does not decreased the levels of the mineral elements but it rather increases the levels of said elements, therefore groundnut oil is a good source of protein and minerals which can be used in diets to prevent against some mineral deficiencies.

KEYWORDS

Peanut oil, Acid value, Iodine value

INTRODUCTION

Peanuts are a very good source of monounsaturated fats, the type of fat that is emphasized in the heart-healthy Mediterranean diet. Peanuts are good sources of vitamin E, niacin, folate, protein and manganese. Oils from nut are both edible and non-edible depending on the type. These oils are often available as raw materials for chemical and industrial applications. Nuts provide an interesting nutritional supply due to their high nutritive and energetic value. However, their high fatty content makes them unattractive for new consumers demanding “light”, low-fatty foods. Among nuts, almonds have a significant economic importance.¹ Peanut (*Arachis hypogaea* L.) is one of the most important oil crops in the world. Peanut oil is used to lower cholesterol and prevent heart disease.

It is also used to decrease appetite as an aid to weight loss. Some people use it to help prevent cancer. Rectally, peanut oil is used in ointments and medicinal oils for treating constipation. Pharmaceutical companies use peanut oil in various products they prepare for internal and external use.

The chemical and properties of oils are amongst the most important properties that determine the quality and help to describe the present condition of oils. Its constitute one of the essential components of balanced diet as good source of energy. The study indicated that Peanut oil, may have a higher shelf life, nutritional value and industrial applications. Vegetable oil had made an important contribution to the diet in many countries. The Peanut oil was analyzed for chemical properties, such as: iodine and acid value in the present investigation.

A groundnut/peanut (*Arachis hypogaea*) is a legume which is widely grown as a food crop. It is an herbaceous plant of which there are different varieties such as Boro light, Boro Red,

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Mokwa, Campala, Guta and Ela.² Peanut is an important source of edible oil for millions of people living in the tropics. Edible oils from plant sources are of interest in various food and application industries. They provide characteristics flavours and textures to food as integral diet components³ and can also serve as a source of oleo chemicals.⁴ The oil content of groundnut differs in quantity, the relative proportion of fatty acids, geographical location, seasons and growing conditions.⁵ Groundnut/Peanut seed contains 44 to 56 % oil and 22 to 30 % protein on a dry seed basis and is a rich source of minerals (phosphorus, calcium, Magnesium and potassium) and vitamins E, K and B group.⁶

Groundnut protein is increasingly becoming important as food and feed sources, especially in developing countries where protein from animal sources are not within the means of the majority of the populace.⁷ Groundnut seeds are reported to contain 9.5 to 19.0 % total carbohydrates as both soluble and insoluble carbohydrate.^{8,9,10} The chemical composition of groundnut seeds has been evaluated in relation to protein level¹¹ and fatty acid composition¹² in several countries. Vegetable oils are in high demand due to diseases associated with fat from animal origin. The groundnut cake has several uses in feed and infant food formulations.¹³ The literature has reported many health benefits associated with consumption of peanuts including cancer inhibition. This benefit is mainly attributed to micronutrients such as α -tocopherol, folate, minerals and health promoting phytochemicals, particularly resveratrol, ferulic acid and other phenolic compounds.¹⁴ Barku et al., 2012 have reported changes on the chemical composition as a result of processing. However, little information on the effect of traditional processing on peanuts quality was reported. The aim of this study was to investigate the nutritional composition and chemical composition in Groundnut oil.

METHODS

The Groundnut oil was analyzed for chemical properties, such as iodine value and acid value.

Acid Value

Acid value was determined by titrametric method of Pearson (1970). 5 gm of oil sample was weighted and 75 ml of hot neutral alcohol was added with a few drops of phenolphthalein. The mixture was shaken vigorously and titrated with 0.1 M NaOH solution with constant shaking until the pink coloration remains permanent. Acid value was calculated using the formula

Iodine Value

The iodine value of an oil/fat is the number of grams of iodine absorbed by 100g of the oil/fat, when determined by using Wijs solution. Iodine value was determined according to the titrimetric method of Pearson (1970).¹⁵ 2 gm of oil sample was weighted into a dry glass stopper bottle of 250 ml capacity and 10 ml of carbon tetrachloride was added to oil. About 20 ml of Wij's solution was then added and allowed to stand in dark for 30 minutes. 15 ml of (10 %) Potassium Iodide and 100 ml of water was added and then titrated with 0.1 M Sodium thiosulphate solution using starch as indicator just before the end point. A blank was also prepared alongside the oil samples. Iodine was calculated using formula

RESULTS AND DISCUSSION

The determination of physical and chemical values is often used as a general indication of the condition and edibility of oil.² The acid value is defined as the number of milligrams of potassium hydroxide required to neutralize the free fatty acids present in one gram of fat. It is a relative measure of rancidity as free fatty acids are normally formed during decomposition of oil glycerides. The value is also expressed as percent of free fatty acids calculated as oleic acid. Acid values are used to measure the extent to which glyceride in the oil has been decomposed by lipase and other actions such as light and heat.¹⁶ Peanut oil has a high smoke point relative to many other cooking oils, so is commonly used for frying foods. Its major component fatty acids are oleic acid (46.8% as

olein), linoleic acid (33.4% as linolein), and palmitic acid (10.0% as palmitin).¹⁷

All fats and oils are composed of fat molecules known as fatty acids. The molecules can be classified into three categories depending on their degree of saturation. You have saturated fatty acids, monounsaturated fatty acids, and polyunsaturated fatty acids. The iodine value is a measure of the amount of unsaturated fatty acids in the oil. A fatty acid that is missing any hydrogen atoms is classified as being unsaturated. This includes all monounsaturated and polyunsaturated fatty acids. The high iodine value denotes high degree of unsaturation of the oil caused by the extent of oxidation and degree of heat treatment during oil processing.¹⁸ Groundnut oil samples analyzed have good and nutritional valuable minerals whose importance had already been emphasized.^{19,20} However, the availability of these nutrients after ingestion depends on the antinutritional factors present in the food. Vegetable oil now constitutes a major component of daily diet consumption and growth in market is now considered on the basis of functionality, economy and acceptability.²

Acid value and Iodine value in Groundnut oil.		
Parameter	Unit	Groundnut oil
Acid value	mgKOH/g	1.489
Iodine value	wij's	0.5030

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