

Edible Oil Utilization in Ghanaian Homes

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Introduction

Edible Vegetable and Animal Oils form one of the most important culinary ingredients in our daily food preparations. In Ghana especially, our special food preparation technique, makes us large consumers of oil e.g. 50 per cent or more of our soups are prepared from oil seeds of high oil content. All our stews are fried in oil and some of our other popular foods contain fair amounts of oil. Table I shows average quantities of oil in some local food preparations.

Percentage of fat in typical Ghanaian dishes

Preparation			% fat in dish on weight basis
Groundnut Soup	...	...	21.8%
Palava Sauce	...	...	25.0%
Garden Egg Stew	...	...	16.4%
Jollof Rice	...	...	10.7%
Akpledze (Ewe)	...	...	17.0%
Mpotompoto (Twi)	...	...	13.5%
Nkontomire Stew	...	...	32.0%

Though Animal oils are also used to a large extent in domestic preparation e.g. the use of lard for frying, the lack of a well organised Animal and Fish Industry has limited the use of animal oils in Ghana. Our consumption of animal oils is only in association with our consumption of fish and meat of various types *per se*.

The desirability of Oil in the Kitchen

Though oils have the greatest calorific value when compared with other food constituents such as Carbohydrates and Proteins, man's conscious reason for eating oils is because they contain characteristic desirable flavours, imparted to the food with which they are associated,

which is appetising to the palate. The calorific benefit of oils though very beneficial to those living in cold climates, has on the contrary created a problem for an increasing number of the world's population especially of the female sex who are weight conscious and to others who are "heart disease" conscious. Other benefits of oils however are its content of Vitamin A, needed for proper eyesight, Vitamin D, associated with the formation and maintenance of healthy bones and Vitamin E associated with the sex hormones.

Availability of Oils in Ghana

The oil seeds available in Ghana include Palm Fruits, Groundnuts, Palm Kernel, Coconut and Shea nuts. Palm fruits produce palm oil, with a characteristic flavour and colour and richer in carotene more than any other food material. The oil is fairly heavy and it is generally liquid at temperatures of 29°C and above, and solidifies below that temperatures. Coconut and Palm Kernel oils are light oils with concentrated flavours which are sweet when fresh and pungent when deteriorated. These oils are generally liquid at about 25°C and solidify below that temperature. Shea butter is a high melting fat with a strong unpleasant odour in its crude form. In its refined form, it is one of the best fats that finds use in the margarine and chocolate industry in addition to its use as a cooking fat. Shea butter is however not used much in Southern Ghana because of the availability of other oils and also because it is used only as an inferior pomade. In Northern Ghana on the other hand, it is used alongside with Groundnut oil as a cooking fat and also as a pomade. Groundnut oil has a very low melting point and so remains liquid even at about 80 Centigrade. This behaviour is due to the peculiar chemical composition of the oil which makes it

also dietetically superior. The fluid nature of the oil even at lower temperature also gives it an added advantage when used in the manufacture of other products such as salad cream. Figures show that the production of palm oil, groundnut oil, coconut oil and palm kernel oils is about 8650 tons/year by Ghanaian industry, and legal imports of such oils into the country amount to about 4300 tons/year. Though accurate figures are not available, it is believed that traditional manufacture accounts for about 50 per cent of the total consumption of oil in Ghana, and an unestimated but fair amount of oil comes through smuggled routes.

Manufacture of Oils in Ghana

Manufacture of oils from oil seeds, takes two forms in Ghana:—

- (a) A water extraction process used in (Traditional Processing). and
- (b) Pressing by worm expellers used in Industrial processing.

The traditional method of extraction, uses very fresh raw materials since it operates on a very small scale and has about 33 per cent efficiency i.e. only one-third of the total oil content of the oil seed is extracted. Coconut oil processed by such method has a rich natural flavour and a good appearance but palm kernel oil processed by such method usually has a poor colour quality due to method of processing. Palm oil obtained Traditionally takes two forms:—

- (a) Production of Dzomi (Ewe) (a high quality crude oil) and
- (b) Production of Amidze (Ewe) (a lower grade crude palm oil).

All traditional manufacturing processes however use the same principle i.e. the oil seed is first roasted or boiled to soften the tissues. The treated seeds are then milled or grated to produce fine particles, or a loose paste. Hot or warm water is then mixed with the material to dissolve out the oil from the tissues of the material. The emulsion is then left to stand in a cold place whereby the oil phase separates and remains on the water phase. The oil phase is then skimmed off and boiled later to remove last traces of water.

Industrial methods take various forms but the most popularly used in Ghana is the screw expeller system in which the raw materials after preliminary heat conditioning are subjected to mechanical pressure to squeeze out the oil. Industrial methods have a high efficiency of about 85-90 per cent i.e. of the total oil content of the seed can be extracted. Industrially processed crude oils however do not have the same freshness of taste as traditionally processed types since industry handles large tonnages of material which undergo storage and consequently suffer from deteriorative changes of oil-seeds during storage.

Refining of oils

For a long time past, the consumption of oils has been of the crude type. However, the consumption of refined oils is now ever increasing. All oils are refinable in the sense that the process of refining only removes certain chemical constituents of the oil which impart to the oil objectionable taste and flavour if present. A typical example of a Ghanaian refined oil is the Makola cooking oil.

Quality of Oils

The quality of any product can be examined using many criteria but usually the most important and accurate, though subjective are the organoleptic and cooking properties. These properties can be discussed as follows:—

Foaming during frying—Oils which foam when used for frying (a) may have just a little more water in the oil than necessary. (b) May have undergone an oxidative deterioration, and extensive polymerisation. Apart from foaming, such oils have a greater tendency to darken in colour and to smoke.

Stickiness on Tongue—This is a defect which is much more easily detectable in heavy oils such as palm oil. This is usually due to high free fatty acids in the oils. High free fatty acids are caused by lipolytic breakdown of the oil-seed before processing. Such oils also show pungency and off-flavour.

Good Storage Properties—A desirable cooking property of an oil is its ability to store for a period of time without fast deterioration. This is important especially as house-

wives have a tendency to buy quantities to last for a month and over and since the conditions of storage are not as good as may be in industry or in retail shops. Oils which have a poor shelf-life develop off-flavours which can be imparted to the food with which they are associated.

The basic oil quality criteria, as discussed are so few that it should simplify the housewives' problem as to the choice of oil. Chemically all edible oils are members of a unique food substance, and when processed properly, one cannot be distinguished from the other. A well processed corn oil, soyabean oil, sunflower oil, coconut oil and groundnut oil are all interchangeable for food preparation without any drastic changes in the taste and quality of food. On the other hand, it is only when the criteria of quality have not been met e.g. the difference between crude and refined oils, that it is easy to make a choice in oils. This fact has been shown in that housewives who buy from big departmental shops, do buy oils under trade names e.g. "Mac Donald Cooking Oil" without any knowledge of the oil type because the oil type is not important provided the quality is good.

The Practice of Frying in the Home

Observation has shown that when deep-fat-frying of food items like ripe plantain, yam chips, etc. is done in the kitchen, some amount of oil is left in the pan which the housewife always keeps in another container. This oil will be used in the next batch and topped up with

fresh oil. This practice continues until the stock oil is so dirty, it is no longer attractive, and only then may it be discarded. It has been shown that the temperature at which frying is done in the kitchen is so high that the rate of oxidation is fairly high and within 90 minutes of frying, the state of oxidation, described by the peroxide value is very high and discarding the oil should be considered, if the oil is not discarded, rapid deterioration of the oxidised oil, will occur on standing and secondary products may be developed which may not make the oil advisably fit for human consumption. This behaviour of the oil will however vary as to whether it is crude or refined and if refined, to what extent it is refined.

The Nutritional Benefits of Oil

It is rather unusual to talk about the nutritional significance of oils as much as one would consider leafy vegetables and some other protein-containing foods. Oils, as has been pointed out have a high calorific value and 3-main oil soluble vitamins useful to the body. On the other hand, the varying chemical constitution of certain oils has been associated with various heart diseases. Whilst the subject still remains controversial, it is enough to suggest here that, oils of vegetable origin, contain poly-unsaturated fatty acids and are less prone to cause heart diseases than fats of animal origin. Similarly the consumption of crude oils is least recommended since certain constituents may be the cause of certain ailments. The consumption of pure refined vegetable oils is therefore a big step forward in the whole concept of oil utilization.