



A PROJECT

ON

PRODUCTION OF PALM OIL AND IT'S HEALTH BENEFITS

PRESENTED BY

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SUPERVISED BY

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May, 2025.

CERTIFICATION

This Project has been read, certified and approved as meeting of the requirements of the Department of Hospitality Management Technology, Kwara State Polytechnic, Ilorin, in partial fulfillment of the requirement for the awards of National Diploma (ND) in Hospitality Management Technology.

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DEDICATION

This research work is dedicated to Almighty God for his infinite mercy all through the period of this work. And also to my lovely parents much love for them.

ACKNOWLEDGEMENTS

I thank Almighty God for his support and mercy throughout the program for sparing my life to see the end of this programme.

I am very grateful and appreciate my parents and siblings for their support, financially, spiritually and their advice may Almighty God grant them long life to reap the fruit of their labour (Ameen). Furthermore, my appreciation goes to my Amiable Supervisor, MRS. ADEBAYO S.M and all the Hospitality Management Lecturers may God continue to bless you all. (Ameen).

ABSTRACT

Palm Oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palms. The oil is used in food manufacturing, in beauty products, and as biofuel, Palm oil accounted for about 33% of global oils deficiency, cancer, brain disease, aging, and treating malaria, high blood pressure, high cholesterol, and cyanide poisoning. Palm oil is used for weight loss and increasing the body's metabolism. As food, palm oil is used for frying. Industrially, palm oil is used for manufacturing cosmetics, soaps, toothpaste, waxes, lubricant, and ink palm oil contains saturated and unsaturated fats, vitamin E, and beta-carotene. It might have antioxidant effects.

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CHAPTER ONE

1.1 INTRODUCTION

Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palms. The oil is used in the food manufacturing, in beauty products, and as biofuel. Palm oil accounted for about 33% of global oils produced from oil crops in 2014.

Palm oil, an edible vegetable oil rich in saturated fats and free of trans fats, is derived from the mesocarp (reddish pulp) of the fruit of the oil palms. Mainly the African oil palm (*Elaeis guineensis*) and to some extent from the American oil palm (*Elaeis oleifera*) and the maripa palm (*Attalea maripa*).

Palm mesocarp oil which is 49% saturated, is generally reddish in colour because of high beta-carotene content. Crude red palm oil that has been refined, bleached and deodorized, a common commodity called RBD palm oil, does not contain carotenoids. It is semisolid at room temperature. Palm oil is a common cooking ingredient in the tropical belt of Africa, Southeast Asia and parts of Brazil.

The oil palm originated in tropical West Africa where it is found growing in any areas the centers of production of oil palms stretches from Senegal, through Dahomey and Nigeria to Congo and Angola. Nigeria is one of the world's leading producer of palm oil and palm kernels palm produce was the main commodity which attracted the early European traders to west African those traders saw the oil rivers to the Nigeria delta area where they traded the use of oil palm and its products are many the leaves are used for making brooms and for roofing materials the back and the front is peeled and weaving into baskets, the main trunk can be split and used as supporting frames in buildings a sap tapped from the female flower is drunk as palm wine a rich source of yellow red palm oil can be extra from the fibrous layers of the nuts of the fruit bunch this is locally used in the manufacture of candles, margarine, and soap a clear oil from the kernels is used for making pomades palm kernel meats is used as a minimal food for the empty fruit bunch, the shell and fortress which remain

after oil extraction are used as food. Many plantations of oil palm have been established in West Africa, but most palm produced is obtained from palms growing wild.

The use of palm oil has attracted the concern of environmental groups due to deforestation in the tropics where palms are grown, and has been cited as a factor in social problems due to allegations of human rights violations among growers. An industry group formed in 2004 to create more sustainable and ethical palm oil, through the Roundtable on Sustainable Palm Oil. However, very little palm oil is certified through the organization, and some groups have criticized it as green washing.

Palm oil from *E. guineensis* has long been recognized in West and Central African countries, used widely as cooking oil. European merchants trading with West Africa occasionally purchased palm oil to use as a cooking oil in Europe.

Palm oil became a highly sought-after commodity by British traders for use as an industrial lubricant for machinery during Britain's Industrial Revolution. Palm oil formed the basis of soap products, such as Lever Brothers' (now Unilever) "Sunlight" soap, and the American Palmolive brand.

By around 1870, palm oil constituted the primary export of some West African countries, although this was overtaken by cocoa in the 1880s with the introduction of colonial European cocoa plantations.

1.2 STATEMENT OF PROBLEM

Much research has not been made on the production of palm oil and its health benefits to human.

We shall be looking at ways to problems of production of palm oil from palm kernel and the analysis of the importance of palm oil with its health benefits to human.

1.3 AIMS AND OBJECTIVES OF THE STUDY

The objective of the study is to critically examine the production of palm oil and its health benefit. However, other objectives will be looked into which are:

1. To examine the production of palm oil.
2. To examine the health benefits palm oil.
3. To examine the process involve in the production of palm oil.

1.4 RESEARCH QUESTIONS

1. What are the processes involved in the production of palm oil?
2. What are the textures of the palm oil after production?
3. What is the nutritional value and health benefit of palm oil to consumers?

1.5 SIGNIFICANCE OF THE STYDY

1. This research project is very important as it will showcase to the reader and other researchers some of the importance of palm oil.
2. The research will also state the nutritional composition and health benefits of palm oil
3. The research will also lead us to ways on the production of palm oil.

1.6 SCOPE OF THE STUDY

This research focuses on a comparative study on the production and health benefits of palm oil.

The scope of the study therefore is to examine some authorship work postulating nutritional analysis of the constitution of palm oil and how palm oil can be produced.

1.7 LIMITATION OF THE STUDY

The following are some of the implications or constraints which the researcher encountered during the course of writing the research.

- **Time constraint:** the research will simultaneously engage in this study with other academic work. This consequently will cut down on the time devoted for the research work.
- **Financial constraint:** insufficient funds tend to impede the efficiency of the researcher in sourcing for the relevant materials, literature, or

information and in the process of data collection (internet, questionnaire and interview).

However, it should be noted the researcher improvised where necessary in order for the mentioned limitations not to negatively affect the quality of the research.

CHAPTER TWO

LITERATURE REVIEW

2.1 PALM KERNEL

Elaeis guineensis is a species of palm commonly just called **oil palm** but also sometimes **African oil palm** or **macaw-fat**. It is the principal source of palm oil. It is native to west and southwest Africa, specifically the area between Angola and the Gambia; the species name, *guineensis*, refers to the name for the area, Guinea, and not the modern country now bearing that name. The species is also now naturalised in Madagascar, Sri Lanka, Malaysia, Indonesia, Central America, Cambodia, the West Indies, and several islands in the Indian and Pacific Oceans. The closely related American oil palm *Elaeis oleifera* and a more distantly related palm, *Attalea maripa*, are also used to produce palm oil.

E. guineensis was domesticated in West Africa along the south-facing Atlantic coast. There is insufficient documentation and as of 2009 insufficient research to make any guesses as to when this occurred. Human use of oil palms may date as far back as 5,000 years in Egypt; in the late 1800s, archaeologists discovered palm oil in a tomb at Abydos dating back to 3000 BCE.

The first Western person to describe it and bring back seeds was the French naturalist Michel Adanson.

Oil palms can produce much more oil per unit of land area than most other oil producing plants (about nine times more than soy and 4.5 times more than rapeseed).

2.1.1 PALM KERNEL DESCRIPTION

E. guineensis is monocotyledonous. Mature palms are single-stemmed and grow to 20 meters (66 ft) tall. The leaves are pinnate and reach 3-5 meters (9.8-16.4 ft) long. A young palm produces about 30 leaves a year. Established palms over 10 years produce about 20 leaves a year. The flowers are produced in dense clusters; each individual flower is small, with three sepals and three petals.

The palm fruit takes 5-6 months to develop from pollination to maturity. It is reddish, about the size of a large plum, and grows in large bunches. Each fruit is made up of an oily, fleshy outer layer (the pericarp), with a single seed (the palm kernel), also rich in oil. When ripe, each bunch of fruit weighs between 5 and 30 kg (11 and 66lb) depending on the age of the palm tree.

2.1.2 PLANTING OF PALM KERNEL

For each hectare of oil palm, which is harvested year-round, the annual production averages 20 tonnes of fruit yielding 4,000 kg of palm oil and 750 kg of seed kernels yielding 500 kg of high-quality palm kernel oil, as well as 600 kg of kernel meal. Kernel meal is processed for use as livestock feed.

All modern, commercial planting material consists of tenera palms or DxP hybrids, which are obtained by crossing thick shelled dura with shell-less pisifera. Although common commercial germinated seed is as thick-shelled as the dura mother palm, the resulting palm will produce thin-shelled tenera fruit. An alternative to germinated seed, once

constraints to mass production are overcome, are tissue-cultured or "clonal" palms, which provide "true copies" of high-yielding palms.

2.2 PALM OIL

Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palms. The oil is used in food manufacturing, in beauty products, and as biofuel. Palm oil accounted for about 33% of global oils produced from oil crops in 2014.

The use of palm oil has attracted the concern of environmental groups due to deforestation in the tropics where palms are grown, and has been cited as a factor in social problems due to allegations of human rights violations among growers. An industry group formed in 2004 to create more sustainable and ethical palm oil, through the Roundtable on Sustainable Palm Oil. However, very little palm oil is certified through the organization, and some groups have criticized it as green washing.

Palm oil, an edible vegetable oil rich in saturated fats and free of trans fats, is derived from the monocarp (reddish pulp) of the fruit of the oil palms, mainly the African oil palm (*Elaeis guineensis*) and to some extent from the American oil palm (*Elaeis oleifera*) and the maripa palm (*Attalea maripa*).

Palm mesocarp oil which is 49% saturated, is generally reddish in colour because of high beta-carotene content. Crude red palm oil that has been refined, bleached and deodorized, a common commodity called RBD palm oil, does not contain carotenoids. It is semisolid at room temperature. Palm oil is a common cooking ingredient in the tropical belt of Africa, Southeast Asia and parts of Brazil. The fruit of the oil

palm tree (*Elaeis guineensis*) is the source of red palm oil. The oil palm is a perennial crop tree and has the highest oil yield compared with other leading oilseed crops in terms of oil yield per hectare. Currently, Malaysia and Indonesia are the leading producers of palm oil.

The oil palm is a unique crop that can produce two types of oil, namely palm oil from the fibrous mesocarp (which has a brilliant, deep red-orange pulp) and palm kernel oil (which resembles coconut oil) from the kernel.

Crude palm oil can be processed into various downstream products, although phytonutrients are partially removed during processing. Refined, bleached, and deodorized palm oil, the major processed product, is obtained from the bleaching and deodorization of crude palm oil.

During the refining process, the carotenes that give crude palm oil its red-orange color become decomposed, resulting in refined, bleached, and deodorized palm oil, which has a light yellow color and retains part of the other phytonutrients. Refined, bleached, and deodorized palm oil is versatile oil widely used in more than 150 countries worldwide.

Red palm oil, on the other hand, is obtained through the novel processes of pretreatment, deacidification, and deodorization using molecular distillation, which allow about 80% of the carotenes and vitamins present in crude palm oil to be retained.

As a result, red palm oil has a distinctive favor and aroma and is rich in phytonutrients such as carotenes (which give the oil a bright red color), vitamin E, phytosterols, squalene, and coenzyme. Red palm oil has been known for its versatility as both a food and a health remedy for centuries. It was valued as a sacred food by the pharaohs of ancient Egypt. Red palm oil is traditionally used in the tropical rain forest regions of West Africa and northeastern Brazil.

Despite the high production and use of refined palm oil in countries like Malaysia and Indonesia, the nutritional potential of red palm oil has been underutilized in these countries. Its nutritional properties are conferred mainly via its constituent phytonutrients.

2.2.1 HISTORY OF PALM OIL

Humans used oil palms as far back as 5,000 years. In the late 1800s, archaeologists discovered a substance that they concluded was originally palm oil in a tomb at Abydos dating back to 3,000 BCE. It is believed that traders brought oil palm to Egypt. Palm oil from *E. guineensis* has long been recognized in West and Central African countries, used widely as a cooking oil. European merchants trading with West Africa occasionally purchased palm oil for use as cooking oil in Europe.

Palm oil became a highly sought-after commodity by British traders for use as an industrial lubricant for machinery during Britain's Industrial Revolution. Palm oil formed the basis of soap products, such as Lever Brothers' (now Unilever) "Sunlight" soap, and the American Palmolive brand.

By around 1870, palm oil constituted the primary export of some West African countries, although this was overtaken by cocoa in the 1880s with the introduction of colonial European cocoa plantations.

Oil palms were introduced to Java by the Dutch in 1848, and to Malaysia (then the British colony of Malaya) in 1910 by Scotsman William Sime and English banker Henry Darby. The species of palm tree *Elaeis guineensis* was taken to Malaysia from Eastern Nigeria in 1961. As noted it originally grew in West Africa.

The southern coast of Nigeria was originally called the Palm oil coast by the first Europeans who arrived there and traded in the commodity. This area was later renamed the Bight of Biafra.

In traditional African medicine different parts of the plant are used as laxative and diuretic, as a poison antidote, as a cure for gonorrhea, menorrhagia, and bronchitis, to treat headaches and rheumatism, to promote healing of fresh wounds and treat skin infections.

In Cambodia, this palm was introduced as a decorative plant in public gardens, its Khmer name is dôông préing (doong palm, preing oil).

2.2.2 TYPES OF PALM OIL

There are two types of palm oil, which are:

Red palm oil

Since the mid-1990s, **red palm oil** has been cold-pressed from the fruit of the oil palm and bottled for use as a cooking oil, in addition to other uses such as being blended into mayonnaise and vegetable oil.

Oil produced from palm fruit is called red palm oil or just palm oil. It is around 50% saturated fat-considerably less than palm kernel oil and 40% unsaturated fat and 10% polyunsaturated fat. In its unprocessed state, red palm oil has an intense deep red color because of its abundant carotene content. Red palm oil also contains sterols, vitamin E, and carotenoids such as alpha-carotene, beta-carotene, and lycopene.

White palm oil

White palm oil is the result of processing and refining. When refined, the palm oil loses its deep red color. It is extensively used in food manufacture and can be found in a variety of processed foods including peanut butter and chips. It is often labeled as palm shortening and is used as a replacement ingredient for hydrogenated fats in a variety of baked and fried products.

2.3 SOCIAL AND ENVIRONMENTAL IMPACT OF PALM OIL

While only 5% of the world's vegetable oil farmland is used for palm plantations, palm cultivation produces 38% of the world's total vegetable oil supply. In terms of oil yield, a palm plantation is 10 times more productive than soybean, sunflower or rapeseed cultivation because the palm fruit and kernel both provide usable oil.

Palm oil has garnered criticism from environmentalists due to the environmental importance of where it is grown. However, it is indisputably more efficient in comparison to other oil producing plants.

In 2016, it was found that palm oil farms produce around 4.17 metric tons of oil per hectare. Whereas other oils such as sunflower, soybean, or peanut only produce 0.56, 0.39, and 0.16 metric tons respectively per hectare. Palm oil is the most sustainable vegetable oil in terms of yield, requiring one-ninth of land used by other vegetable oil crops. In the future, laboratory-grown microbes might achieve higher yields per unit of land at comparable prices.

However palm oil cultivation has been criticized for its impact on the natural environment, including deforestation, loss of natural habitats, and greenhouse gas emissions which have threatened critically endangered species, such as the orangutan and Sumatran tiger. Slash-and-burn techniques are still used to create new plantations across palm oil producing countries. From January to September 2019 857,000 hectares of land was burned in Indonesia; peat lands accounted for more than a quarter of the burned area.

Environmental groups such as Greenpeace and Friends of the Earth oppose the use of palm oil biofuels, claiming that the deforestation caused by oil palm plantations is more damaging for the climate than the benefits gained by switching to biofuel and using the palms as carbon sinks.

A 2018 study by the International Union for Conservation of Nature (IUCN) concluded that palm oil is "here to stay" due to its higher productivity compared with many other vegetable oils. The IUCN maintains that replacing palm oil with other vegetable oils would necessitate greater amounts of agricultural land, negatively affecting biodiversity. The IUCN advocates better practices in the palm oil

industry, including the prevention of plantations from expanding into forested regions and creating a demand for certified and sustainable palm oil products.

In 2019 the Rainforest Action Network surveyed eight global brands involved in palm oil extraction in the Leuser Ecosystem, and said that none was performing adequately in avoiding "conflict palm oil". Many of the companies told the Guardian they were working to improve their performance. A WWF scorecard rated only 15 out of 173 companies as performing well.

In 2020 a study by Chain Reaction Research concluded that NDPE (No Deforestation, No Peat, No Exploitation) policies cover 83% of palm oil refineries. NDPE policies are according to the Chain Reaction Research the most effective private mechanism to cut the direct link with deforestation, due to the economic leverage refineries have over palm oil growers

In addition to environmental concerns, palm oil development in regions that produce it has also led to significant social conflict. Regions with fast growing palm oil production have experienced significant violations of indigenous land rights, influxes of illegal immigrant labor and labor practices, and other alleged related human rights violations.

The palm oil industry has had both positive and negative impacts on workers, indigenous peoples and residents of palm oil-producing communities. Palm oil production provides employment opportunities, and has been shown to improve infrastructure, social services and reduce poverty.

2.4 USES OF PALM OIL

In food

The highly saturated nature of palm oil renders it solid at room temperature in temperate regions, making it a cheap substitute for butter or hydrogenated vegetable oils in uses where solid fat is desirable, such as the making of pastry dough and baked goods. The health concerns related to trans fats in hydrogenated vegetable oils may have contributed to the increasing use of palm oil in the food industry.

Palm oil is sometimes used as a minor ingredient in calf milk replacer.

Non-food consumer product

Palm oil is pervasively used in personal care and cleaning products and it provides the foaming agent in nearly every soap, shampoo, or detergent. Around 70% of personal care products including soap, shampoo, makeup, and lotion, contain ingredients derived from palm oil. However, there are more than 200 different names for these palm oil ingredients and only 10% of them include the word "palm"

Biomass and biofuel

Palm oil is used to produce both methyl ester and hydrodeoxygenated biodiesel. Palm oil methyl ester is created through a process called transesterification. Palm oil biodiesel is often blended with other fuels to create palm oil biodiesel blends. Palm oil biodiesel meets the European EN 14214 standard for biodiesels.

Hydrodeoxygenated biodiesel is produced by direct hydrogenolysis of the fat into alkenes and propane. The world's

largest palm oil biodiesel plant is the C550 million Finish-operated Neste Oil biodiesel plant in Singapore, which opened in 2011 with a capacity of 800,000 tons per year and produces hydro deoxygenated NEXBTL biodiesel from palm oil imported from Malaysia and Indonesia.

Significant amounts of palm oil exports to Europe are converted to biodiesel (as of early 2018: Indonesia: 40%, Malaysia 30%). In 2014, almost half of all the palm oil in Europe was burnt as car and truck fuel. As of 2018, one-half of Europe's palm oil imports were used for biodiesel. Use of palm oil as biodiesel generates three times the carbon emissions as using fossil fuel, and, for example, "biodiesel made from Indonesian palm oil makes the global carbon problem worse, not better."

2.5 NUTRITIONAL VALUE OF PALM OIL

One cup of Palm oil serves 1909 calories and 216g of total lipid fat. It also offers 0.02mg of iron, 0.6mg of choline, 34.43mg of Vitamin E, 17.3ug of Vitamin K, 106.488g of total saturated fat, 0.216g of lauric acid, 2.16g of myristic acid, 93.96g of palmitic acid, 9.288g of stearic acid, 79.92g of total monounsaturated fats.

Palm oil contain 0.648 g of palmitoleic acid, 79.056g of oleic acid, 0.216g of gadoleic acid, 20.088g of total polyunsaturated fats, 19.656g of linoleic acid and 0.432g of Linolenic acid.

Fatty acids

Palm oil, like all fats, is composed of fatty acids, esterified with glycerol. Palm oil has an especially high concentration of saturated fat, specifically the 16-carbon saturated fatty

acid, palmitic acid, to which it gives its name. Monounsaturated oleic acid is also a major constituent of palm oil. Unrefined palm oil is a significant source of tocotrienol, part of the vitamin E family.

Carotenes

Red palm oil is rich in carotenes, such as alpha-carotene, beta-carotene and lycopene, which give it a characteristic dark red color. However, palm oil that has been refined, bleached and deodorized from crude palm oil (called "RBD palm oil") does not contain carotenes.

2.7. HEALTH BENEFIT OF PALM OIL

Not only you can cook with palm oil, but this oil is used in various snack products, wax, cosmetic, and skincare items. Now even it is used as a biofuel and medicinal purposes. Palm oil is beneficial for health, diabetic person can use it as it reduced blood glucose level and enhance antioxidant status.

Palm Oil helps in improving vision

Beta-carotene is very much important for improving vision. Many antioxidants can be found in palm oil, which provide powerful defensive mechanisms of the body. They are the beneficial by-products of cellular metabolism and can help by protecting the body against free radicals.

Free radicals are responsible for a lot of cellular breakdown and mutation, including the damage of vision. Using palm oil as a replacement for other types of oil can help prevent macular degeneration and cataracts.

Palm oil helps in preventing cardiovascular issues

Palm oil in spite of having a high content of HDL and LDL cholesterol can still create a healthier balance in our body. High levels of LDL cholesterol can increase the chances of atherosclerosis, which can cause strokes and heart attacks. By maintaining a healthy balance of cholesterol (both of which is needed in our body), one can ensure a healthier cardiovascular system.

Palm oil helps in reducing the risk of cancer

Tocopherols, a form of vitamin E present in are natural antioxidants that can help to prevent cancer by neutralizing free radicals. Free radicals cause healthy cells to mutate into cancerous cells, so high levels of tocopherol as is present in palm oil are necessary.

Palm oil helps in providing naturally soft skin

Palm oil makes the skin naturally soft and glossy without it getting a greasy appearance. This is the reason the oil is a key ingredient in many soap bars and skin creams. It also provides relief to ragged cuticles and itchy skin.

Palm oil helps to improve hair growth

Palm kernel oil provides thorough conditioning of hair, thickens hair and reduces hair fall by making it stronger. Used as a hot oil treatment, it provides a soothing effect along with the desired nourishment.

Palm oil rich In Vitamin K

Vitamin K is one of the most important fat-soluble vitamins that the body requires. It boosts bone health and also acts as a blood coagulant. Palm kernel oil contains high amounts of the vitamin K and hence is recommended for daily use.

Palm oil richly loaded with antioxidants

With a sufficient amount of Vitamin E, rarely found tocotrienols and being loaded with antioxidants, palm oil provides amazing anti-aging benefits. It prevents the occurrence of wrinkles and fine lines. Palm oil is capable of providing protection against harmful UV rays and other toxins and hence it is healthy for the skin.

Palm oil contains unsaturated fats

The palm kernel oil is a source of healthy unsaturated fats and medium chain fatty acids. This is perfect for use as a cooking medium. Moreover, these qualities make it ideal for healthier skin, bones and joints.

Palm oil contains zero Trans-Fat

Palm oil does not contain any Trans-fat, and is hence considered as ideal cooking oil for those who are looking to shed extra pounds.

Palm oil rich in nutrients

In addition to having important fat-soluble vitamins, palm kernel oil also has high nutritional value. It has numerous nutrients that are essential for maintaining a good health. The presence of palmitic acid, considered as a 16-carbon saturated fatty acid, makes it distinctive from other cooking oils.

Palm oil helps during pregnancy

The deficiency of vitamin could be harmful for a pregnant woman as well as her unborn child. Palm oil contains Vitamin D, A and E which is beneficial for the health. A pregnant woman should have Palm oil in her diet to prevent the vitamin deficiencies.

Palm oil helps in providing with energy

Palm oil has beta carotene in it which carotene assists in promoting the level of energy and enhances the balance of hormones in the body.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

In this chapter the researcher will present the material and the methods adopted in experimenting the research topic. The researcher will be present the ingredient needed to prepare the palm oil.

3.2 STUDY AREA

The study Area in which the research is taken place is kwara state polytechnics, Ilorin located along old- Jebba road, Moro local government area, of kwara State.

3.3 TARGET POPULATION OF THE STUDY

According to Aladebe (1993), population can be defined as the set of all possible value of variable in one or more geographical location. In respect to this research work, the targeted kwara state polytechnic students and staff.

3.4 SAMPLING TECHNIQUE

For the purpose of this research the sample, size will include (30) people of which 30 will be for selected business across kwara state polytechnic, 15 students of the kwara state polytechnic, Ilorin and 15 staffs of the kwara state polytechnic, Ilorin.

3.5 SAMPLE SIZE

The sample for this study covers both the lecturers and students of hospitality management department of kwara state polytechnic, Ilorin. Copies of sensory evaluation will be distributed to the respondents. 30 were filled and returned by the respondents.

3.6 RESEARCH INSTRUMENT

The research instrument used for this research study is experiment, observation and sensory evaluation form. Questions were prepared by the researcher and administered to the respondent to respond.

3.7 MEASUREMENT OF VARIABLE

The focus of this study is preparation of powdered milk from fresh cow milk. Therefore, the variable that will be employed in this study will be preparation of palm oil.

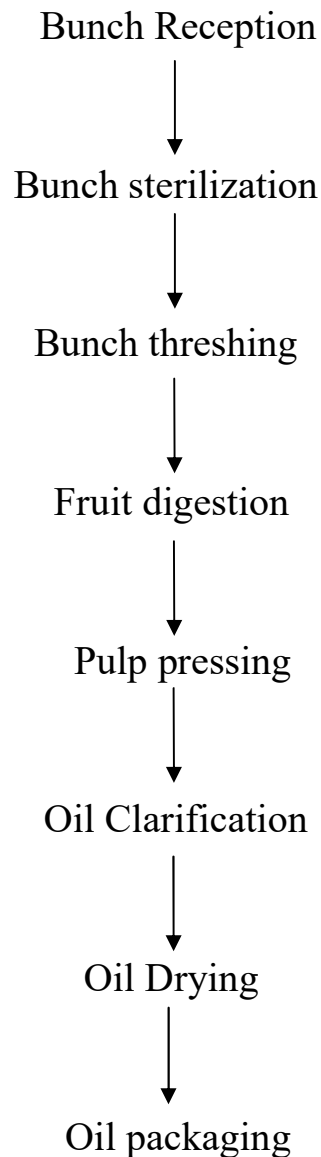
3.8 DATA COLLECTION METHODS

The researcher designed sensory evaluation by appearance, taste, lever texture and colour will be use to collect necessary information from the respondents.

3.9 METHOD OF DATA ANALYSIS

The method used in analyzing the data in this research is the use of Sale percentage and frequency tables.

FLOW CHART OF PALM OIL PRODUCTION



3.4.1 Bunch reception

Fresh fruit arrives from the field as bunches or loose fruit. The fresh fruit is normally emptied into wooden boxes suitable for weighing on a scale so that quantities of fruit arriving at the processing site may be checked.

The quality standard achieved is initially dependent on the quality of bunches arriving at the mill. The mill cannot improve upon this quality but can prevent or minimize further deterioration.

3.4.2 Threshing (removal of fruit from the bunches)

The fresh fruit bunch consists of fruit embedded in spikelet growing on a main stem. Manual threshing is achieved by cutting the fruit-laden spikelet's from the bunch stem with an axe or machete and then separating the fruit from the spikelet's by hand. Children and the elderly in the village earn income as casual laborers performing this activity at the factory site.

Small-scale operators use the bunch waste (empty bunches) as cooking fuel. In larger mills the bunch waste is incinerated and the ash, a rich source of potassium, is returned to the plantation as fertilizer

3.4.3 Sterilization of bunches

Sterilization or cooking means the use of high-temperature wet-heat treatment of loose fruit. Cooking normally uses hot water; sterilization uses pressurized steam. The cooking action serves several purposes.

Heat treatment destroys oil-splitting enzymes and arrests hydrolysis and autoxidation. However, during sterilization it is important to ensure evacuation of air from the sterilizer. Air not only acts as a barrier to heat transfer, but oil oxidation increases considerably at high temperatures; hence oxidation risks are high during sterilization. Over sterilization can also lead to poor bleach ability of the resultant oil. Sterilization is also the chief factor responsible for the discolouration of palm kernels, leading to poor bleach ability of the extracted oil and reduction of the protein value of the press cake.

3.4.4 Digestion of the fruit

Digestion is the process of releasing the palm oil in the fruit through the rupture or breaking down of the oil-bearing cells. The digester commonly used consists of a steam-heated cylindrical vessel fitted with a central rotating shaft carrying a number of beater (stirring) arms. Through the action of the rotating beater arms the fruit is pounded. Pounding, or digesting the fruit at high temperature, helps to reduce the viscosity of the oil, destroys the fruits' outer covering (exocarp), and completes the disruption of the oil cells already begun in the sterilization phase.

3.4.5 Pressing (Extracting the palm oil)

There are two distinct methods of extracting oil from the digested material. One system uses mechanical presses and is called the 'dry' method. The other called the wet' method uses hot water to leach out the oil.

In the 'dry' method the objective of the extraction stage is to squeeze the oil out of a mixture of oil, moisture, fibre and nuts by applying mechanical pressure on the digested mash. There are a large number of different types of presses but the principle of operation is similar for each. The presses may be designed for batch (small amounts of material operated upon for a time period) or continuous operations. High pressing pressures are reported to have an adverse effect on the seach ability and oxidative conservation of the extracted oil.

3.4.6 Clarification and drying of oil

The main point of clarification is to separate the oil from its entrained impurities. The fluid coming out of the press is a mixture of palm oil, water, cell debris, fibrous material and 'nonoily solids'. Because of the non-oily solids the mixture is very thick (viscous). Hot water is therefore added to the press output mixture to thin it. The dilution (addition of water) provides a barrier causing the heavy solids to fall to the bottom of the container while the lighter oil droplets flow through the watery mixture to the top when heat is applied to break the emulsion (oil suspended in water with the aid of gums and resins). Water is added in a ratio of 3:1.

The wastewater from the clarifier is drained off into nearby sludge pits dug for the purpose. No further treatment of the sludge is undertaken in small mills. The accumulated sludge is often collected in buckets and used to kill weeds in the processing area.

3.4.7 Oil storage

In large-scale mills the purified and dried oil is transferred to a tank for storage prior to dispatch from the mill. Since the rate of oxidation of the oil increases with the temperature of storage the oil is normally maintained around 50°C, using hot water or low-pressure steamheating coils, to prevent solidification and fractionation. Iron contamination from the storage tank may occur if the tank is not lined with a suitable protective coating.

Small-scale mills simply pack the dried oil in used petroleum oil drums or plastic drums and store the drums at ambient temperature.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

The research sensory evaluation questionnaire distributed to some randomly selected staff and student of the hospitality department in kwara state polytechnic, llorin. A total of the respondents after effective testing of cereal made with millet.

4.2 DATA ANALYSIS AND RESULTS

The following data were presented and analysis. Data presentation were made under two sub-headings, section A and B. section A consists of demographic characteristics of respondents while section B consists of main sensory evaluation, data analysis.

SECTION A: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS.

The following demographic data are analyzed in this research project based on the responses received from the administered questionnaire:

TABLE 4.1: SEX OF RESPONDENTS

SEX	FREQUENCY	PERCENTAGE%
FEMALE	14	45
MALE	16	55
TOTAL	30	100

SOURCE: field survey 2022

The table 1 above shows that 14 respondents representing 45% are female, while the remaining 16 respondents representing 45% are male.

TABLE: EDUCATIONAL QUALIFICATION

Educational	Frequency	Percentage%
O LEVEL	12	35
OND \ NCE	12	35
HND \ BSC	4	20
MSC	2	10
TOTAL	30	100

Source: field survey 2022

From the table above 12 (35%) of the respondents are those who obtained O level certificates, 12 (35%) are with OND \ NCE, whereas 4 (20%) are those with HND \ BSC, while 2 (10%) are with MSC.

Table 4.3: AGE OF RESPONDENTS

Age	Frequency	Percentage %
Under 25	6	20
26-39	11	35
40-59	13	55
60 and above	0	0

Total	30	100
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Souce: field survey, 2022

From the table 3 above, 30% of the respondents are between the ages of under 25 years old, 35% are between 26-39 years old, 55% are between 40-59 years old while no respondents is 60 year and above

TABLE 4.4: RESPONDENTS MARITAL STATUS

Marital status	Frequency	Percentage %
Single	16	55
Married	14	45
TOTAL	30	100

Source: field survey, 2022

From the table above 55% of the respondents are single while 45% of the respondents are married.

Sensory evaluation data analysis questions as structured in the administered questionnaire.

TABLE 4.5: APPEARANCE OF THE PRODUCED PALM OIL

Classification of Responses	No of respondent	Percentage %
Excellent	--	0
Very good	16	60
Good	14	40

Fair	-	0
Total	30	100

Source: field survey 2022

According to the result (Given in the table 5 above) 60% of the respondents agreed that the produced Palm oil is very good in appearance, while 40% of the respondents agreed that the produced Palm oil is good in appearance.

TABLE 4.6: TASTE|FLAVOUR OF THE PRODUCED PALM OIL

Classification of Responses	No of respondent	Percentage %
Excellent	12	40
Very good	10	30
Good	6	30
Fair	2	10
Total	30	100

Source: field survey 2022

According to the result (Given in table 6 above) 10% of the respondents agreed that the produced palm oil is excellent in taste, 50% agreed that the produced palm oil is very good in taste, 30% agreed that the produced Palm oil good in taste, while 10% agreed that the produced Palm oil is fair in taste.

TABLE 4,7: SMELL\AROMA OF THE PRODUCED PALM OIL

Classification of Responses	No of respondent	Percentage %
Excellent	1	5
Very good	16	60
Good	10	25
Fair	3	10
Total	30	100

Source: field survey 2022

According to the result (Given in the table 8 above) 5% of the respondents agreed that the produced Palm oil is excellent in smell/aroma. However 25% of the respondents agreed that the produced Palm oil is very good in smell/aroma, while 60% of the respondents agreed that the produced Palm oil is good in smell/aroma, also 10% of the respondents agreed that the produced Palm oil is fair in smell/aroma.

TABLE 4.8: ACCEPTABILITY OF THE PRODUCED PALM OIL

Classification of Responses	No of respondent	Percentage %
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Excellent	2	10
Very good	8	20
Good	16	60
Fair	4	10
Total	30	100

Source: field survey 2022.

According to the result (Given in the table 9 above) 10% of the respondents rated the produced Palm Oil excellent in acceptability. However 60% of the respondents rated the produced Palm Oil is very good in acceptability, while 20% of the respondents rated the produced Palm oil is good in acceptability, also 10% of the respondents rated the produced Palm Oil is fair in acceptability.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION, RECOMMENDATIONS

5.1 SUMMARY

Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palms. The oil is used in food manufacturing, in beauty products, and as biofuel. Palm oil accounted for about 33% of global oils produced from oil crops in 2014.

Humans used oil palms as far back as 5,000 years. In the late 1800s, archaeologists discovered a substance that they concluded was originally palm oil in a tomb at Abydos dating back to 3,000 BCE. It is believed that traders brought oil palm to Egypt.

Palm oil from *E. guineensis* has long been recognized in West and Central African countries, used widely as a cooking oil. European merchants trading with West Africa occasionally purchased palm oil for use as a cooking oil in Europe.

Palm oil became a highly sought-after commodity by British traders for use as an industrial lubricant for machinery during Britain's Industrial Revolution. Palm oil formed the basis of soap products, such as Lever Brothers' (now Unilever) "Sunlight" soap, and the American Palmolive brand.

By around 1870, palm oil constituted the primary export of some West African countries, although this was overtaken by cocoa in the 1880s with the introduction of colonial European cocoa plantations.

Oil palms were introduced to Java by the Dutch in 1848, and to Malaysia (then the British colony of Malaya) in 1910 by Scotsman William Sime and English banker Henry Darby. The species of palm tree *Elaeis guineensis* was taken to Malaysia from Eastern Nigeria in 1961. As noted it originally grew in West Africa.

Palm oil, an edible vegetable oil rich in saturated fats and free of trans fats, is derived from the mesocarp (reddish pulp) of the fruit of the oil palms, mainly the African oil palm (*Elaeis guineensis*) and to some extent from the American oil palm (*Elacis oleifera*) and the maripa palm (*Attalea maripa*).

Palm mesocarp oil which is 49% saturated, is generally reddish in colour because of high beta-carotene content. Crude red palm oil that has been refined, bleached and deodorized, a common commodity called RBD palm oil, does not contain carotenoids. It is semisolid at room temperature. Palm oil is a common cooking ingredient in the tropical belt of Africa, Southeast Asia and parts of Brazil.

5.2 CONCLUSIONS

The oil palm originated in tropical West Africa where it is found growing in any areas the centres of production of oil palms stretches from Senegal, through Dahondy and Nigeria to Congo and Angola.

Nigeria is one of the worlds loading producer of palm oil and palm kernels palm produce was the main commodity which attracted the early European traders to west African those traders save the oil rivers to the Nigeria delta area where they traded the use of oil palm and it products are many the leaves are used for making brooms and for roofing materials the back and the front is paled and weaving into baskets, the main trunk can be split and used as supporting frames in buildings a sap tapped from the female flower is drunk as palm wine a rich source of year red palm oil can be extra from the fibrous layers of the nuts of the fruit bunch this is locally used in the manufacture of candles, margarine, and soap a clear oil from

the kernels is used for making pomades palm kernel meats is used as a menial food the empty fruit bunch, the shell and fortress which remain after oil extraction are used as fondle many plantation of oil palm have been establish in west African, but most palm produced is obtained from palms growing wild.

5.3 RECOMMENDATIONS

In the course of this research work, the following recommendations are being made.

- The importance of palm oil should be taken important in human nutrition.
- More palms fond should be planted so that it will circulate to everyone that wanted to make use of it.
- Orientation should be given to the general public on the importance of palm oil in human nutrition.
- Orientation should be given to the general public on the health benefit of palm oil to human health.

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APPENDIX A

SENSORY EVALUATION FOR PRODUCED PALM OIL

Demographic information

1. Sex. A. Male. B. Female
2. Age. A. 18-25. B. 26 - 40. C. 40 - 70
3. Marital status. A. Single B. Married C. Others
4. Education level A. SSCE B. OND/NCE C. HND/BSC

Kindly tick the appropriate answer to evaluate the product

VARIETIES	EXCELLENT	VERY GOOD	GOOD	FAIR	POOR
TASTE					
APPEARANCE					
TEXTURE					
FLAVOUR					
COLOUR					