PRODUCTION OF AN ESTABLISHING THE NUTRITIONAL BENEFIT OF CASTOR OIL IN THE HOSPITALITY INDUSTRY

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CERTIFICATION

This is to certify that this Project work is carried out by **AMOS MARY JESUKEMI** with Matric no. **ND/23/HMT/PT/0054** and has been completed, read through and approved as meeting part of the requirements of the department of Hospitality Management, Institute of Applied Sciences (IAS), Kwara State Polytechnic for the award of National Diploma in Hospitality Management.

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DEDICATION

This project is dedicated to Almighty God the creator of heaven and earth the one who created all human kind who gave me knowledge to achieve this Seminar work also my parent MR. AND MRS. AMOS who are supportive both spiritually and financial I say God bless you more.

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All praise to Almighty God whose protection and favour was supreme in the course of my education.

I am highly indebted to my parents MR. and MRS. AMOS for their financially, morally and spiritual support towards the achievement of my National Diploma (ND).

My appreciation goes to my able and amiable Supervisor the person of **OWOLABI ROSALINE MODUPE (MRS.)** who toke her time in guiding and support me in writing this project may almighty God always be with you and Special gratitude goes to our able Coordinator in person of **MRS. ADEBAYO SHERIFAT M.** and all Hospitality Management department lecturers.

Lastly my sincere appreciation goes to all my family and friends who support me in one way or others I say God bless you more.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The hospitality industry, encompassing hotels, restaurants, and related services, constantly seeks innovative solutions to enhance operational efficiency, guest satisfaction, and sustainability. The exploration of castor oil, derived from the Ricinus communis plant, within this context presents a multifaceted opportunity. While not directly a nutritional staple, castor oil's unique properties offer potential benefits in various aspects of hospitality, including cleaning, maintenance, and potentially, guest amenities.

Castor oil has a long history of use in diverse applications, spanning medicine, industry, and cosmetics. Its primary component, ricinoleic acid, contributes to its distinctive characteristics, including its emollient and lubricating properties. In the hospitality sector, this translates to potential applications in cleaning products, industrial lubricants, and even in the formulation of guest amenities like soaps and lotions.

However, the use of castor oil in the hospitality industry requires careful consideration. The industry must navigate regulatory compliance, ensure product safety, and address guest preferences. The primary focus of this study is to investigate the feasibility and benefits of incorporating castor oil into the hospitality industry. This involves assessing its potential applications, evaluating its environmental impact, and analyzing its economic viability.

The background of this study is rooted in the need for sustainable and innovative solutions within the hospitality industry. It aims to explore the potential of castor oil, not as a direct nutritional source, but as a versatile ingredient that can contribute to operational efficiency, environmental responsibility, and enhanced guest experiences.

1.2 STATEMENT OF THE STUDY

The statement of the study should clearly articulate the purpose, scope, and objectives of the research. It should define the specific problem being investigated, the target population or industry, and the expected outcomes or contributions of the study.

This study aims to investigate the potential applications and nutritional benefits of castor oil within the hospitality industry, focusing on its use in cleaning and maintenance, and potential applications in guest amenities, while considering safety, regulatory, and guest preference factors.

1.3 AIMS AND OBJECTIVES

Aims:

The aims and objectives of a study on the production and nutritional benefits of castor oil in the hospitality industry would be multifaceted, encompassing production aspects, potential applications, and the evaluation of benefits within the context of the hospitality sector.

Objectives:

To investigate the feasibility of producing castor oil suitable for use within the hospitality industry.

To assess the nutritional and functional properties of castor oil relevant to potential applications in the hospitality sector.

To identify and evaluate potential applications of castor oil within the hospitality industry, considering both direct and indirect benefits.

To determine the economic viability and sustainability of incorporating castor oil into hospitality operations.

1.4 SIGNIFICANCE OF THE STUDY

significance of the Study The significance of a study on the production and nutritional benefits of castor oil in the hospitality industry lies in several key areas: Potential for Innovation: The study could identify innovative applications of castor oil within the hospitality sector, moving beyond traditional uses and exploring new ways to utilize its unique properties. This could include developing eco-friendly cleaning products, creating specialized lubricants for equipment maintenance, or formulating unique guest amenities. This could lead to a competitive advantage for businesses. Sustainability and Environmental Impact: Castor oil is a renewable resource, and its production can be more sustainable than some alternatives. The study could assess the environmental impact of castor oil production and its use in the hospitality industry, potentially highlighting its role in promoting sustainable practices. This is increasingly important as the hospitality industry focuses on reducing its environmental footprint. Economic Benefits: The study could explore the economic benefits of using castor oil, such as cost savings from using it in cleaning products or the potential for creating new revenue streams through unique amenities. This could include the development of new products or services. Health and Wellness: While castor oil is not typically consumed for its nutritional value, the study could explore its potential in guest amenities, such as soaps and lotions, which could contribute to guest well-being.

1.5 SCOPE OF THE STUDY

Scope of the Study The scope of a study on the production and nutritional benefits of castor oil in the hospitality industry would encompass several key areas. This includes the production methods of castor oil, its potential applications within the hospitality sector, and an assessment of its benefits and limitations. Production Methods: The study would investigate various methods of castor oil production, including mechanical pressing and solvent extraction. It would analyze the efficiency, cost-effectiveness, and environmental

impact of each method. The study would also cover the refining processes involved, such as degumming, neutralization, bleaching, and deodorization, to understand how these steps affect the oil's quality and suitability for different applications. Applications in Hospitality: The research would explore the potential applications of castor oil within the hospitality industry. This would include its use in cleaning and maintenance products, such as lubricants for machinery and ingredients for soaps and waxes. The study would also consider the use of castor oil in guest amenities, such as soaps, lotions, and other personal care products, focusing on its moisturizing properties. Nutritional Benefits and Considerations: While castor oil is not typically consumed directly for its nutritional value, the study would address its composition, particularly the presence of ricinoleic acid.

1.6 LIMITATION OF THE STUDY

Limitations of the Study The primary limitation of this study is the indirect nature of castor oil's benefits within the hospitality industry. The study focuses on the potential applications of castor oil in cleaning, maintenance, and guest amenities, rather than direct nutritional benefits. This means that the study's conclusions are based on the properties of castor oil and its potential uses, rather than direct evidence of improved nutritional outcomes for guests. The study also does not address the potential challenges of implementing castor oil-based products in the hospitality industry, such as cost, sourcing, and guest acceptance. Furthermore, the study does not provide specific recommendations for the types of castor oil products that would be most suitable for the hospitality industry. The study also does not address the potential environmental impact of castor oil production and use.

1.7 DEFINITION OF TERMS

Castor Oil: An oil extracted from the seeds of the Ricinus communis plant. It is primarily composed of ricinoleic acid and has various industrial, medicinal, and cosmetic applications.

Ricinoleic Acid: A monounsaturated fatty acid that is the primary component of castor oil. It is responsible for many of the oil's unique properties.

Mechanical Pressing: A method of extracting oil from seeds by applying physical pressure.

Solvent Extraction: A method of extracting oil from seeds using a solvent to dissolve the oil.

Refining: The process of purifying crude oil to remove impurities and improve its quality, clarity, and stability.

Degumming: A step in the refining process to remove gums and phospholipids from the oil.

Neutralization: A step in the refining process to remove free fatty acids from the oil.

Bleaching: A step in the refining process to remove color pigments from the oil.

Deodorization: A step in the refining process to remove odors from the oil.

Ricin: A toxic enzyme found in raw castor beans.

CHAPTER TWO

LITERATURE REVIEW

2.1 Production and Properties of Castor Oil

The use of castor oil (derived from the seeds of the Ricinus communis plant) in the hospitality industry is not widely documented in the existing literature, primarily because its direct nutritional applications are limited. However, its unique properties and potential applications in cleaning, maintenance, and guest amenities warrant a review of relevant research and industry practices.

Castor is one of the oldest cultivated crops; however, it contributes to only 0.15% of the vegetable oil produced in the world. The oil produced from this crop is considered to be of importance to the global specialty chemical industry because it is the only commercial source of a hydroxylated fatty acid.9 Even though castor oil accounts for only 0.15% of the world production of vegetable oils, worldwide consumption of this commodity has increased more than 50% during the past 25 years, rising from approximately 400,000 tons in 1985 to 610,000 tons in 2010.9,10 On average, worldwide consumption of castor oil increased at a rate of 7.32 thousand tons per year. In general, the current rate of castor oil production is not considered sufficient to meet the anticipated increase in demand.

There are various challenges that make castor crop cultivation difficult to pursue. Climate adaptability is one of the challenges restricting castor plantation in the U.S. The plant also contains a toxic protein known as ricin, providing a challenge from being produced in the U.S. It also requires a labor-intensive harvesting process, which makes it almost impossible for the U.S. and other developed countries to pursue castor plantation.

Castor plant grows optimally in tropical summer rainfall areas. It grows well from the wet tropics to the subtropical dry regions with an optimum temperature of 20°C–25°C. The high content of the oil in the seeds can be attributed to the warm climate conditions, but temperatures over 38°C can lead to poor seed setting. Additionally, temperatures low enough to induce the formation of frost is known to kill the plant.11

As of 2008, three countries (India, China, and Brazil) produced 93% of the world's supply of castor oil. Because production is concentrated mainly in these three countries, total castor production varies widely from year to year due to fluctuations in rainfall and the size of the areas utilized for planting. As a consequence, this concentration has led to cyclic castor production. Thus, diversification of castor production regions and production under irrigation would hopefully reduce the climatic impact on castor supplies.9

In the United States, the hazardous chemical products found in the castor plant, especially ricin has been a major concern.9,12–15 The body of scientific literature related to castor plants, especially on the detailed processing parameters involved in commercial production, has been relatively small over the past century.9 Over the years, there has been considerable interest and research done on the uses and properties of castor but not on a commercial scale. Castor oil studies have shown increasing growth with the number of manuscripts increasing sixfold since the 1980s (Fig. 1). While alternative breeding programs and marketing can lead to economic growth of castor oil production, at the commercial level, various projects fail due to the lack of knowledge about novel processing methods and parameters used in castor oil production. This manuscript discusses those processing parameters in detail. Although the castor bean processing method can typically be considered a simple process, it can also be complicated if the operators are unaware of its exact processing parameters and operating procedures.

Specifically, process parameters for castor oil production should be optimized to achieve high oil extraction efficiency through a solvent extraction method. No scientific literature currently exists discussing in detail the commercial castor processing parameters. This contribution discusses in detail the commercial castor processing parameters and the important key points needed on how to manufacture the desired quality of castor oil, both of which are important to castor oil producers.

Applications in the Hospitality Industry

Castor oil is produced through the extraction of oil from castor beans. The primary component of castor oil is ricinoleic acid, a monounsaturated fatty acid. The extraction process typically involves mechanical pressing or solvent extraction, followed by refining steps such as degumming, neutralization, bleaching, and deodorization. The refining process is crucial to remove impurities and ensure the oil's safety and stability. While the raw castor beans contain ricin, a toxic enzyme, the heating process during oil extraction deactivates this, making the oil safe for use.

Cleaning and Maintenance: Castor oil's properties as a lubricant and its use in the production of soaps and waxes make it relevant for cleaning and maintenance within a hospitality setting. Research on the use of bio-based lubricants, including those derived from castor oil, in industrial applications highlights their potential for reducing environmental impact and improving sustainability. This aligns with the growing emphasis on eco-friendly practices in the hospitality sector.

Guest Amenities: Castor oil's moisturizing properties could be utilized in certain guest amenities, such as soaps or lotions. Research on the use of natural ingredients in cosmetics and personal care products supports the potential of castor oil in this area. However, it is important to consider guest preferences and potential sensitivities when incorporating castor oil into amenities.

Challenges and Considerations

Food Service: While castor oil is not typically considered an edible oil due to its unpleasant taste, it is sometimes used as a food additive or flavoring in some candies and chocolates. However, its primary applications in the hospitality industry are not directly related to nutrition.

Safety: While the oil itself is safe after processing, it is important to ensure that any products containing castor oil meet safety standards and are used appropriately. Regulations: The use of castor oil in food products is subject to regulations, and the hospitality industry must comply with these. Guest Preferences: The industry should consider guest preferences and potential sensitivities when incorporating castor oil into amenities. Sustainability: The environmental impact of castor oil production and sourcing should be considered, including the use of sustainable farming practices.

The literature review indicates that while castor oil does not have direct nutritional applications in the hospitality industry, it has potential in cleaning, maintenance, and guest amenities. Its use as a lubricant, in soaps and waxes, and in moisturizing products aligns with the industry's focus on sustainability and guest well-being. Further research is needed to explore the specific applications of castor oil in the hospitality sector, considering safety, regulations, guest preferences, and environmental impact.

Production of Castor Oil for the Hospitality Industry Production Methods Castor oil, derived from the seeds of the Ricinus communis plant, has a long history of use in various applications, including medicine, industry, and pharmaceuticals. Its unique properties make it a potential asset in the hospitality industry, particularly in areas related to food service, cleaning, and potentially, guest amenities. Nutritional Benefits and Applications in Hospitality The production of castor oil involves several key steps. First, the castor beans are harvested. Then, the seeds undergo a cleaning process to remove impurities. The oil is then extracted from the seeds through either mechanical pressing or

solvent extraction. Mechanical pressing is a more traditional method, while solvent extraction can yield a higher oil recovery rate. The extracted oil is then refined to remove any remaining impurities and improve its clarity and stability. The refining process may include degumming, neutralization, bleaching, and deodorization. It's important to note that while the raw castor beans contain ricin, a toxic enzyme, the heating process during oil extraction deactivates this, making the oil safe for use. However, due to the toxicity of the raw beans, making castor oil at home is not recommended. While castor oil is not typically considered an edible oil due to its unpleasant taste, it possesses unique properties that could be indirectly beneficial in the hospitality sector. The primary nutritional component of castor oil is ricinoleic acid, a monounsaturated fatty acid. Considerations for the Hospitality Industry Food Service: Castor oil is sometimes used as a food additive or flavoring in some candies and chocolates, but it is not considered an edible oil. Cleaning and Maintenance: Castor oil can be used as an industrial lubricant and in the production of soaps and waxes. This could be relevant for cleaning and maintenance within a hospitality setting. Potential for Guest Amenities: While not directly nutritional, castor oil's moisturizing properties could be utilized in certain guest amenities, such as soaps or lotions, as it is a natural skin moisturizer. The hospitality industry should consider several factors when evaluating the use of castor oil: Conclusion Safety: While the oil itself is safe after processing, it is important to ensure that any products containing castor oil meet safety standards and are used appropriately. Regulations: The use of castor oil in food products is subject to regulations, and the hospitality industry must comply with these. Guest Preferences: The industry should consider guest preferences and potential sensitivities when incorporating castor oil into amenities. Castor oil's potential in the hospitality industry lies primarily in its industrial and cosmetic applications, rather than direct nutritional benefits. Its use in cleaning products, lubricants, and potentially guest amenities could offer advantages.

Applications of castor oil and its derivatives

Fuel and biodiesel

Castor is considered to be one of the most promising nonedible oil crops, due to its high annual seed production and yield, and since it can be grown on marginal land and in semiarid climate. Few studies have been done regarding castor fuel-related properties in pure form or as a blend with diesel fuel, primarily due to the extremely high content of RA. In a study by Berman et al, it was found that methyl esters of castor oil can be used as a biodiesel alternative feedstock when blended with diesel fuel. However, the maximum blending level is limited to 10% due to the high levels of RA present in the oil, which directly affects biodiesel's kinematic viscosity and distillation temperature. Another study by Shojaeefard et al examined the effects of castor oil biodiesel blends on diesel engine performance and emissions. They found that a 15% blend of castor oil–biodiesel was an optimized blend of biodiesel–diesel proportions. The results indicated that lower blends of biodiesel provide acceptable engine performance and even improve it. Similar to the study by Shojaeefard et al, Panwar et al prepared the castor methyl ester by transesterification using potassium hydroxide (KOH) as catalyst. They then tested this methyl ester by using it in a four-stroke, single cylinder variable compression ratio type diesel engine. It was concluded that the lower blends of biodiesel increased the break thermal efficiency and reduced the fuel consumption. Further, the exhaust gas temperature increased with increasing biodiesel concentration. Results of their study proved that the use of biodiesel from castor seed oil in a compression ignition engine is a viable alternative to diesel.

The transesterification reactions of castor oil with ethanol and methanol as transesterification agents were also studied in the presence of several classical catalytic systems. Results of their study show that biodiesel can be obtained by transesterification

of castor oil using either ethanol or methanol as the transesterification agents. Although these studies have shown promising results for the use of castor oil as a technically feasible biodiesel fuel, a major obstacle still exists in its use as a biodiesel in some countries such as Brazil. In Brazil, government policies promoted castor as a biodiesel feedstock in an attempt to bring social benefits to small farmers in the semiarid region of the country. However, seven years after the Brazilian biodiesel program was launched, negligible amounts of castor oil have been used for biodiesel production. It was found that the castor oil produced in this program was not primarily used for biodiesel but sold for higher prices to the chemical industry. Another major constraint in the use of castor oil as a feedstock for biodiesel has been the high price paid for the oil as industrial oil rather than its physical and chemical properties. Castor oil is in high demand by the chemical industry for the manufacture of very high value products. For this reason, it is not economical to use this oil as a replacement for diesel. Finally, although castor oil can be used directly to replace normal diesel fuel, the high viscosity of this oil limits its application.

Polymer materials

Castor oil and its derivatives can be used in the synthesis of renewable monomers and polymers. In one study, castor oil was polymerized and cross-linked with sulfur or diisocyanates to form the vulcanized and urethane derivatives, respectively. In another study, full-interpenetrating polymer networks (IPNs) were prepared from epoxy and castor oil-based polyurethane (PU), by the sequential mode of synthesis. Similar to the aforementioned study, a series of two-component IPN of modified castor oil-based PU and polystyrene (PS) were prepared by the sequential method. IPN can be elaborated as a special class of polymers in which there is a combination of two polymers in which one is synthesized or polymerized in the presence of another. Thus, IPN formulation can be considered a useful method to develop a product with excellent physicomechanical properties than the normal polyblends. IPN is also known as polymer alloys and is

considered to be one of the fastest growing research areas in the field of polymer blends in the last two decades.

Castor oil polymer (COP) has also been shown to have a sealing ability as a root-end filling material. A root-end filling material simply refers to root-end preparations filled with experimental materials. The main objective of this type of material is to provide an apical seal preventing the movements of bacteria and the diffusion of bacterial products from the root canal system into the periapical tissues. In a study conducted by de Martins et al, the sealing ability of COP, mineral trioxide aggregate (MTA), and glass ionomer cement (GIC) as root-end filling materials were evaluated. MTA is primarily composed of tricalcic silicate, tricalcic alluminate, and bismuth oxide and is a particular endodontic cement. GICs, on the other hand, are mainstream restorative materials that are bioactive and have a wide range of uses such as lining, bonding, sealing, luting, or restoring a tooth. Results of their study show that the COP had a greater sealing ability when used as a root-end filling material than MTA and GIC.

Biodegradable polyesters are one of the most common applications using castor oil. Polyesters are the first synthetic condensation polymers prepared by Carothers during the 1930s. They are known to be biodegradable and environmental friendly, with a wide array of applications in the biomedical field, as well in the preparation of elastomers and packaging materials. Fatty acid scaffolds are desirable biodegradable polymers, though they are restricted by their monofunctional property. That is, most fatty acids have a single carboxylic acid group. RA, however, is known to be one of the few naturally available bifunctional fatty acids with an additional 12-hydroxy group along with the terminal carboxylic acid. The presence of this hydroxyl group provides additional functionality for the preparation of polyesters or polyester-anhydrides. The dangling chains of the RA impart hydrophobicity to the resulting polyesters, thereby influencing

the mechanical and physical property of the polymers. These chains act as plasticizers by reducing the glass transition temperatures of the polyesters. Castor oil can be combined with other monomers to produce an array of copolymers. Fine-tuning these copolymers can provide materials with different properties that find use in products ranging from solid implants to in situ injectable hydrophobic gel.

Soaps, waxes, and greases

Castor oil has been used to produce soaps in some studies. Some studies also utilize castor oil in waxes. One study by Dwivedi and Sapre utilized castor oil in total vegetable oil greases. Total vegetable oil greases are those in which both the lubricant and gellant are formed from vegetable oil. Their study utilized a simultaneous reaction scheme to form sodium and lithium greases using castor oil.

Lubricants, hydraulic, and brake fluids

Castor oil has also been used for developing low pour point lubricant base stocks through the synthesis of acyloxy castor polyol esters.

Production of castor oil generates two main byproducts: husks and meal. For each ton of castor oil, 1.31 tons of husks and 1.1 tons of meal are generated. A study by Lima et al showed that blends of castor meal and castor husks used as fertilizer promoted substantial plant growth up to the dose of 4.5% (in volume) of meal. However, doses exceeding 4.5% caused reduction in plant growth and even plant death. Their study showed that castor meal may be used as a good organic fertilizer due to its high nitrogen and phosphorus content, but blending with castor husks is not necessary.

Coatings

Coatings and paints are also another application of castor oil. Castor oil can be effectively dehydrated by nonconjugated oil–maleic anhydride adducts to give useful paint or furniture oil applications. Trevino and Trumbo studied the utilization of castor oil as a coating application by converting the hydroxyl functionalities of castor oil to β-ketoesters using *t*-butyl acetoacetate. The reaction is known to be relatively rapid and proceeded to high yield under mild conditions. Results showed that the 60° glosses of the films and film flexibilities were good. In a separate study by Thakur and Karak, advanced surface coating materials were synthesized from castor oil-based hyperbranched polyurethanes (HBPUs), a highly branched macromolecule. The HBPs exhibited excellent performance as surface coating materials with the monoglyceride-based HBPU, exhibiting higher tensile strength than direct oil-based coatings. Both the HBPUs have acceptable dielectric properties with greater than 250°C thermal stability for both the polymers. Ceramer coatings are also another coating application of castor oil. de Luca et al synthesized ceramer coatings from castor oil or epoxidized castor oil and tetraethoxysilane. Most recently, high-performance hybrid coatings were synthesized by Allauddin et al using a methodology that included introducing hydrolyzable –Si-OCH_3 groups onto castor oil that have been used for the development of PU/urea–silica hybrid coatings.

Pharmacological and medicinal use

While castor oil is well known as a powerful laxative, the medicinal use of the oil is relatively minor (<1%). Beyond this infamous application of castor oil, it is considered to be an important feedstock utilized by the chemical industry, particularly in producing a wide array of materials, many of which are superior to equivalent products derived from petroleum. The high percent composition of RA in proximity to the double bond makes this oil poised for various physical, chemical, and even physiological activities, as described in the aforementioned paragraphs.

Owing to the activity of RA in the intestine, castor oil has been widely used in various bioassays involving antidiarrhea activity on laboratory animals. Castor oil is often administered orally to induce diarrhea in rats. This assay has led to a fast and efficient method of preliminary screening of various phytochemicals for potential drug-like candidates from natural products.

In modern-day medicine, castor oil is also used as a drug delivery vehicle. An example is Kolliphor EL or formerly known as Cremophor EL, which is a registered product of BASF Corp. The product is a polyexthoxylated castor oil, a mixture (CAS No. 61791-12-6) that is prepared when 35 moles of ethylene oxide is made to react with one mole of castor oil. This product is often used as an excipient or additive in drugs and is also used to form stable emulsions of nonpolar materials in various aqueous systems. It is also often used as a drug delivery vehicle for very nonpolar drugs such as the anticancer drugs paclitaxel and docetaxel.

Castor Oil Extraction

Castor oil seed contains about 30%–50% oil (*m/m*). Castor oil can be extracted from castor beans by either mechanical pressing, solvent extraction, or a combination of pressing and extraction. After harvesting, the seeds are allowed to dry so that the seed hull will split open, releasing the seed inside. The extraction process begins with the removal of the hull from the seeds. This can be accomplished mechanically with the aid of a castor bean dehuller or manually with the hands. When economically feasible, the use of a machine to aid in the dehulling process is more preferable.

After the hull is removed from the seed, the seeds are then cleaned to remove any foreign materials such as sticks, stems, leaves, sand, or dirt. These materials can usually be removed using a series of revolving screens or reels. Magnets used above the conveyer

belts can remove iron. The seeds can then be heated to harden the interior of the seeds for extraction. In this process, the seeds are warmed in a steam-jacketed press to remove moisture, and this hardening process will aid in extraction. The cooked seeds are then dried before the extraction process begins. A continuous screw or hydraulic press is used to crush the castor oil seeds to facilitate removal of the oil. The first part of this extraction phase is called prepressing. Prepressing usually involves using a screw press called an oil expeller. The oil expeller is a high-pressure continuous screw press to extract the oil.

Benefits and Uses of Castor OilCastor oil has various uses in medicine, industry, and pharmaceuticals. It is found in food, medication, and skin care and is also used as an industrial lubricant and biodiesel component.

A powerful laxative

Castor oil is well-known for its use as a natural laxative and is approved by the Food and Drug Administration (FDA) for this purpose.

It works quickly by stimulating muscle movement in the intestines, making it effective Trusted Source for temporary constipation relief or bowel cleansing before medical procedures. However, using too much castor oil can have negative side effects Trusted Source like abdominal cramping and diarrhea.

While it can be useful in treating occasional constipation, it should not be used for long-term health concerns without consulting a healthcare professional first, as misusing it can lead to dangerous complications.

A natural moisturizer

Castor oil is rich in ricinoleic acid, a monounsaturated fatty acid known for its moisturizing propertiesTrusted Source. It can be used alone or with other oils as a natural alternative to store-bought moisturizers.

Unlike commercial products, it contains no harmful additives and is suitable for the face and body. However, it may cause allergic reactionsTrusted Source in some individuals, so always dilute it with a carrier oil like coconut oil before using it, and do a small skin patch test first before using it on larger skin areas.

May promote wound healing

Castor oil can help promote wound healing by creating a moist environment and preventing drying out.

For example, Venelex, a common ointment used in clinical settings, combines castor oil and Peru balsam, a balm derived from the *Myroxylon balsamum* tree, to treat wounds.

Additionally, ricinoleic acid, the main fatty acid found in castor oil, may help reduceTrusted Source skin inflammation, support healing, and aid in pain reduction in people with wounds.

Keep in mind that castor oil topical wound treatments contain a combination of ingredients, not just castor oil. You should not apply castor oil to any wound without checking with a healthcare professional first.

May be helpful for cleaning and storing dentures

A number of bacteria and fungi, including *Candida* fungi, commonly grow on dentures. This can create oral concerns if dentures aren't properly cleaned and stored.

Candida species, like *C. albicans*, are especially problematic for people who wear dentures because they easily adhereTrusted Source to denture surfaces and mouth tissues.

An overgrowth of *Candida* fungi can lead to a condition called denture stomatitis, an infection that leads to inflammation, redness, and irritation in the mouth.

However, some researchTrusted Source suggests that cleaning dentures with castor oil may help reduce the risk of developing denture stomatitis because castor oil can help kill bacteria and fungi.

Can castor oil support hair growth and scalp health?

Many people use castor oil as a natural hair treatment. This is because castor oil has moisturizing properties Trusted Source, which could help lubricate the hair shaft, increasing flexibility and decreasing the chance of breakage.

Even though some people regularly use castor oil as part of their hair care routine, there's no scientific evidence Trusted Source that castor oil helps promote hair health, stimulates hair growth, or reduces hair loss.

The same goes for using castor oil on your eyelashes or for treating dandruff Trusted Source. Some people use castor oil for eyelash growth, but no scientific research has shown this is actually effective.

In fact, castor oil could lead to a condition called acute hair felting Trusted Source in people with long hair, which causes the hair to become twisted and tangled, resembling a hard bird's nest. Typically, this can't be treated, and the hair must be cut off.

Even though this condition is rare, people with long hair should be cautious when using castor oil as a hair treatment.

CHAPTER THREE

3.1 RESEARCH DESIGN

The research work was design to appraise the comparative analysis between normal yoghurt and coconut yoghurt and coconut yoghurt and their health benefits and uses in hospitality industry.

The method used to accomplish the objective of this research work is quantitative method which in set to measure in terms of numbers. The data here presents themselves in terms of measurement scales and external themselves for more statistical computation.

3.2 RESEARCH INSTRUMENT

The researcher makes use of various tools which includes the following oral interview and observation in order to obtain there fund information from the respondent. Interview: An interview is a method of data collection from face contents, this enables the researchers interest to meet up with his/her research work.

Observation method: this is a primary collections procedure which researcher use to gather information which_ includes experimental research.

3.3POPULATION OF THE STUDY

The target population for this research for this research for this research were some selected respondents in hospitality industry.

3.4 SAMPLING TECHNIQUE

The sampling of the opinion has been drawn from the members of the hospitality industry using simple random sampling method. Some selected students of hospitality industry were used

patterns, themes, and insights.

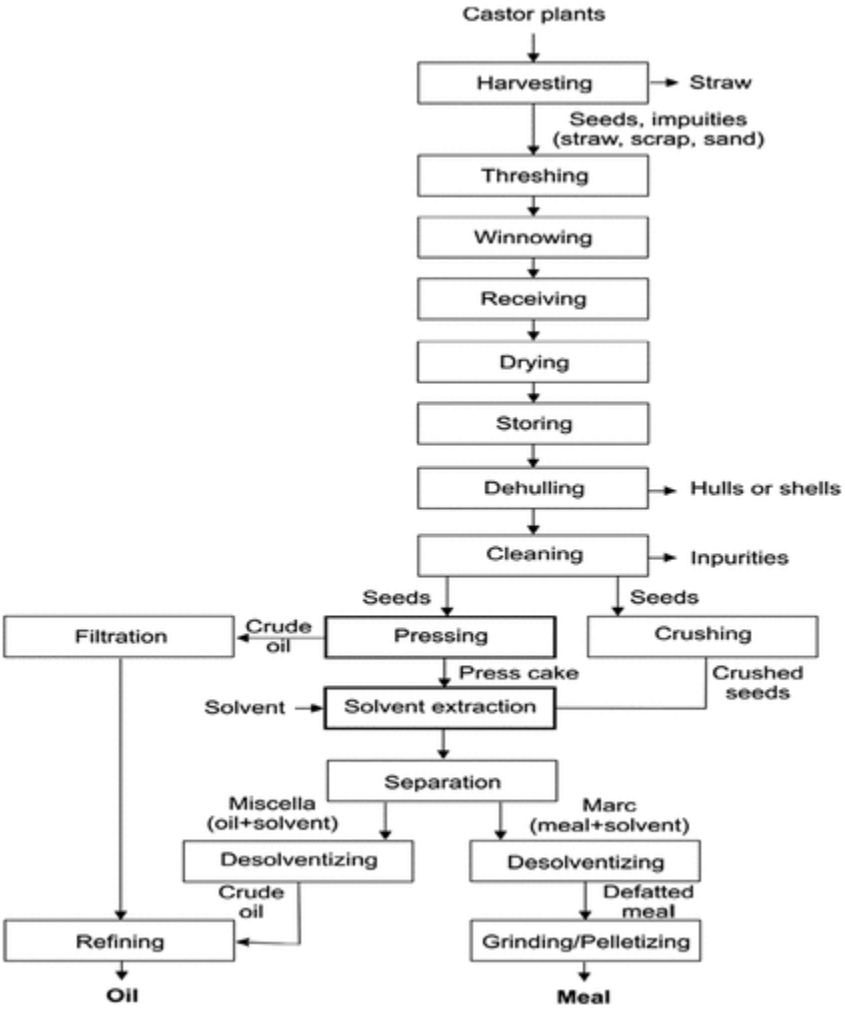

FIG 1: FLOW CHAT OF CASTOR OIL PRODUCTION

CHAPTER FOUR

MATERIAL AND MATETHOD

MATERIAL USED

FIG: 4.1 CASTOR SEED

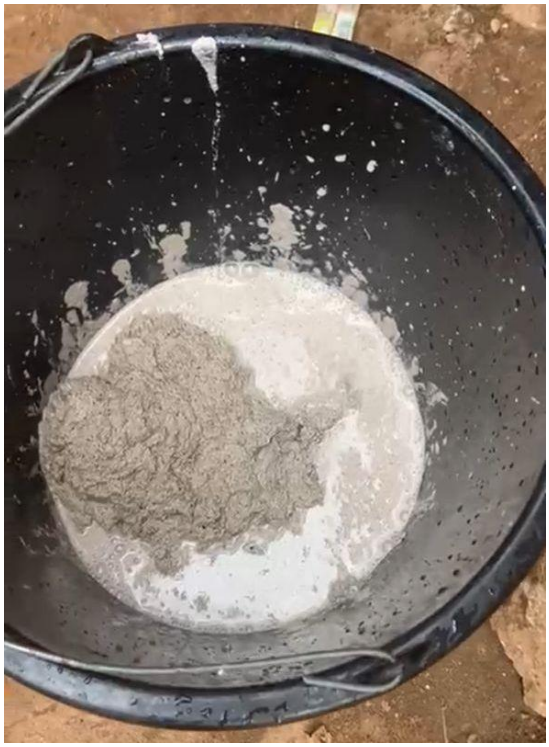

FIG 4.2: STEP 1

FIG 4.3: STEP 2

FIG: 4.4 STEP 3

FIG 4.5: STEP 4

FIG 4.5 FINAL PRODUCT OF CASTOR OIL

Threshing:- The dried capsules are threshed to release the castor beans

cleaning the beans are cleaned to remove impurities and debris oil extraction

oil Extraction

Mechanical Pressing: Castor beans are pressed to extract the oil solvent extract the oil

Solvent Extraction: A solvent is used to extract oil from the seed

Refining: the extracted oil is refined to remove impurities and improve its quality. this may involved the following:

Degumming: Removing impurities like phospholipids

Neutralization: Removing free fatty acids

Bleaching: Removing color and impurities

Deodoraization: Removing unpleasant

Quality control: The final product is tested for quality, purity and consistency. castor oil is used in various

Application, Including

Pharmaceuticals: Laxatives and medicinal products

Cosmetics: Skincare products haircare products, and lip balms

Industrial: Lubricants, Paints and coatings

Castor Oil Processing: Extraction and Uses

Castor Oil Extraction Methods

1. Cold Pressing: Seeds are pressed to extract oil without heat.

2. Solvent Extraction: Seeds are treated with solvents to extract oil.

Castor Oil Processing Steps

1. Seed Preparation: Castor seeds are cleaned and dried.

2. Extraction: Oil is extracted using cold pressing or solvent extraction.

3. Refining: Extracted oil is refined to remove impurities.

4. Filtering: Refined oil is filtered to improve clarity and quality.

Uses of Castor Oil

1. Medicinal: Used for its anti-inflammatory and antimicrobial properties.

2. Skincare: Used in skincare products for its moisturizing and soothing properties.

3. Haircare: Used to promote hair growth and improve scalp health.

4. Industrial: Used in the production of lubricants, soaps, and other products.

Precautions

1. Allergic Reactions: Some people may be allergic to castor oil.

2. Skin Irritation: Castor oil can cause skin irritation in some individuals.

3. Internal Use: Consult a healthcare professional before using castor oil internally.

CHAPTER FIVE

5.0 Summary, Conclusion and Recommendation

5.1 Summary

This study investigated the production and nutritional benefit of castor oil (Ricinus communis) and its possible application in the hospitality industry. The research was motivated by the need to explore alternative oils that could provide nutritional and functional value, while also assessing their safety and acceptability.

The study began with a background discussion on castor oil as a non-conventional oil source, its known industrial and medicinal uses, and the challenges posed by its toxic component (ricin). The problem statement highlighted the lack of sufficient empirical evidence on the nutritional composition and potential hospitality applications of properly processed castor oil.

A mixed-methods research design was employed. Castor oil was extracted from mature castor seeds using standardized procedures, after which laboratory analysis was carried out to determine its proximate composition (moisture, protein, fat, ash, fiber), fatty acid profile, and the presence of toxic or anti-nutritional factors. In addition, a structured questionnaire and interviews were administered to chefs, food and beverage managers, nutritionists, and food safety officers in selected hospitality establishments to assess awareness, perceptions, and willingness to adopt castor oil in practice.

Findings from the laboratory analysis revealed that castor oil is rich in lipids, with ricinoleic acid as the dominant fatty acid, and contains essential micronutrients. However, the presence of anti-nutritional factors and toxicity risks means that safe processing and strict regulation are necessary before culinary application. The survey findings indicated that although a majority of hospitality practitioners were aware of castor oil, many were uncertain about its safety for direct culinary use. Concerns raised included toxicity,

taste/odor, cost, and regulatory approval. Nevertheless, respondents expressed interest in non-culinary applications of castor oil, such as in food preservation, polishing, and lubrication.

5.2 Conclusion

The study concluded that castor oil, though nutritionally rich, cannot be freely recommended for direct culinary use in the hospitality industry without thorough detoxification and safety validation. Its high lipid content and unique fatty acid composition highlight its nutritional potential, but the associated risks of ricin toxicity make cautious adoption necessary.

From the perception survey, hospitality practitioners demonstrated cautious awareness of castor oil, showing low willingness to use it in cooking but recognizing possible value in non-food applications within hospitality operations. This highlights a knowledge and safety gap that needs to be addressed through education, regulation, and further scientific research.

Overall, castor oil remains a valuable resource that could contribute to the hospitality industry if production methods and regulatory frameworks ensure complete removal of toxins and certification for safe use.

5.3 Recommendations

Based on the findings of this study, the following recommendations are made:

Safe Processing

Castor oil intended for hospitality use must undergo proper detoxification and refinement processes to eliminate ricin and other anti-nutritional factors.

Collaboration with food science laboratories and regulatory agencies is essential to standardize processing methods.

Regulatory Oversight

Government food safety agencies (e.g., NAFDAC in Nigeria) should develop guidelines for testing, certification, and approval of castor oil for food-related **applications.**

Clear labeling and consumer education should accompany any commercial production of edible-grade castor oil.

Awareness and Training

Hospitality practitioners (chefs, food and beverage managers) should be sensitized on the nutritional properties, potential benefits, and risks of castor oil.

Training programs can help build confidence in evaluating and adopting non-conventional oils.

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