



## RESEARCH ARTICLE

### PRODUCTION AND NUTRITIONAL EVALUATION OF FISH OIL AND SOYA OIL EXTRACT

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#### Abstract

Studies have shown that fish oil and soybean oil are of excellent public and medical importance to humans. The health benefits of the oils have been widely documented. The purpose of the present study was to manufacture and evaluate the nutritional properties of fish and soybean oil obtained in Nigeria. The oils were extracted from fish and soybean seeds using existing procedures. Thirty liters of the oils were extracted, respectively, and the nutritional contents and other properties were determined. The study provided insight into the nutritional composition of fish oil and soybean oil. The findings and recommendations are discussed.

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#### Introduction: -

Fish oil is of great medical and public interest (de Magalhães et al., 2016). The health advantage of fish oil has been widely recognized (Miyashita, 2019). Primarily due to the presence of omega -3-fatty acid and eicosatetraenoic acid (EPA), and docosahexaenoic acid (DHA). Fish oil has been commonly used in fortified food products because of its remarkable health benefits (Jamshidi et al., 2020). (Encina et al., 2016) reported that fish oil is a natural source of LCω3-PUFA, which are typically incorporated into food products. For instance, in the United States, fish oil is the most commonly used nonvitamin, and nonmineral dietary supplements (Hilleman et al., 2020). Fish oils have many dietary benefits (Ghorbanzade et al., 2017). They have been shown to play a vital role in lowering the risk of metabolic syndromes and benefit an extensive range of chronic diseases (Gao et al., 2017). Although fish oil is uneven during the production, storage, and application process (Li et al., 2020). It is an industrial product of high nutritional value because of its Omega-3 polyunsaturated fatty acids content (Bonilla-Mendez & Hoyos-Concha, 2018). The health benefits of fish oil have attracted long attracted the attention of researcher over the years (Bakula et al., 2011; Ballou & DePeters, 2008; Durmuş, 2019; Ghasemi Fard et al., 2019; Harris, 2004; Z. Lin et al., 2019; Parletta et al., 2019; Raatz & Bibus, 2016; Ramalingam et al., 2018; Sidhu, 2003; Suzana et al., 2016; Ulven & Holven, 2015)

Plant oils have been utilized for various purposes throughout history (Lin et al., 2018). Soybean oil is a vegetable oil extracted from the soybean seeds (Glycine max). It is considered healthier than other vegetable oil because it contains many essential fatty acids required for healthy living. Soybean oil is rich in vitamin E (Arianto et al., 2019). The vitamin and mineral constituents associated with soybean remain healthy parts of this delightful and commonly used legume (Cheng, 2008). Soybeans are legumes that include peanuts, chickpeas, other beans, and pulses, which are typically processed into oil, flour, and meal (Ahsan, 2018). It is one of the most widely consumed cooking oils. Over the last few decades, there has been an overwhelming increase in human consumption of soybean-oil (Deol et al., 2020; Korach-Rechtman et al., 2020). With the increasing demands of soybean oil for food and industrial purposes, increasing soybean oil becomes essential (Cheng & Rosentrater, 2017). Researches (Ciabotti

et al., 2019; Darr et al., 2020; Dhakal et al., 2014; O'Bryan et al., 2014; Segura Munoz et al., 2020) have pointed the various benefits of soybean to human health. For example, soybean has been found effective in the control of cholesterol (Freeman, 2009), impact positively on cognition (Elbouruee, 2010), bone enhancement (Janse, 2010), maintains healthy eye and Skin (Judith, 2007), and have antioxidant potential (Kristin, 2011). However, research has shown that fish oil and soybean oil are of high nutritional value (Alfonso et al., 2012; Amanlou et al., 2012; Cho et al., 2013; Lim et al., 2011; Ryckebosch et al., 2014; Xia et al., 2019). The production is increasing worldwide mainly due to acclaimed health benefits (Lokuruka, 2011). The current study aimed to produce and evaluate the nutritional values of fish oil and soybean oil.

### Materials and Method: -

All the materials used in the study were adequately prepared and sterilized in line with the procedure outlined in (Ivanovs & Blumberga, 2017). The soybean seed and fish oil were sourced from the general public and subjected to laboratory analysis. The extraction method highlighted in (Campbell & Glatz, 2009) and (Bako et al., 2017) respectively were applied. The moisture content, ash content, fat content, carbohydrate, protein, vitamin, and mineral contents of the fish oil were determined. The nutritional contents of soybean oil and flavonoid, saponins, sugars, phenolic compounds, fatty acid, vitamins, and phosphorus in the samples were also determined.

### Result: -

Thirty liters of fish oil and soybean oil were produced and put in a white sterile bottle. Drops of the oil were dropped on the filter paper and allowed for few minutes.

**Table 1: -** Table showing the observed properties of the examined fish and soybean oil.

Colour	smell	texture
Fish oil	yellowish	Sharp, oily smell like fish Oily
Soybean oil	yellowish	Odour like soybean More viscous

**Table 2: -** Table showing the proximate analysis of fish oil.

Raw Material	Fish oil
Protein	68.4
Carbohydrate	5.4
Moisture content	7.30
Fat	12.50
Ash	6.40

**Table 3: -** Table showing the proximate analysis of soybean oil.

Raw Material	Soybean oil
Protein	67.4
Carbohydrate	4.4
Moisture content	6.4
Fat	19.7
Ash	1.9

**Table 4: -** Table showing the bioactive component of soybean oil.

Flavonoids	+++
Saponin	++
Alkaloids	++
Tannin	++

**Table 5:** - The Mineral Content of Fish Oil.

Mineral	mg/kg
Calcium	+ -
Magnesium	++
Sodium	+
Potassium	++
Copper	+
Zinc	++
Iron	+
Phosphorus	++

**Table 6:** - The Mineral Content of Soybean Oil.

Mineral	mg/kg
Calcium	++
Magnesium	++
Sodium	+
Potassium	+
Copper	+ -
Zinc	+
Iron	++
Phosphorus	+++

Note: + =Indicates the presence in trace or minutes amount. ++ indicate the presence in moderate amount. +++ = indicates the presence of appropriate amount. + =Indicates presence in very trace amount.

### Discussion: -

Table 1 shows the observed color, smell, and texture of the fish and soybean oil analyzed. The yellowish color was observed in both, and the smells are similar to fish and soybean oil, respectively. Although the textures are oily, however, soybean oil is stickier. Tables 2 and 3 indicate the composition of fish oil and soybean oil. The carbohydrate content was high in soybean oil to fish oil. This indicates that soybean oil can serve as food. The higher value was indicated as a result of profound color change during the reaction. The moisture content or iodine value in both indicates that the oil is susceptible to spoilage. Hence it must be stored appropriately to ensure longer shelf life (Warner, 2002). The protein content is an essential component of the diet needed for the survival of animals and human beings. Their primary function in nutrition is to supply an adequate amount of required amino acids. Protein deficiency causes growth retardation, and abnormal swelling of the belly, and fluid collection in the body (Mount, 2000). Both samples have a high protein content. Based on this, Crude fat is essential because they provide essential fatty acids (EFA) as their name defines, they are essential nutrients required by the body. Crude fiber aid in digestion. The vitamin content in both shows that they are good antioxidants that can promote resistance to disease, delay aging, and preside over the health of the eyes, skin, nails, and hairs.

Table 4 shows the phytochemical contents of soybean oil. While tables 5 and 6 show the two oils' mineral compositions, the analysis based on changes shows that soybean oil has more minerals to fish oil. This may be due to the source. Both showing to compose minerals indicates such as zinc suggest that these oils will be useful in reproduction, predominantly male fertility. Zinc also stimulates the activity of vitamin formation of red and white corpuscles.

### Conclusion: -

The current study aimed at producing and evaluating the nutritional values of fish and soybean oil found that the oils contain vital nutritional compositions. The study provides insight into the usefulness of the oils in food and drug formulations. Moreover, the study contributes to the literature by proving that the widely used PA (eicosatetraenoic acid) and DHA (Docosahexaenoic acid) in Nigeria are essential in human functioning. Therefore, the study recommends that fish and soybean oil be robustly produced to meet the oils' increasing demand.

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