Nigerian Research Journal of Chemical Sciences **(ISSN: 2682-6054)**
Vol. 7, 2019

QUALITATIVE TEST OF PALM FROND FIBER FOR PHYTOCONSTITUENTS

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ABSTRACT

Oil palm (*Elaes guineensis* Jacq) is one of the most important commercial crop for the production of palm oil which generate 10.8 tons of oil palm frond per hectare, of the plantation as a by-products. In this study, oil palm frond fiber was extracted using aqueous and ethanol extract. The preliminary phytochemical screenings were carried out and the following were detected: saponins, tannins, alkaloids, carbohydrates, flavonoids, steroids and triterpenoids, vitamin C and glycosides. These results are indicative those palm oil fronds can provide the implied phytochemicals for the use of man if they can be harnessed.

Keywords: alkaloids, carbohydrates, Elaesguineensis Jacq, flavonoids, steroids, tannins, triterpenoid.

INTRODUCTION

Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palms, primarily the African oil palm, elaeis guineensis,[1] and to a lesser extent from the American oil palm, elaeis oleifera, and the maripa palm, attaleamaripa. Along with coconut oil, palm oil is one of the few highly saturated vegetable fats and is semisolid at room temperature [2]. Palm oil is a common cooking ingredient in the tropical belt of Africa, Southeast Asia and parts of Brazil. Its use in the commercial food industry in other parts of the world is widespread because of its low cost [3].

The oil palm biomass such as oil trunks, frond leaves mesocarp, fibers, shell and empty fruit branches can be used to generate electricity. In addition, recycling of cut frond and empty branches of palm oil mill, contribute in replenishing of nutrient in oil palm plantation. Beside the economic value, oil palm waste may also contain valuable components for medicinal purposes. It is noteworthy that everything about this plant can be used medicinally [4]. The juice squeezed

from the leaves can be used to heal wounds and, in fermented form, can be used to improve lactation in nursing mother [5]. The pulverized root can be added to drinks to cure *gonorrhea*, *menorraghia*, as well as, bronchi, while the fruit, mesocarp oil, palm kernel oil are administered as poison antidote and used externally as lotion with addition of other herbs for the treatment of skin diseases [6]. Ethno-botanical studies have revealed that folklore medicinal claim of *E. gueneensis*, for the treatment of cancer, rheumatism, headache and as an aphrodisiac liniment and diuretic. Ethno-botanical use of plant is one of the most successful tools used in pharmaceutical industry for searching new therapeutic agent. This raised the interest of this researcher to further investigate the palm frond since it has been reported to contain level of bioactive compounds in high concentrations [7]. Therefore this work aims to investigate the phytochemical compounds from the palm frond fiber. The aim of this study is to carry out the phytochemical screening of the aqueous and ethanol extract of the palm frond fiber. In this project work, collection of the palm frond and extraction of the phytochemicals from it using water and water/ethanol as the solvents for the desired study are our major objectives.

EXPERIMENTAL

The research design employed in this study is experimental.

Collection and Preparation of plant material (palm frond)

Plant fronds were collected from the local village UmomiOfu LGEA, Kogi State of Nigeria.

Preparation of palm frond began by removing the parts, i.e. the rachis and petiole, to obtain a whitish filament (palm fiber) which was then reduced in size by cutting with knife to make it easier for pounding in a mortar with pestle. It was sun dried for 4 days and further size reduced in grinding engine to fine powder. The resulting powder was used for the phytochemical screening.

Equipment and Reagents

The equipment used were knife, cutlass, weighing balance, pistol and mortar, beakers, measuring cylinder, grinding engine (RV vicker engine).The following reagents were employed; ethanol, ferric chloride, acetic anhydride, sodium hydroxide, ninhydrin and acetic acid. All the reagents were obtained from the Chemistry Laboratory, Kogi State University Anyigba.

Two solvents, water and 50% ethanol solution in water, were obtained.

Extraction of Phytochemicals

About 3g of palm frond powder was weighed and placed in a 250ml beaker containing 100ml of 50% ethanol/water and left for 24 hrs at the room temperature. Similarly another 3g of palm frond powder was weighed and placed in a 250ml beaker containing 100ml of water and left for 24 hrs at the room temperature.

The extracts were tested for the presence of phytochemicals such as triterpenoids, steroids, glycosides, saponins, alkaloids, flavonoids, tannins, protein, free amino acids, carbohydrate and vitamin C. Methods applied are standard methods recommended by [8] & [9].

Test for steroids and triterpenoids

Libermann Buchard test-crude extract was mixed with few drops of acetic anhydride, boiled and cooled. Concentrated sulphuric acid was then added from the sides of the test tube and observed for the formation of a brown ring at the junction of two layers. Green coloration of the upper layer and the formation of deep red color in the lower layer would indicate a positive test for steroids and triterpenoids respectively.

Test for Glycosides

Keller-Killiani test-test solution was treated with few drops of glacial acetic acid and ferric chloride solution and mixed. Concentrated sulphuric acid was added, and observed for the formation of two layers. Lower reddish brown layer and upper acetic acid layer which turns bluish green would indicate a positive test for glycosides.

Bromine water test

Test solution was dissolved in bromine and observed for the formation of yellow precipitate to show a positive result for the presence of glycosides.

Test for saponins (Foam test)

Test solution was mixed with water and shaken and observed for the formation of froth, which is stable for 15 minfor a positive result.

Test for alkaloids (Hager's test)

Test solution was treated with few drops of Hager's reagent (saturated picric acid solution). Formation of yellow precipitate would show a positive result for the presence of alkaloids.

Test for flavonoids (Ferric chloride test)

Test solution when treated with few drops of ferric chloride solution would result in the formation of blackish red color indicating the presence of flavonoids.

Alkaline reagents test

Test solution when treated with sodium hydroxide solution, shows increase in the intensity of yellow color which would become colorless on addition of few drops of dilute hydrochloric acid to indicate the presence of flavonoids.

Lead acetate solution test

Test solution when treated with few drops of lead acetate (10%) solution would result in the formation of yellow precipitate.

Test for tannins

Gelatin test-test solution when treated with gelatin solution would give white precipitate indicating the presence of tannins.

Test for proteins (Biuret test)

Test solution was treated with 10% sodium hydroxide solution and two drops of 0.1% copper sulphate solution and observed for the formation of violet/pink color.

Test for free amino acid

Ninhydrin test-test solution when boiled with 0.2% solution of ninhydrin, would result in the formation of purple color suggesting the presence of free amino acid.

Test for carbohydrate

Benedict's test: Test solution was mixed with few drops of Benedict's reagent (alkaline solution containing cupric citrate complex) and boiled on water bath. It was observed for the formation of reddish brown precipitate to show a positive result for the carbohydrate.

Test for Vitamin C (DNPH test)

Test solution was treated with Dinitrophenyl hydrazine dissolved in concentrated sulphuric acid. The formation of yellow precipitate would suggest the presence of vitamin C.

RESULTS AND DISCUSSIONS

Table: Results of qualitative phytochemical screening of the palm frond samples

Test	Ethanol solution	Water
Triterpenoids Steroids	-	-
Glycosides	-	+
Saponins	-	+
Alkaloides	+	-
Flavanoids	+	+
Tannins	+	+
Protein	+	+
Carbohydrate	+	+
Vitamin C	+	+

+ = PRESENT ; - = ABSENT

The phytochemical screening test may be useful in the detection of bioactive principles and subsequently may lead to drug discovery and development. Further, these tests facilitate their estimation and qualitative separation of pharmacologically active chemical compounds.

The phytochemical screening in the present study has revealed the presence of triterpenoids, steroids, glycosides, tannins, flavonoids, carbohydrate and vitamin C. The presence of these different phytoconstituents in two different extracts may be responsible for the therapeutic properties of palm frond

CONCLUSION AND RECOMMENDATION

The presence of phytoconstituents makes the plant useful for treating different ailments and has potential of providing useful drugs for human use. In the present study, we have found that most of the biologically active phytochemicals were present in the ethanol and aqueous extract of palm frond fiber. Since the ethanol extract of palm frond contains more constituents it can be

considered beneficial for further investigation. The medicinal properties of palm frond extract maybe due to presence of above mentioned phytochemicals.

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