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Phytochemical screening and Study of the Proximate Compositions of Artocarpus altilis (Parkinson ex F.A.Zorn) Stem and Root Rachel. O. Ogboru1, Anita, E. Owoeye2., Christopher. A. Idibie3 and Adeola. O. Ogunsiji4 1 Research coordinating unit, Forestry Research Institute of Nigeria, Ibadan, Nigeria, 2 Moist Forest Research Station, P.M.B 2444, Benin-City.

Edo State, Nigeria. 3. Department of Chemical Sciences, Edwin Clark University, P.M.B. 101, Kiagbodo, Delta State, Nigeria 4Sustainable Forest Management; Forestry Research Institute of Nigeria, Ibadan, Nigeria. Abstract: Phytochemical screening and study of the proximate compositions of Artocarpus altilis (Parkinson ex F.A.Zorn) stem and root was carried out.

Result showed presence of tannins, anthraquinones, steroids, terpenoids, glycosides and flavanoids of acceptable values. Although the root of Artocarpus altilis had more phytochemicals than the stem apart from steroids, as the tannin in the root sample (6.69±0.36 mg/100g) was greater than the value in the stem 3.82±0.26 mg/100g). Anthraquinones present in stem of A.altilis was found to be (0.78±0.05 mg/100g) being slightly more in root (0.60±0.02 mg/100g) than the stem (0.48±0.04 mg/100g). Same trend was noticed with flavanoids content, as the root content (20.19±0.22 mg/100g) was higher than the stem (8.51±0.21 mg/100g). However, the steroids value in the stem (0.64±0.47 mg/100g) was higher than the content in the root (0.22±0.03 mg/100g).

The presence and levels of the nutrients (ash, carbohydrate, protein, and fat) found in the plant stem and root was appreciable alright within the reference standards while fibre was above. The t-test statistics revealed significance in the means of steroids of A.altilis at 5% alpha level between the root and the stem, but no significance in others.

Index Terms- Artocarpus altilis, phytochemicals, root extracts, stem extracts, T-test _ _ 1. INTRODUCTION Since time immemorial, man has used various parts of plants in the cure and deterrence of many sicknesses and diseases and studies have focused on the use of plants extracts and their biologically active compounds (Chah et al., 2006).

Medicinal plants play an imperative part in the current humanity because they are the basis of many vital drugs used in allopathic and herbal medicines as well as in homoeopathy and aromatherapy. (Pradhan et al., 2012). Artocarpus altilis, also commonly referred to as the Breadfruit is alleged to be resident to a cosmic area extending from Indo-Malayan Archipelago in the Philippines and Moluccas through New Guinea to western Micronesia (Lim., 2012).

It is a humid tree usually cultivated for food in the Pacific Islands, Malaysia, Indonesia, New Guinea, the Philippines, and Southern Nigeria. This breadfruit is a versatile agro-forestry tree crop that is mainly used for its nourishing staid fruit, which is a loaded supply of carbohydrates, calcium and phosphorus (Ragone, 1997).

The diverse significance of bread fruit includes inclusion of its leaves in animal feed, medicine, food, clothing material, and as a construction material. The fruit and leaf extracts of species of Artocarpus have been considered for their antimicrobial activity (Jiyauddin et al.,2014, Pradhan et al., 2012, Shanmugapriya et al., 2011 and Consolacion et al., 2004). The therapeutic significance of A.

altilis has gained huge significance in countries like Trinidad and Bahamas, where diverse parts of the plants are used in the treatment of ailments such as low blood pressure, tongue thrush, skin infections, diarrhea, and asthma (Golden and Williams, 2001). According to Pradhan et al., 2012, breadfruit leaf extracts in diverse solvent medium have been reported to have many phyto-constituents. The sap from its leaves is used as eardrops.

Powdered roasted leaves of A. altilis are used as a medicine for inflamed spleen (Morton 1987). Research also found that extract from roots and stem barks prove a little antimicrobial activity against gram-positive and have latent use in treating tumors (Sundarrao et al., 1993). Similar studies also revealed, the root and stem bark extracts were used against some bacteria (Seaforth et al., 1983 and Ragone, 1997).

It has also showed some antimicrobial activity against Gram-Positive bacteria and has latent use in treating tumours (Mohanty and Pradhan, 2015). The therapeutic use of breadfruit is so immensely researched round the world. Artocarpin, isolated from Thai

breadfruit heartwood extract exhibits inhibitory effect on melanogenesis, showing high antioxidant activity.

This property points out the potential use of heartwood of breadfruit in cosmetics (Donsing et al., 2008). This study is imperative to compare the phytochemical constituents present in the stem and the root, quantify them and also asses the proximate composition of Artocarpus altilis. 2. MATERIALS AND METHODS 2.1

Sample Collection and Preparation Fresh stem and root of Artocarpus altilis were sourced from a tree at a residential quarter in Utagban community, Benin-city, Southern Nigeria. The stem of the plant was air dried at room temperature for one month while the root samples were washed properly to remove the soil particles on it and also air dried. The stem and root samples were abridged into roughly powder using a metallic crucible.

The powdered sample was sent to University of Benin Pharmaceutical Chemistry Lab for analysis. 2.2 Determination of Phytochemical Constituents using Qualitative Approach Phytochemical screening was carried out on the stem and root extracts of Artocarpus altilis to ascertain the presence or absence of tannins, anthraquinones, steroids, cardiac glycosides, terpenoids, saponins, glycosides, sugar, flavanoids and alkaloids.

Test for alkaloids and anthraquinones were done using Mayer and Dragendorff's reagents (Soibia et al., 2011), while glycosides was carried out using Keller-Killani test. Meanwhile Saponins and trepenoids tests were done using both the frothing test and Liebermann-Burchard reaction test as described by Edeoga et al.,

2005 and Odozi et al., 2016. 2.3 Determination of Proximate constituents of the stem and root of A. altilis The parameters considered for proximate analysis include Ash content, crude protein, crude fat, moisture content, fibre content and carbohydrate. This was carried out according to methods described by AOAC (2000) and adopted by many scientist (Nwaokobia et al., 2018; Ogboru et al., 2017 and Ogboru et al.,

2016.Statistical analysis was carried out to obtain the means and standard deviation of the triplicate results obtained from both analyses while hypothesis was tested using t-test statistics to compare means at 5% alpha level between the stem and root of A. altilis. SSPS Version 16 was used for this analysis. 3.

RESULTS Table 1: Phytochemical screening of leaf extracts of Artocarpus altilis Phytochemicals _Stem _Root _ _Tannins _+ _- _ _Anthraquinone _+ _+ _ _Steriods _+ _+ _ _Cardiac glycosides _- _- _ _Terpenoids _+ _+ _ _Saponins _- _+ _ _Glycosides _+ _+ _

_Sugar _ND _ND _ _Flavanoids _+ _+ _ _Alkaloids _- _- _ _+= Present - = Absent ND= Not detected Table 2: Phytochemical quantification of Artocarpus altilis stem and root in mg/100g S/N _Phytochemicals _STEM _ROOT _ _1 _Tannin _3.82±0.26 _6.69±0.36 _ _2 _Anthraquinones _0.78±0.05 _0.81±0.02 _ _3 _Steroids _0.64±0.47 _0.22±0.03 _ _4 _Terpenoids _0.48±0.04 _0.60±0.02 _ _5 _Glycosides _0.64±0.13 _0.88±0.05 _ _6 _Flavanoids _8.51±0.21 _20.19±0.22 _ _ Table 3: Proximate analysis of Artocarpus altilis stem and root in % S/N _Constituents _Stem _Root _ _1 _Ash _4.86±0.14 _5.61±0.12 _ _2 _Crude Protein _6.54±0.04 _3.23±0.16 _ _3 _Crude Fat _7.41±0.45 _5.53±0.72 _ _4 _Moisture content _60.2±0.32 _51.74±1.35 _ _5 _Fibre _61.67±.92 _51.86±1.11 _ _6 _Carbohydrate _13.52±1.09 _14.59±0.44 _ _ Table 4: T-test Statistics of difference in Phytochemicals between the stem and root of Artocarpus altilis.

S/N _Phytochemical Parameters _T-Statistics _Significant Value _ _1 _Tannins _-13.807 _0.590 _ _2 _Anthraquniones _-2.145 _0.629 _ _3 _Steroids _1.531** _0.028 _ _4 _Tarpenoids _-4.854 _0.331 _ _5 _Glycosides _-8.902 _0.516 _ _6 _Flavanoids _-65.056 _0.757 _ _**Significant at 5 % alpha level Table 5: T-test Statistics of difference in Proximate constituents between the stem and roots of Artocarpus altilis.

S/N _Proximate constituents _T-Statistics _Significant Value _ _1 _Ash _-7.059 _0.677 _ _2 _Crude Protein _34.309 _0.141 _ _3 _Crude Fat _3.802 _0.379 _ _4 _Moisture content _8.468 _0.897 _ _5 _Crude Fibre _11.800 _0.916 _ _6 _Carbohydrates _-1.574 _0.097 _ _ 4. DISCUSSIONS Phytochemical screening of the stem and root of A.

altilis showed the presence of Tannins, Anthraquinones, Steriods, Terpenoids, Glycosides and Flavanoids as shown in Table 1. It was supported by previous reports for the presence of phenols and flavanoids in the Morocae family (Jiyauddin et al., 2014). In the investigated samples, the Root of the Artocarpus altilis had more phytochemicals than the stem apart from steroids. This is clearly shown in Table 2.

The tannins in the root sample (6.69±0.36 mg/100g) were higher than that of stem (3.82±0.26 mg/100g). Tannins commonly known as tannic acid are known to occur naturally in bark of plants. When added in herbal teas are used to check leucorrhoea, rhinorrhea, intestinal bleeding, fight cavities and diarrhea.

(Harbone, 1973; MediBiztv, 2018 and Ogboru et al.,2017). Anthraquinones present in stem of A.altilis as 0.78±0.05 mg/ 100g being slightly more in root of the sample (0.87 ±0.02 mg/ 100g). Anthraquinones constituents are reported to exhibit anti-tumour, anti-malaria, anti-viral and anti-microbial activities (Noda et al., 2000).

It is used as a laxative and used in elimination of arrow poisoning (Ogboru et al., 2017).

Terpenoids content was higher in root (0.60±0.02 mg/100g) than in the stem (0.48±0.04 mg/100g). Terpenoids have a sturdy spicy odour due to camphene. They are organic chemicals produced naturally by many plants. It has anti-fungal, anti-hepatoxic and antibacterial properties and extensively trendy in the cosmetic industry, taste enhancer in the food industry and pesticides (Shukranul et al., 2015). Flavonoids content in the root (20.19±0.22 mg/100g) was higher than the amount of constituents found in the stem (8.51±0.21 mg/100g) Flavonoids have antioxidant and detoxification actions and many health promoting effects (Adjatin, 2013). Flavanoids have various ethno-botanical uses.

It generally protects against free radicals, platelet aggregation, eczema, asthma, sinusitis, ulcers, liver injury, viruses, heart diseases and tumours (Adedapo et al., 2013; Gbadamosi et al., 2012; Morel, 2011 and Adjatin et al., 2013). The steroids value in the stem of A.altilis (0.640±.47 mg/100g) is higher than the content in the root (0.220±.03 mg/100g).

Plant steroids are known for their analgesic, regulate carbohydrate and protein metabolism, anti-microbial, anti-inflammatory and cardio-tonic properties (Hossain et al., 2013 and Ajatin et al., 2013). Glycosides in root (0.880±.05 mg/100g) of the sample were higher than that in the stem (0.64 0±.13 mg/100g). Glycosides are ample stretched in plants and are enormously varied in action, effect and medicinal application.

Glycosides act on the heart muscles and boost renal stream (diuresis) (Omotayo and Borokini 2012). Table 3 revealed the presence and content levels of ash, protein, Crude Fat, Moisture, Fibre and Carbohydrate in the stem and root of Artocarpus altilis. The levels of the nutrients found in the plant stem and root (Ash, Carbohydrate, protein, and fat) were appreciable alright within the reference standards while fibre was above. Fibre had the highest value of 61.670±.92 mg/100g for the stem while in the root it had a value of 51.861±.11 mg/100g.

High moisture in the stem and root indicates that the plant may easily susceptible to spoilage if not well preserved (Omoregie and Osagie, 2011). From Table 4 and 5, T-test statistics showed significance in the means of steroids of A.altilis at 5% alpha level between the root and the stem, but no significance in the tannins, anthraquinones, terpenoids, glycosides and flavanoids between the root and stem.

There was also no significance in the means of the ash, crude protein, crude fat, moisture content, fibre and carbohydrates. 5. CONCLUSION The phytochemical screening of Artocarpus altilis (Parkinson ex F.A.Zorn) stem and root that as studied showed some vital phytochemicals present within acceptable values.

Although the root had more phytochemicals than the stem, apart from steroids. The presence and levels of the nutrients (ash, carbohydrate, protein and fat) found in the plant stem and root was appreciable alright within the reference standards while fibre was above. There was significance in the means of steroids of A.altilis between the root and the stem, but no significance in other phytochemicals and proximate compounds present using T-test statistics. 6.

ACKNOWLEDGEMENT The authors would like to appreciate the taxonomist of Moist Forest Research Station, Mr Emmamuel Isebmhe & Dr. Emmanuel Odion of the Pharmaceutical chemistry laboratory in The University of Benin, both in Edo State, Nigeria, for their assistance in identification & analysis. REFERENCES Adedapo, A., T.Adewuyi and Sofidiya, M. (2013).

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