

Research Article

QUANTIFICATION OF TANNIC ACID PRESENT IN CASHEW (RED COLOUR) (*ANARCANDIUM OCCIDEPTALIS*) AND ITS USE AS MAJOR RAW MATERIAL IN THE PRODUCTION OF INK

*Owoeye G., Owokotomo, I. A, Ojo I.O

Chemistry Department Federal University Of Technology Akure Ondo State, Nigeria.

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ABSTRACT

Tannin acids are widely distributed in plants and fruits, most of them are glycosides and, there is need for quantification in other to assess their usefulness as industrial raw materials. Therefore this paper seek to investigate the total amount of tannic acid present in cashew fruit and carry out qualitative test using standard methods. The results of the test were found-positive for tannic acid, the percentage tannin content present was $83.8 \pm 0.02\%$, the infra-red spectrum of the standard and sample were observed to be similar at the peaks for O - H and C - H and at sp and ap2 carboxylic acid range and that, the ink produce has a compatible quality with those currently in the market.

Keywords: Tannins, qualitative and quantitative analysis and Infra-Red Spectrum.

INTRODUCTION

Tannic acid is one of the carboxylic acid with high molecular weight of 1700g/mol with formular $C_{75}H_{52}O_{46}$. Its present in fruits in the form of tannins. It has lustrous yellowish to light brown amorphous powder flaked spongy mass. Finar (2008). They are widely distributed in plants, and can be derived from the barks. Tannin is used as mordant to fix dye, clarify wine and beer, and as astringent. Finar (2008). Tannins are also phenolic compounds of high molecular weight, containing many hydroxyand other suitable group of carbonyl compound. The compound formed an effective strong complex with protein and other macromolecules. Manny tannins are glycoside and are colorless non- crystalline substance which form colloidal solution in water and the water will have an astringent taste. They form blue black color with ferric salts. Tannin can be put to use in many areas of chemistry such as, natural product in leather production, [tan leather], synthesis of wood resin, useful in the phenolic compound present in edible and non-edible plant and has being reported to have multiple biological effect and antioxidant activity Onyenekenka (2007). Finally tannin are classified into two) The hydrolysable tannins, which are esters of garlic acids and its and glycosides, secondly the condensed tannins which are polymers derived from various flavonoids Finar (2008), It can also be natural or artificial, they are from vegetable origin and are classified into two color class, catechol and pyragallol. CASHEW: (*Anacardiumoccidentalis*), Cashew belong to anarcadacea family, the family has 73 general and about 600 species. The fruit is native of Tropical America of which the cashew is by far most important economically. (McGraw 1997). The anarcadaceae is known to have a resinous back very often, castor oil in the leaves. Cashew are one of the few fruits crops normally grown for seeds and few for improved cultivar which exist as a commercial product with yellow and red apple and are not hybridized easily. Cashew plant are easily grafted and the future of this type of cultivar may improve productivity for its production greatly, Samson (1986). Cashew was also found early in north eastern Brazil in the area between Atlantic rain forest. The vegetation found in the area are the dry forest, savannah woodland and almost desert area.

Finally cashew fruits, has medicinal properties: these are, uses of leaves, bark and apple juice as medicine for cancer, pains, common illness and veneral diseases, Its seeds are used for making shampoo.

EXPERIMENTAL

MATERIAL AND METHODS

Preparation of samples: Mature red colour fruits were harvested from the main plant tree present in the University premises, Federal University of Technology Akure located in Ondo State Nigeria. The samples were taken to the Crop and Pest Department of the same University for identification and then, properly cleaned with distilled water and cut into pieces, dried in an oven at 50°C temperature for 6 - 8 hours, after it was properly cooled and blended into powder with Kenwood blender (M201) and was kept in a clean PVC plastic container until when needed inside refrigerator at -5°C temperature.

METHODS

QUALITATIVE TEST

The distilled water – ether extract of the sample was tested for acidity level using pH meter (Jenway 3015 Model). The reaction of the sample extract was also tested with alkaline solution of ammonia, aqueous solution of potassium ferro-cyanideand ferric chloride solution ($FeCl_3$). AOAC (1995) All test was carried out in triplicate.

QUANTITATIVE TEST

Determination of tannin using Burden and Robison methods 1981

500mg of the powder sample was weighted into the clean plastic beaker (50ml) containing 50ml of distilled water. and was shake for one hour with a mechanical shaker (Griffiin model) This solution was filtered into another 50 ml volumetricflask with no1 what-man filtered paper and made to mark with distilled water, then 5ml of the filtrate was pippered out into a test tube and mixed with 2ml of 0.01M $FeCl_3$ in 3ml of 0.1N HcL (hydrochloric acids) and 0.008 M potassium ferrocyanide and left for 3min.for proper color development, The absorbance was measured at 120nm within 19min. Tannic acid salt

*Corresponding Author: Owoeye G,
Chemistry Department Federal University Of Technology Akure Ondo State, Nigeria.

(BDH) standard was used in the preparation of standard solution which varies at: 0.2ppm, 0.4ppm, 0.6ppm, 0.8ppm and 1.0ppm. They were also treated as the sample. The total amount of tannin was calculated by extrapolation of the standard graph plotted. The experiment was carried out in triplicate.

INTRUMENTAL ANALYSIS

The spectrum of the sample was carried out using infra-red spectrophotometer (Spectrum2 perkinmemer M) Standard tannic acid salt spectrum was also carried out with the same instrument. Using standard method AOAC 1995.

PRODUCTION OF INK

Materials use:

Tannin sample, Ferrous sulphate salts, ferric chloride, garlic acid, Hydrochloric acid, diethylene glycol, denatured spirit and acetone. (All chemical used were BDH chemicals).

Methods of preparation:

5g of ferrous sulphate salt was added to 3g of ferrous ammonium sulphate salt with ferric chloride salts and 30ml of distilled water was added to the mixture forming a solution, these was added with 20g of tannin sample, 5ml of garlic acid solution and 2ml of concentrated hydrochloric acid was added. (in other to avoid fungus growth formation) The resulted solution was kept for two mouths and then 30ml of diethylene glycol, 20ml of glycerol and 55ml of acetone was finally added two days before filtration, All the content was filtered, the filtrate was the generated ink which was poured into a labeled plastic bottle. Blue black in color AOAC(1995) The experiment was conducted three times.

RESULTS

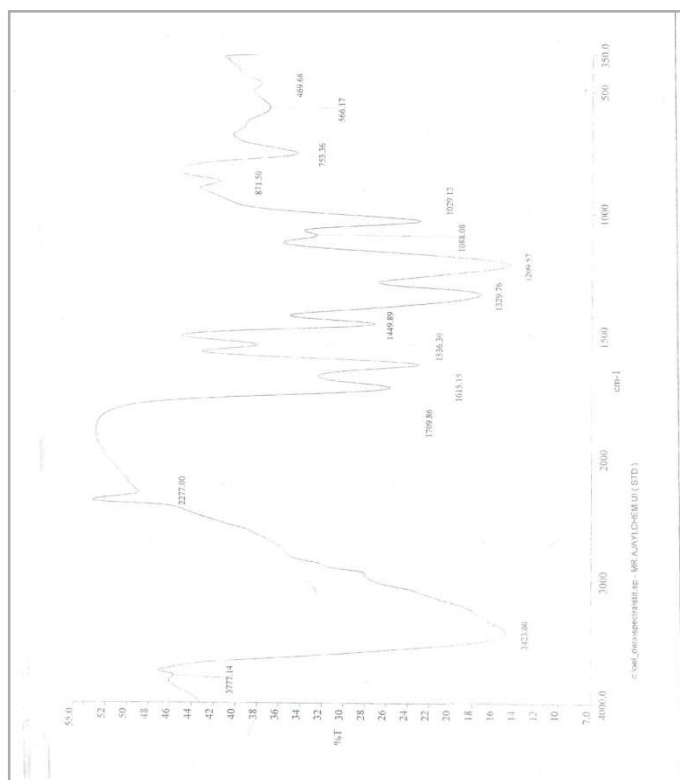
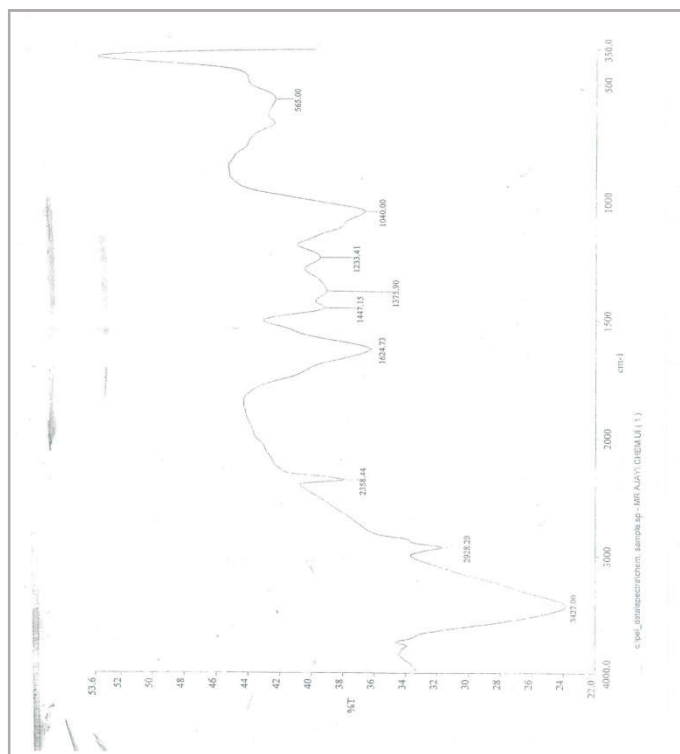
TABLE I QUALITATIVE TEST RESULTS

TEST / OBSERVATION	OBSERVATION	INFERENCE
1 pH of the sample	4.3	Acidic
2 Sample extract solution +alkali + K ₂ Fe(CN) ₆	Red color present	Tannin present
3 sample extract solution + FeCl ₃	Green color	Tannin present
4 Sample extract solution + K ₂ Fe(CN) ₆	Blue color	Tannin present

All test were carried out in triplicate

TABLE II QUANTITATIVE TEST RESULTS

PARAMETERS	AMOUNT
% Tannins	83.8 ±0.02%



DISCUSSION

The table I above reveal the qualitative test results on the distilled water - ether extract of the sample, The pH was 4.3, while the conducted experiments were positive to the present of tannin, with red, green and blue color observed respectively and the table II reveals the observed amount of tannin present in the sample, to be 83.8±0.02% while the ink produce with the sample was compatible with those in the market (control) and when dry it can be used as toner. The I R spectrum of the sample reveal the absorption of peaks of varied shapes and intensity, with standard peaks at 3423.06 cm⁻¹ and 3322.14cm⁻¹ as carboxylic acid present while the sample peaks at 3427.00cm⁻¹ and 2928.30cm⁻¹respectively, This indicated that the

peaks are due to C---H stretching and that it is within the standard data table for carboxylic acid and it reads, 2500cm⁻¹ --- 3600cm⁻¹ for O ---H stretching. for single bond while, double bond carboxylic is 1700cm⁻¹ --- 1725cm⁻¹, Carrey (2000). other peaks for carboxylic acid range was at 1709.86cm⁻¹ and 1615.15cm⁻¹ for standard and 1624.73cm⁻¹ for the sample respectively, this region are due to various bending vibrations which was observed to be similar also. Other similar peaks were: peaks at 1449.19cm⁻¹ and 1329.76cm⁻¹ while sample peaks at 1447.15cm⁻¹ and 1375.90cm⁻¹. The spectrum were also similar for standard peak at 1209.57cm⁻¹, 1028.08cm⁻¹ and 1029cm⁻¹ while the sample peaks also at 1233.41cm⁻¹ and 1040cm⁻¹ respectively and it was observed similar. (The finger print region)The finger print region was observe from the spectrum to be similar. Both spectrum also, shows sp and sp² C -- H single bond stretching, this was observed at 3322.14cm⁻¹ for standard while sample at 3427.00cm⁻¹ this, also indicate their similarity. Therefore, based on the similarity of broad peaks at different intensity and the finger print region, both for standard and samples, was found the same and it, confirm the present of tannin in the cashew (red type) sample. The effect was also observed in the ink production.

Conclusion

The use of cashew as food for man and animal has been known for a long period of time and they are good for health but the area of its waste has not been well addressed, since they are easily affected by microorganism and lack long shelve life, therefore this paper has addressed one of the means of controlling the waste by using them in the production of tannic acid which is the major raw material for ink production.

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