



### Phytochemicals Comparison of some Selected Plant Leaves Extracts

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#### Abstract

The importance of the selected plants for treating different forms of diseases locally in Oyo State, Nigeria and the reason to quantify the various secondary metabolites present in them gave rise to the research work. The plant samples were collected and air dried. Extraction was carried out using recommended protocol without modification. The tannin content of *Vernoniaamygdalina* ( $0.197 \pm 0.002^a$  mg/g) was better and higher than that of *Morindalucida* ( $0.063 \pm 0.003^a$  mg/g) and *Carica papaya* ( $0.048 \pm 0.001^a$  mg/g) respectively. The Phenol content of *Vernoniaamygdalina* ( $0.510 \pm 0.004^a$  mg/g) was higher than that of *Caricapapaya* ( $0.498 \pm 0.002^b$  mg/g) and *Morindalucida* ( $0.480 \pm 0.003^b$  mg/g). The flavonoid content of *Morindalucida* ( $3.690 \pm 0.002^c$  mg/g) was more than that of *Vernoniaamygdalina* ( $3.105 \pm 0.003^c$  mg/g) and *Carica papaya* ( $2.586 \pm 0.004^c$  mg/g). However, the extracts were rich in alkaloid; *Vernoniaamygdalina* ( $6.689 \pm 0.004^d$  mg/g), *Carica papaya* ( $6.408 \pm 0.002^d$  mg/g) and *Morindalucida* ( $5.042 \pm 0.001^d$  mg/g). It could be deduced that the plants showed different contents of metabolites which confirms the application or usefulness of the plants in treating different sicknesses locally in Oyo State.

Keyword: Extraction, Alkaloid, Flavonoid, Phenol and Tannin.

#### Introduction

The traditional usefulness of plants are known to us all because the variety of plants is a treasure house of potential drugs and in the recent years, researchers have continuously beaming their search light on plants for their various physiological characteristics. It has been reported that medicinal plants contain some organic compounds that have pharmaceutical benefits to human being and these compounds include alkaloids, flavonoids, tannin, saponin, (Edoga, 2005 and Mann, 1978) and host of others. There is expansion in the usefulness of plants for pharmaceutical purposes, usually in the form of traditional medicine, which is now given proper

recognition by the World Health Organization (WHO) as a strong building block for health care (Akerele, 1988; WHO, 2005). The healing power of herbs had been recognized since creation and hence botanical medicine is one of the oldest practiced professions by mankind (Van Wyk, and Gericke, 2000; Iwu, 1993).

It has been estimated that 25% of prescribed medicines today are substances derived from plants (Hamburger and Hostettmann, 1991). These include about 119 plants derived chemical compounds of known structures which are currently used as drugs or as biodynamic agents that affects human health. Less than a dozen of these compounds are produced by chemical synthesis or semi-synthesis, the rest being extracted and purified directly from plants (Farnsworth, 1990). The three selected plants namely *Carica papaya*, *Vernoniaamygdalina* and *Morindalucida* have been differently reported to possess various phytochemicals and being used for treating various ailments locally. The need to compare the phytochemicals of the three plants; tannins, alkaloids, phenol and flavonoids necessitated the research work.

## Materials and Methods

*Mangifera indica*, *Vernoniaamygdalina* and *anacardium occidentale* leaves were collected from a farm located in Ibadan and authenticated at the Department of Agricultural science, University of Ibadan. The chloroform and methane extracts of the leaves of the plants were prepared according to standard methods (Harborne, 1973; Sofowora, 1993).

### Phytochemical analysis

#### Qualitative Phytochemical Tests

The plant extracts were screened for the presence of the phytochemicals present using recommended procedure: The extracts were screened for presence of alkaloid using the methods of Trease and Evans, 1989 and Harborne 1973. The methods of Harborne, 1973 and Sofowora 1993 were adopted without modification in screening the extracts for the presence of Flavonoid. Tannins and Phenol extracts were screened using the method recommended by Harborne, 1973.

#### Quantitative Phytochemical Analysis

##### Tannin determination

Finely grounded sample was weighed (0.2g) into a 50ml sample bottle. Ten of 70% aqueous acetone was added and properly covered. The bottle was put in an ice bath shaker and shaken for 2 hours at 300C. The solution was then centrifuged and the supernatant stored in ice, 0.2ml of the solution was pipette into the test tube and 0.8ml of distilled water was added. Standard tannin acid solution was prepared from a 0.5mg/ml of the stock and the solution made up to 1ml with distilled water, 0.5ml of Folin-ciocateau reagent was added to the sample and standard followed by 2.5ml of 20%  $\text{Na}_2\text{CO}_3$ . The solution was then vortex and allow to incubate for 40 minutes at

room temperature, its absorbance was read at 725nm against a reagent blank concentration of the same solution from a standard tannic acid curve prepared (Markkar and Goodchild., 1996).

### Saponin determination

The spectrophotometric method of Brunner (1984) was used. Two grams of the finely grinded sample was weighed into a 250ml beaker and 100ml of Isobutyl alcohol was added. Shaker was used to shake the mixture for 5hours to ensure uniform mixing. The mixture was filtered using No 1 Whatman filter paper into 100ml beaker containing 20 ml of 40% saturated solution of magnesium carbonate. The mixture obtained again was filtered using No1 Whatman filter paper to obtain a clean colourless solution. One (1ml) was added into 50 ml volumetric flask using pipette, 2ml of 5% iron (iii) chloride ( $\text{FeCl}_3$ ) solution was added and made up to the mark with distilled water. It was allowed to stand for 30min for the color to develop. The absorbance was read against the blank at 380nm.

The Saponin value was calculated as: 
$$\frac{\text{Absorbance of sample} \times \text{concentration of standard}}{\text{Absorbance of standard}}$$

### Alkaloid determination

Five grams of the sample was weighed into a 250 ml beaker and 200ml of 10% acetic acid in ethanol was added and allowed to stand for 4minutes, this was filtered and extract was concentrated on a water bath to one quarter of the original volume. Concentrated ammonium hydroxide added drop wise to the extract until the precipitation was completed. The whole solution was allowed to settle and the precipitate was collected and washed with dilute ammonium hydroxide and then filtered. The residue was alkaloid which was dried and weighed (Harbone 1973).

$$\% \text{ Alkaloid} = \frac{W_3 - W_2}{W_1} \times 100$$

Where:

$W_1$  =initial weight of sample

$W_2$  =weight of the extract

$W_3$  = final weight of the residue.

### Flavonoid Determination

The flavonoid content of the extract was determined using a colorimetric assay developed by (Bao. J.Y et al 2005), 0.2ml of the extract was added to 0.30ml of 5%  $\text{NaNO}_3$  at zero time. After five minutes, 0.6 ml of 10 %  $\text{AlCl}_3$  was added and after six minutes, two ml of 1M NaOH was added to the mixture followed by the addition of 2.1ml of distilled water. Absorbance was read at 510nm against the reagent blank.

## Results and Discussion

The result of table1 indicate that tannin content of *Vernoniaamygdalina* ( $0.197 \pm 0.002^a$  mg/g) was better and higher than that of *Morindalucida* ( $0.063 \pm 0.003^a$  mg/g) and *Carica papaya* ( $0.048 \pm 0.001^a$  mg/g) respectively. However, the results were better than that of *Aspiliaafricana* ( $0.040 \pm 0.10$  mg/g) as reported by Okwu, 2005. The results of the three extracts were low than that of *Garcina kola* ( $0.26 \pm 0.20$  mg/g) as reported by Okwu, 2004. The Phenol content of *Vernoniaamygdalina* ( $0.510 \pm 0.004^a$  mg/g) was higher than that of *Carica papaya* ( $0.498 \pm 0.002^b$  mg/g) and *Morindalucida* ( $0.480 \pm 0.003^b$  mg/g). The flavonoid content of *Morindalucida* ( $3.690 \pm 0.002^c$  mg/g) was more than that of *Vernoniaamygdalina* ( $3.105 \pm 0.003^c$  mg/g) and *Carica papaya* ( $2.586 \pm 0.004^c$  mg/g). However, the extracts were rich in alkaloid; *Vernoniaamygdalina* ( $6.689 \pm 0.004^d$  mg/g), *Carica papaya* ( $6.408 \pm 0.002^d$  mg/g) and *Morindalucida* ( $5.042 \pm 0.001^d$  mg/g). It could be deduced that the plants showed different contents of metabolites which confirms the application or usefulness of the plants in treating different sicknesses locally in Oyo State.

## Conclusion and Recommendations

Further examination should be carried out on the plants as some other novel compounds may be present in them by subjecting the extracts into isolation of compounds using various spectroscopic techniques.

## References

- Akerele, O., (1998). Medicinal plants and primary health care: An agenda for action. *Fitoterapia* 59 (5), 355-363. Bao, J. S, Sun, M., Wang G. Y and. Corke, H, (2005). flavonols and free radical scavenging activity of Chinese bayberry extracts and their color properties and stability. *J. Agric. Food Chem.* 53, pp. 2327–2332.
- Brunner, J.H., (1984). Direct spectrophotometric determination of saponin. *Anal.Chem.*, 34: 1314- 1326. Edoga, H. O., Okwu, D.E., Mbaebie, B.O. (2005). Phytochemicals constituents of some Nigerian medicinal plants. *Afr. J. Biotechnol.*, 4(7): 685-688
- Farnsworth, N.R. and Buigel, A.S. (1977). Problems and Prospects of Discovering New Drugs from Higher Plants by Pharmacological Screening. Springer Verlag, Berlin, Germany.
- Hamburger, M. and Hostettmann, K. (1991). Bioactivity in plants. The link between phytochemistry and medicine. *Phytochemistry*. 30 (12), 3864-3874.

Harbone, J.B. (1973). *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis*. Chapman and Hall, London, pp: 267-270

Iwu, M. M. (1993). *Handbook of African Medicinal Plants*. CRC Press, Boca Raton, FL, USA.,pp: 26-267.

Markkar, A.O.S. and Goodchild, A.V. (1996). *Quantification of tannins: A laboratory manual*. International Centre for Agriculture Research in Dry Areas (ICARDA), Aleppo, Syria, pp: 25.

Mann, J. (1978). *Secondary Metabolism*. Oxford University press, London, pp. 154.

Okwu, D. E., Okwu, M.E. (2004). Chemical composition of *Spondias mombin* plant parts. *J. Sustain. Agric. Environ.*, 6(2): 140-147.

Sofowora, A (1993). *Phytochemical Screening of Medicinal Plants and Traditional Medicine in Africa*, Spectrum Books Ltd, Ibadan, Nigeria.

Trease, G.E and Evans, W.C (1989). "Phenols and phenolic glycosides," in *Textbook of Pharmacognosy*, vol. 12, pp. 343–383, Balliesse, Tindall and Co Publishers, London, UK, 1989.

Van Wyk, B.E. and N. Gericke, 2000. *People's Plants: A Guide to Useful Plants of Southern Africa*. Briza Publications, Pretoria, South Africa, ISBN: 13-9781875093199, Pages: 351

WHO, (2005). *World malaria report*. World Health Organization, Geneva, Switzerland

Table1: Showing the phytochemicals of the Three Selected Plants

Parameter (mg/g)	<i>Carica papaya</i>	<i>Morinda lucida</i>	<i>Vernonia amygdalina</i>
Alkaloid	6.408±0.002 <sup>d</sup>	6.042±0.001 <sup>d</sup>	6.689±0.004 <sup>d</sup>
Flavonoid	2.586±0.004 <sup>c</sup>	3.690±0.002 <sup>c</sup>	3.105±0.003 <sup>c</sup>
Phenol	0.498±0.002 <sup>b</sup>	0.480±0.003 <sup>b</sup>	0.510±0.004 <sup>b</sup>
Tannin	0.048±0.001 <sup>a</sup>	0.063±0.003 <sup>a</sup>	0.197±0.002 <sup>a</sup>