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Retraction

Retracted: A Preliminary Qualitative Study of Two Common Acacia Species in Sudan

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The paper titled "A Preliminary Qualitative Study of Two Common Acacia Species in Sudan" [1], published in Journal of Chemistry, has been retracted as it is found to contain a substantial amount of material, without referencing, from the thesis titled "Tannins of Three Common Acacias of Sudan," Isam Eldin Hussein Elgailani, University of Khartoum, Sudan.

References

[1] A. A. Jacknoon, E. A. Elhefian, A. M. Mohammed, O. A. A. Hamdi, and A. H. Yahaya, "A preliminary qualitative study of two common Acacia species in Sudan," *E-Journal of Chemistry*, vol. 9, no. 2, pp. 851–856, 2012.

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A Preliminary Qualitative Study of Two Common Acacia Species in Sudan

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Abstract: This research is dealing with the analysis of tannins of two common Acacia species of Sudan i.e. *Acacia nilotica* and *Acacia seyal*. Bark samples from collections of the two acacia species were extracted with distilled water, 80% methanol and 70% acetone. Two sets of extraction were made, one by boiling, and the other by shaking the samples in the respective solvent for eight hours at room temperature. It was found that the 70% acetone was a more efficient solvent than either water or 80% methanol. In addition, qualitative analysis of the phytochemicals showed that the fruits (garad) contain tannins materials, flavonoids and coumarins.

Keywords: *Acacia nilotica*, *Acacia seyal*, Extraction, Phytochemicals.

Introduction

Acacia species is considered as a rich source of gallic and ellagic acid[1]. It is a medicinally and economically important plant. Most of the acacias are of medicinal and health benefits to human being. For example, *Acacia nilotica* pods are used in treatment of wound (pods), malaria, sore throat (aerial part) and toothache (bark)[2-5] while Gum Arabic is applied for kidney diseases treatment[6]. Most of the acacias produce tannins. *Acacia nilotica* for instance, produces more than 20% tannins, especially the inner bark, which is used commercially for tanning and dyeing leather black in Sudan[7].

This work is aimed at extracting two common Acacia species of Sudan *i.e.*, *Acacia nilotica* and *Acacia seyal* using three solvents (distilled water, 80% methanol and 70% acetone). Qualitative analysis (phytochemical screening) was also investigated in this study. This study is considered as an important initial study for leather industry.

Experimental

Areas of samples collection

Bark samples, mature and immature fruits from individual collections of *Acacia nilotica* (mature and immature fruits) and acacia seyal (bark) were used to determine the tannins. Bark was removed from wood before drying and material was taken from several trees in each instance.

Acacia nilotica and acacia seyal samples were collected from the Sunt Industrial and Tourism Center (Sunt forest), 1 kilometer south of the white Nile bridge near the junction of the white Nile and blue Nile on the eastern bank of the white Nile river at Khartoum state. The samples were collected according to the natural cycle of the tree.

Samples preparation

The samples collected of the different subspecies of *acacia nilotica* were dried under shed for three days, then purified and the seeds were discarded from the pods in order to prepare them for grinding; sieving, mesh 10 mm; then dried at 105 °C for 2 h in the oven and then kept in clean labeled samples bottles.

Extraction of bark samples

Air-dried bark samples (from bulk collections) were ground in a wiley mill (2 mm screen). A portion of 40 g was extracted with water, another with 80% methanol, and a third with 70% acetone (200 mL) by shaking at room temperature for 8 hours. The samples were filtered (whatman 1 paper, 18.5 cm disc) and the residual material rinsed with additional solvent (2x50 mL).

Extracts were transferred to a tared, round-bottom flask and concentrated under vacuum to thick syrup. The samples were then dried in a vacuum oven at 60 °C until a solid material was obtained. The amount of extract was determined by weight difference.

Preparation of the plant extracts (PE)

Dried crushed and powdered fruits of Acacia nilotica (100 g) and the bark of the *acacia seyal* (100 g) and the mixture between powder of *Acacia nilotica* and bark of *the acacia seyal* was extracted (soxhlet) with 500 mL of 80% ethanol. The cooled solution was filtrated and enough ethanol was evaporated to adjust the volume of the filtrate to 200 mL. This prepared extract (PE) was used for the photochemical screening analysis.

Qualitative analysis for plant extracts (PE)

Photochemical screening

Photochemical screening of the active morphological samples is extremely valuable in giving us information about the nature of constituents found in each plant sample. It was found necessary to correlate between the nature of chemical constituents and antibacterial activity test for the detection of the different chemical groups. In general, the methods described by Harborne[8] with some modifications have been used to test for the presence of the active ingredients in the samples.

Test for alkaloids

1.0 g of the (PE) was dissolved in 10 cm^3 of 2 N HCl and filtered. The filtrate was extracted with successive portions of chloroform. The combined chloroform extracts were evaporated

to dryness and the residues were dissolved in 2 cm^3 of diluted hydrochloric acid and tested with Mayors reagents. The formation of precipitate indicates the presence of alkaloid or nitrogenous bases.

Test for sterols and triterpenses

10 mL of the (PE) was evaporated to dryness on a water bath and the cold residue was stirred several times with petroleum ether to remove most of the coloring materials. The residue was then extracted with 20 mL chloroform. The chloroform solution was dehydrated over anhydrous sodium sulphate. 5 mL portion of the chloroform solution was mixed with 0.5 cm^3 of acetic anhydride followed by 2 drops of concentrated sulphuric acid. The gradual appearance of green to blue or pink to purple color indicates the absence of sterols or triterpene.

Test for tannins

10 mL of the (PE) was evaporated to dryness on a water bath and the residue was extracted several times with n-hexane and filtered. The hexane insoluble portion was stirred with 10 cm^3 of 10% w/v sodium chloride in freshly distilled water. The mixture was cooled and filtered and the volume adjusted to 10 cm^3 with more saline solution. 5 cm^3 of this solution was treated with few drops of ferric chloride solution. The formation of blue color indicates the presence of tannins.

Test for saponins

1.0 g of the Original dried powder plant material was placed in a clean test tube. 10 mL of distilled water was added and the tube was stoppered and vigorously shaken for about 30 seconds. The tube was then allowed to stand and observed for the formation of honeycomb. The appearance of honeycomb, which persisted for at least an hour, was taken as evidence for the presence of saponins.

Test for flavonoid

10 mL of the (PE) was evaporated to dryness on a water bath, cooled and the residue was defatted by petroleum ether. The defatted residue was dissolved in 30 mL 80% ethanol and the filtrate was used for the following tests:-

- To 3 mL of the filtrate, 1 mL of 5% aqueous potassium hydroxide solution was added. A dark yellow color was taken as a positive test for flavonoid compounds.
- To 3 mL of the filtrate, 0.5 mL of 5% concentrated hydrochloric acid was added followed by little magnesium turnings. The formation of red color, which changes to pink, was taken as evidence for the presence of flavonoids.
- To 3 mL of the filtrate, 5 mL of concentrated hydrochloric acid was added followed by few drops of amyl alcohol. The mixture was then shaken. The absence of red color indicates the absence of flavonoid glycosides.
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Test for anthraquinone glycoside

1 g of the Powdered plant sample was boiled with 10 mL of 0.5N KOH containing 1 mL of 3% hydrogen peroxide solution. The mixture was extracted by shaking with 10 mL of benzene. 5 mL of the benzene solution was shaken with 3 mL of 10% ammonium hydroxide solution and the two layers were allowed to separate. The presence of anthraquinones was indicated if the alkaline layer was found to have assumed pink or red color.

Test for coumarins

1 g of the original dried powder plant sample was boiled with 20 mL distilled water in test tube and filter paper attached to the test tube to be saturated with the vapor after spot of 0.5 N KOH put on it. Then the filter paper was inspected under UV light. The presence of coumarins was indicated by the adsorption of the spot to the UV light[9].

Results and Discussion

The solubility and isolation of organic compounds by solvent extraction have traditionally been made with the determinant in uncharged form, but this method is sufficient when the compound is highly hydrophilic. However, organic compounds that can appear in ionized form can be extracted as ion-pairs.

In this study, two sets of extractions were made, one by boiling with solvent and second by shaking the samples in the respective solvents for 8 hrs at room temperature, (Table 1 and Figures 1 and 2). The solvents used for the extraction were distilled water, 80% methanol, and 70% acetone. Although the amount of material extracted by these two procedures did not differ greatly, 70% acetone was a more efficient solvent than either water or 80% methanol. Also, *Acacia nilotica* and *Acacia seyal* bark samples were rich in materials soluble in 70% acetone, (about 28% and 29% respectively). Malviya *et al*[10] reported that the percent extractives of successive extracts of *Acaica nilotica* roots, stem, leaves and seeds in water are 11.28%, 12.34%, 17.28% and 15.38% respectively, which show agreement with our results.

Acaica nilotica and *seyal* were also subjected to phytochemical screening, which indicated the presence of tannins, saponins, coumarins and flavonoids. However, negative results were recorded for alkaloids, triterpnoids, steroids and anthraquinones indicating the absence of these active principles as presented in Table 2. This study shows agreement with the results reported by Malviya *et al.*[10] who reported the presence of saponins, tannins, and flavonoids in the aqueous extracts of *Acacia nilotica* roots, stem, leaves and seeds. Also, Banso[11] reported that the ethanolic extract of stem bark of *Acaica nilotica* contains saponins and tannins. The phytochemical analysis reported by Raghavendra *et al.*[12] revealed that all the solvent extracts (solvents used were petroleum ether, benzene, chloroform, methanol and ethanol) revealed the presence of phytosterols, saponins and flavonoids.

The presence of some materials, such as flavonoids is important since they exhibit physiological effects beside their economic value. They proved to be potent anti-inflammatory agents, anti-allergic, anti-spasmodic and anti-microbial while the anti-tumor activity of some flavonoids has already been established.

Table 1. Total extractives from acacia species samples with water, 80 Methanol, and 70% Acetone.

Species	Solvent	Boiled, g	% Extracted	Un-boiled	% Extracted
Nilotica	Water	6. 2	15.5	6.1	15.3
	80% MeOH	10.2	25.5	10.0	25.0
	70%acetone	10.5	26.3	11.2	28.0
Seyal	Water	7.7	19.3	8.1	20.3
	80% MeOH	10.3	25.8	11.1	27.8
	70%acetone	11.0	27.5	11.8	29.5

All the values in the table above show no significant differences considering the same solvent between the two species.

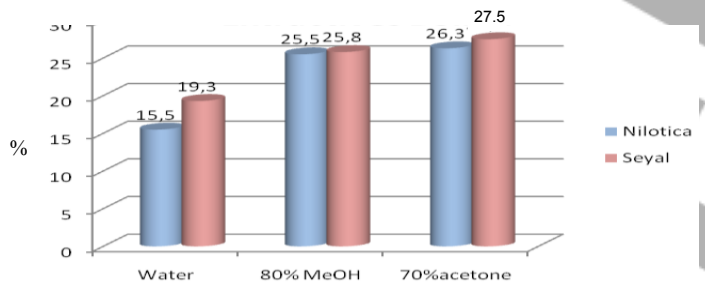

Figure 1. Effect of extraction solvents (Boiled) on the part of species of Acacia.

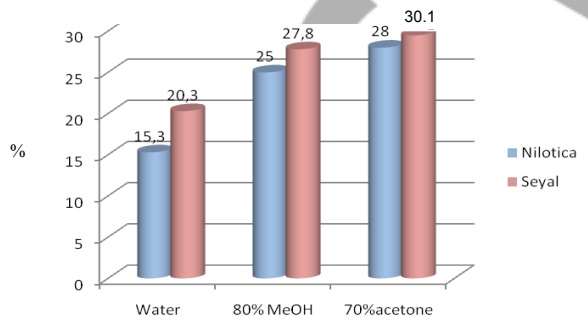

Figure 2. Effect of extraction solvents (Unboiled) on the part of species of Acacia.

Table 2. *Acacia nilotica* and Acacia seyal phytochemical screening analysis.

No	Secondary metabolites	Water extract tests for *Acacia nilotica*	Water extract tests for *Acacia seyal*
1	Alkaloid	Negative	Negative
2	Triterpnoid	Negative	Negative
3	Steroid	Negative	Negative
4	Coumarin	Positive	Positive
5	Flavonoid	Positive	Positive
6	Tannins	Positive	Positive
7	Saponins	Positive	Positive
8	Anthraquinones	Negative	Negative

Conclusion

This research has shown that the extraction of three acacia species using distilled water, 80% methanol and 70% acetone has been successfully made. The extraction was made once by boiling and the other by shaking the samples in the respective solvent for eight hours at room temperature. Results showed that the 70% acetone was the most efficient solvent among the three solvent used. In addition, qualitative analysis of the phytochemical screening revealed the presence of tannins, coumarins and flavonoids in *Acaica nilotica* and *seyal*.

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