

Phytochemical Screening of *Citrullus lanatus* Leaf Aqueous Extract

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ABSTRACT

Qualitative phytochemical analysis of the aqueous extract of *Citrullus lanatus* leaf was conducted in this study using standard procedures. The aqueous extract of *C. lanatus* leaf contained terpenoids, cardiac glycosides and ketoses in high concentrations(+++); tannins, flavonoids, alkaloids, carbohydrates, combined reducing sugars and reducing sugars were detected in moderate concentrations (++) . Free and combined anthraquinones, monosacharrides, pentoses, soluble starch and saponins were not detected. Conclusively, the aqueous extract of *C. lanatus* in this study contains pharmacological components.

Keywords: Phytochemical Screening, *Citrullus lanatus*, Leaf Aqueous Extract.

INTRODUCTION

Citrullus lanatus (Thunb.) Matsum and Nakai belong to the family *Cucurbitaceae* with common names as citron melon or water melon (English), bitter boela, bitter waat lemon, Karkoer (Africana); t'sama (Khoison) and makataan (Tswana), is a prostrate and climbing annual with herbaceous but rigid leaves, and its distribution is restricted to Africa and parts of Asia (Laggetti and Hammer, 2007). The plant has been reported to provide sources of significant amounts of vitamin C, minerals, fats, starch, riboflavin,

ascorbic acid, trace elements and a few calories.

It has been reported to contain lycopene, cucurbitacin, triterpenes, sterols, alkaloids, tannins, flavonoids and saponins, and used traditionally as a diuretic, vermifuge, hypotensive, emetic, antidiabetic and against alcoholic poisoning (Sultan Asyaz *et al.*, 2010). In spite of expanding knowledge on phytochemistry, only a small percentage of plants species have been examined chemically in Nigeria (Gyang. 2001); hence this study was conducted to evaluate the

phytochemical components of *Citrullus lanatus* leaves indigenous to Maiduguri, Nigeria, so as to provide the much needed pharmacological relevance for its use in medicine.

MATERIALS AND METHODS

Plant Material: Fresh and matured *Citrullus lanatus* leaves were obtained from Yanakri village at the outskirts of Maiduguri. The plant was identified by a botanist from the Department of Biological Sciences, University of Maiduguri. The leaves were rinsed in clean water to remove dirt, cut into small bits, and allowed to air dry under shade. Dry leaves were grounded into fine powder to obtain a 205g weight which was extracted by cold maceration for 24 hours in 1000ml of distilled water. The mixture was filtered with a Muslin cloth, and later with what man filter paper (No. 1) and the filtrate evaporated on a water bath (50⁰C) to obtain a 76g dry powder with a 62.9% w/w yield.

Reagent Based Phytochemical

Analysis: The freshly prepared *Citrullus lanatus* leaf aqueous extract was evaluated for phytochemical components including alkaloids, flavonoids, tannins, saponin, terpenoids, glycosides, anthraquinones and carbohydrates using standard methods described by Farnsworth *et al.*, (1985); Trease and Evans, (1989); Harborne, (1989) and Sofowara (1993). Data were recorded as positive signs (+) with their number suggestive of the intensity of the reactions which represented the quantity of chemical constituent present.

RESULTS

The results of this study on phytochemical screening of the aqueous extract of *Citrullus lanatus* leaves for bioactive components is shown in Table 1. Ketones, cardiac glycosides and terpenoids had high scores (+++); tannins, flavonoids, alkaloids, carbohydrates, combined reducing sugars, and reducing sugars had moderate scores (++) while saponins had low scores (+).

Table 1: Phytochemical Components of Aqueous Leaf Extract of *Citrullus lanatus*

Component	Test	Scoring
Carbohydrates	Molisch	++
Monosaccharide	Barfoed	-
Combined reducing sugar	Standard	++
Reducing sugar	Fehlings	++
Pentose	Standard	-
Ketoses	Standard	+++
Soluble starch	Standard	-
Tannins	Ferric chloride	++
	Lead acetate	++
	Hydrochloric acid	-
Free anthraquinone	Standard	-
Combined anthraquinone	Standard	-
Cardiac glycoside	Salkonsk's	++
	Lieberman-Burcherd	+++
	Frothing	+
Saponins	Shinada's	++
Flavanoid	Ferric chloride	++
	Lead acetate	++
	Sodium hydroxide	-
	Dragendorff reagent	++
Alkaloid	May's reagent	+
	Standard	+++

Keys:

- = Not detected
- ++ = Moderate concentration
- + = Low concentration
- +++ = High concentration

DISCUSSION

This study has determined high scores for ketones, cardiac glycosides and terpenoids, and moderate scores for carbohydrate, combined reducing sugar, tannins, flavonoids and alkaloids and low score for saponins. *C. lanatus* has also been reported to contain vitamin C, trace elements, minerals, riboflavin, ascorbic acid, fats and starch, lycopene, cucurbitacin,

triterpenes, sterols and saponins (Sultan Asyaz *et al.*, 2010). Similar studies by Alli *et al.*, (2011), Haruna *et al.*, (2013), Buratai *et al.*, (2011), Mann *et al.*, (2011), Atawodi and Ogunbusola, (2009), and Atawodi *et al.*, (2011) have reported the presence of alkaloids, tannins, flavonoids, saponins, anthraquinones, terpenoids and glycosides in several medicinal plants. Tannins have been reported to have hepato-protective

potentials and stimulate the production of prostanoids that mediate pain, fever and inflammatory processes, while saponins have been reported to have antimicrobial effects and could be precursors of steroidal substances with a wide range of physiological activities (Buratai. *et al.*, 2011). Also, natural products such as alkanoids, terpenes and flavonoids have antitrypanosomal activities (Atawodi and Ogunbusola, 2009; Mann *et al.*, 2011). These values of *C. lanatus* may justify the claim for their remarkable therapeutic activity and wide usage in African traditional medicine; and thus further pharmacological and therapeutic studies should be done to aid the development of new generation of phyto-drugs.

REFERENCES

- Alli, L.A., Okochi, V. I. and Adesokan, A. A. (2011). Antitrypanosomal Activity and Haematological Effects of Aqueous Extract of Leaves of *Morinda lucida* on *Trypanosoma brucei brucei* Infected Rats. *Asian J. Pharm. Hea. Sci.* **1(3)**: 111-115.
- Atawodi, S.E. and Ogunsola, F. (2009). Evaluation of Antitrypanosomal Properties of Four Extracts of Leaves, Stem and Root Barks of *Prosopis Africana* in Laboratory Animals. *Biokemistri*, **21(2)**: 101-108.
- Atawodi, S.E., Joseph-Idrisu, J., Ndidi, U.S. and Yusuf, L.M.D. (2011). Phytochemical and Antitrypanosomal Studies of Different Solvents Extracts of *Boswellia Dalzielii*. *Intern. J. Biol.* **3(2)**:179-184.
- Buratai, L.B., Biu, A.A., Hauwa, M.M. and Daja, A. (2011). Phytochemical Screening of Leaves of *Cassia sieberiana* D.C. (*Caesalpiniaceae*) in Maiduguri, Northern Nigeria. *Savannah J. Agric.* **6(1)**: 63-66.
- Farnsworth, N.R., Akerete, O., Bingal, A.S., Soejarto, D.D. and Guo, Z. (1985). Medicinal Plants in Therapy. World Health Organization, **63**: 965-981.
- Gyang, N.S. (2001). Phytochemical Screening of the Root Bark of *Diospyros messpiliiformis* Hochst Ex. A. DC (*Ebanaceae*). B.Sc. Thesis, University of Jos, Nigeria.
- Harborne, J.B. (1989). *Phytochemical Methods: a Guide to Modern Techniques of Plant Analysis*. London, Chapman and Hall Ltd. Pp.7-8.

- Haruna, Y., Kwanashie, H.O., Anuka, J.A., Atawodi, S.E. and Hussaini, I.M. (2013). Bioassay-guided Fractionation and Anti-trypanosocidal Effect of Fractions and Crude Methanol Roots Extracts of *Securidaca longepedunculata* in mice and Rats. *Intern. J. Modern Biochem.* **2(1)**: 1-14.
- Laggetti, G. and Hammer, K. (2007). The Corsican Citron Melon [*Citrullus lanatus* (Thunb.) Matsumura and Nakai Subsp. *Lanatus* var. *Citroides* (Bailey) Mansf. Ex Greb.] A Traditional and Neglected Crop. *Genetic Resources and Crop Evolution.* **54**: 913-916
- Mann, A., Ifarajimi, O.R., Adewoye, A.T., Ukam, C., Udemé, E.E., Okorie, I.I., Sakpe, M.S., Ibrahim, D.R., Yahaya, Y.A., Kabir, A.Y. and Ogbadoyi, E.O. (2011). *In vivo* Antitrypanosomal Effects of Some Ethnomedicinal Plants from Nupe Land of North Central Nigeria. *Afr. J. Tradit. Complement. Altern. Med.* **8(1)**: 15-21
- Sofowora, A. (1993). *Medicinal Plants and Traditional Medicine in Africa*. Spectrum Books Ltd. Ibadan. 289pp.
- Sultan, A., Farman, U., Khan, I., Hussein, M., Murad, A., Khan, I. and Ullah, K. (2010). Evaluation of Chemical Analysis Profile of *Citrullus colocynthis* Growing in Southern Area of Pakistan. *World Applied Science Journal.* **10(4)**:402-405.
- Trease, G.E. and Evans, W.C. (1989). *A Textbook of Pharmacognosy.* 12th ed. Bailliere Tindall Ltd. London. Pp. 374-726.

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