© 2019 IJSRST | Volume 6 | Issue 6 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X
Themed Section: Science and Technology
DOI : https://doi.org/10.32628/IJSRST196652

Comparative Potential Qualitative and Quantitative Phytochemical Evaluation of Neem and Moringa Oleifera Leaf Plants in Ozoro, Delta State, Nigeria

Uwague A.
Department of Science Laboratory Technology, Delta State Polytechnic, P.M.B. 5. Ozoro, Nigeria
Corresponding Author : uwaguea@gmail.com

ABSTRACT

This study was aimed at determining the qualitative and quantitative phytochemicals present in Neem (Azadirachta indica) and Moringa (oleifera) leaves using standard methods. The result of the analysis reveals the phytochemicals as follows; Alkaloid and glycoside were found to be moderately present while flavonoid and steroid were found to be present whereas saponin was not present in the qualitative analysis of the neem (Azadirachta indica) leaf sample while in that of moringa (oleifera), flavonoid, saponin and steroid were found to be moderately present while alkaloid and glycoside were just present. In the quantitative analysis, Neem (Azadirachta indica) was found to contain 4.00% of saponin while that of moringa (oleifera) was 19.0%, flavonoid was found to contain 2.10% in neem while that of moringa was 11.2%, alkaloid was found to contain 14.5% in neem while that of moringa was 8.00%, glycoside was found to contain 0.27% in neem while that of moringa was 0.18%, steroid was found to contain 0.03% in neem while moringa was found to contain 0.12%. The phytochemicals are present but occurs in different degrees, hence further research and identification of these active ingredients should be carried out through various techniques.

Keywords : Qualitative, Phytochemicals, Biologically, Tropical, Treatment

I. INTRODUCTION

Phytochemicals which simply are the biologically active, naturally occurring chemical compounds found in plants are generally responsible for the protection of plants from disease, damage and equally contributes to the plant's colour, aroma and flavour. These chemicals which are found in most parts of the plants (roots, stems, leaves, flowers, fruits or seeds) include: alkaloids, saponin, carotenoids, phenols, terpenoids, steroids, tannins, glycosides, flavonoids etc. They are not essential nutrients neither are they required by the human body for substaining life, but have important potentials to prevent or to fight some common diseases (Mamta *et al.*, 2013). They have been promoted for the prevention and treatment of diabetes, high blood pressure, and macular degeneration (American Cancer Society, 2000).

Neem (Azadirachta indica) and Moringa (*moringa oleifer* Lam) are types of local medicinal Indian herbs which has turn out to be familiar in the tropical and subtropical countries. Particularly, moringa oleifera is a small native tree to the Sub-Himatayam regions of North West India, which is now indigenous to many regions in Africa, South East Asia, the Pacific and Caribbean Islands and South America. Besides being used daily as vegetable among people of these regions, the moringa is also largely known and used for its health benefits (Ahmad *et al.*, 2014) Among commoners, the moringa oleifera has earned its name as 'the miracle tree' due to its amazing healing

abilities for various ailments and even some chronic diseases.

Neem (*Azadirachta* indica) which belongs to the family *Meliaceae*, is believed to have originated from South Asia, but grows largely in India, Parkistan, Bangladesh, Nepal and other tropical and sub-tropical countries of the world (Bokhari and Aslam, 1985; Von Maydell, 1986; Mohammad, 2016). The neem tree is an incredible plant that has been declared as the Tree of the 21st century by the United Nations (Puri, 1999). In India, the neem tree is commonly described as 'Divine Tree', 'Life giving Tree', 'Nature's Drugstore', 'Village Pharmacy' and 'Panacea for all diseases' (Sofowora, 1993). This is an indication of its vast usage as medical plant.

The neem tree which was first grown from the seeds in Maiduguri, Borno State, Nigeria was introduced from Ghana in 1928 (NRC, 1992; Nwoekeabia, 1994). The Neem is popularly known as 'Dongoyaro' in Nigeria as a whole. It has an extensive deep root system which is responsible for their survival in arid and semi-arid areas of the world (Ramadass and Subramanian, 2018).

For centuries and in many cultures around the globe, the medicinal usage of the Moringa has been to treat problems such as skin infections, anaemia, anxiety, asthma, blackheads, blood impurities, bronchitis, catarrh, chest congestion, cholera and many other illnesses (Khawaja *et al*., 2010; Hamza, 2010; Singh and Sharma, 2012). *Moringa oleifera* also consists of anti-inflammatory, anti-spasmodic, anti-hypertensive, anti-tumour, anti-oxidant, anti-pyretic, anti-ulcer, anti-epileptic, diuretic, cholesterol lowering, renal, anti-diabetic (Paliwa *et al.,* 2011; Sharma *et al.,* 2012) and hepatoprotective activities (Lai *et al.,* 2010; Huang *et al.,* 2012). It has also been labeled for its great cosmetic value in which in recent years, the Moringa has commonly been found to be used in various health care products including body and hair moisturers and conditioners. It was also discovered that Moringa oil was used in skin ointments ever since the Egyptian times The Moringa was claimed to be 'the most nutrient-rich plant yet discovered' (Khawaja *et al*., 2010).

Essentially, the use of herbal medicine for the treatment of diseases and infections is as old as mankind. The World Health Organization (WHO) supports the use of traditional medicines provided they are proven to be efficacious and safe (WHO, 2000). Moringa and Neem are amongst the foremost useful tropical trees. Hence, this study is aimed at determining the potential qualitative and quantitative phytochemical constituents of Neem (*Azadirachta indica*) and *Moringa oleifera* in Ozoro town.

II. METHODS AND MATERIAL

DESCRIPTION OF STUDY AREA

Ozoro is the Headquarter of the Isoko North Local government Area of Delta state. Ozoro is one of the two administrative units in the Isoko region of Delta State, Southern Nigeria. The main economic activity is food crop farming accompanied by some hunting and the staple food crops include cassava and yams. Women form a large population of the farming population, they also engage in trade of food crops for cash to meet other basic household needs. Ozoro has several primary, secondary and post secondary schools. It lies on longitude $6^{0}12^{1}58.00$"E and latitude $5^{0}32^{1}18.00$" N.

SAMPLE COLLECTION AND TREATMENT

Fresh leaf samples of Neem (*Azadirachta indica*) used in this study were collected from the botanical garden in the School of Agriculture, Delta State Polytechinc, Ozoro where it was equally identified by a Botanist while the Moringa oleifera leaf samples were

collected at Hamod Farms Ltd, along Abetere Bush Road, Etevie Quarters, Ozoro. Both leaf samples were separated, washed thoroughly with tap water, shade-dried, homogenizesd to fine powder using mortar and pestle and stored in air tight bottles separately for the analysis.

Extraction of plant materials: 20g of shade-dried powder of each leaf plant sample was used for extraction with 200ml ethanol for 24hours in Soxhlet apparatus. The solvent was removed in rotary evaporator and the crude extracts were dried at room temperature in steady air-current and stored at 4 ^{0}C.

Phytochemical evaluation: The qualitative phytochemical evaluation of both leaf plant samples for saponin, flavonoids, glycoside, alkaloids and steroids were carried out using the established procedures as described by Harbone, 1973; Trease and Evans, (1983); Edeoga *et al.,* (2005), while the quantitative analysis were by the methods described by Harbone, 1973; Ejikeme *et al.*, 2014; Prashant Twari, 2011 and Krishnaiah *et al.*, 2009 respectively.

III. RESULTS AND DISCUSSION

RESULTS

The result of evaluation of the qualitative and quantitative phytochemical constituents of Neem (*Azadirachta indica)* and Moringa (*oleifera)* are shown in table 1 and 2 respectively below;

Table 1 : Shows the result of Qualitative analysis of Neem and *Moringa* leaves

Parameters	Neem leaves	Moringa leaves
Saponin	-	++
Flavonoids	+	++
Glycoside	++	+
Alkaloids	++	+
Steroids	+	++

Key: + = present, ++ = moderately present, - = not present

Table 2: Showing the result of Quantitative analysis of Neem and Moringa leaves

Parameters	Neem leaves (%)	Moringa leaves (%)
Saponin	Nil	19.0
Flavonoids	2.10	11.2
Glycosides	0.27	0.18
Alkanoids	14.5	8.00
Steroids	0.03	0.12

DISCUSSION

The preliminary qualitative phytochemical analysis of Neem (*Azadirachta indica*) and Moringa Oleifera leaf plant extracts using ethanol as showed in table 1 above reveals the presence of saponin, flavonoids, glycoside, alkaloids and steroids, except saponin which is absent in the neem leaf plant extract. Quantitatively in table 2, the saponin content in the Moringa oleifera leaf sample was 19.0%, while the flavonoid content was 2.10 and 11.20, the glycoside content is 0.27 and 0.18, the alkaloid content was 14.5 and 8.00 and the steroid content was 0.03 and 0.12% in neem and Moringa oleifera leaf plant samples respectively. The results in table 2 further shows that moringa oleifera leaf extracts contain in percentage more saponin, flavonoids and steroids while the neem contain more alkaloids and glycosides.

This findings agrees with earlier studies stating that not all phytochemicals are present in all plant parts and that those present occurs in different degrees based on the type of extracting solvent used (Tijjan *et al.,* 2009; Ayinde *et al.*, 2007). According to Rausch *et al.*, (2006), saponins have antioxidant, anti-inflammatory, anti-apoptosis, and immunostimulant

properties which raised speculations that these compounds could positively affect neurodegenerative disorders and delay neural aging. Saponins has been reported to have expectorant action through the stimulation of a reflux of the upper digestive tract. More so, it causes a reduction of blood cholesterol by preventing its re-absorption. Saponins equally have antitumor and antimutagenic activities and can lower the risk of human cancers (David, 1983; Esan, 2014). Quantitavely, as found in this study, saponin is adequately present in moringa oleifera but absent in the neem plant.

Flavonoids are known to have antioxidant effect and have been shown to inhibit the initiation, promotion and progression of tumours (Kim *et al.*, 1994). Reduction of coronary heart disease has been reported to be associated with intake of flavonoid. Flavonoid have equally been reported to exert multiple bio,logical property including antimicrobial, cytotoxicity, anti-inflammatory as well as antitumor activities but the best-described property of almost every group of flavonoids is their capacity to act as powerful antioxidants which can protect the human body from free radicals and oxygen species (Mamta *et al.,* 2013). Flavonoids constitute a wide range of substances that play important role in protecting biological systems against the harmful effects of oxidative processes on macromolecules, such as carbohydrates, proteins, lipids and DNA (Atmani *et al.,* 2009). From this study, flavonoid was quantitatively more in moringa oleifera than in the neem plant.

Alkaloids are nitrogen-containing naturally occurring compounds synthesized by a large numbers of organisms, including animals, plants, bacteria and fungi (Mamta *et al.,* 2013). Almost all known alkaloids have a bitter taste. The alkaloid quinine for example is one of the bitterest tasting substances known and is significantly bitter at a (1×10^5) molar concentration (Mishra, 1989). Alkaloids have hypoglyceamic activities. El-Mahmad Muhammad Abubakar (2009) revealed the existence of alkaloids, carbohydrates, phystosterols, flavonoids and proteins in ethanoic leaves extracts. The presence of bioactive compounds indicates the medicinal value of plants. Antioxidants and antimicrobial properties of various extracts from many plants have recently been of great interest in both research and in the food industry, because their possible use as natural additives emerged from a growing tendency to replace synthetic antioxidants and antimicrobials with natural ones (Dipali and Vilas, 2013). The result in table 2 shows that alkaloid was quantitatively more in the neem plant than in moringa oleifera plant.

Glycocides are found in plants and are generally used in the treatment of heart related diseases, for example, congestive heart failure and arrhythmia. Glycocide is one of the secondary metabolites in plants used by humans as medicines, flavouring, pigments and recreational drugs (Knowledge Encyclopedia, 2016). Steroids are biologically active organic compounds and are used generally to treat varieties of inflammatory diseases and conditions..Glycocide was quantitatively more in the neem leaf plant than in moringa oleifera plant and the reverse was the case in terms of steroid.

IV. CONCLUSION

Neem and moringa oleifera are widely used in traditional medicines to combat and cure various ailments and are also found to be very rich in secondary metabolites which in turn can be attributed to their curative properties. To exploit these pharmacological properties, further research and identification of these active ingredients should be carried out through various techniques.

V. REFERENCES

[1]. Ahmad, F.A.R., Muhammad, D.I. Saie, B.K. (2014). Health Benefits of Moringa oleifera. Asian Pac J. Cancer Prev. 15 (20). Pp8571-8576.

[2]. American Cancer Society (2000). Phytochemicals. http://www.cancer.org/eprise/main/docroot/ETo/content/ETO.

[3]. Atmani, D., Nassima, C., Dina, A., Meriem, B.., Nadjet, D. and Hania, B. (2009). Flavonoids in Human Health: From Structure to Biological Activity. Current Nutrition and Food Science. 5: pp225-237.

[4]. Ayinde, B.A., Onwukaeme, D.N. and Omogbai, E.K.I. (2007). Isolation and characterization of two phenolic compounds from the stem bark of Musanga cecropioides R. Brown (Moraceae). Acta Pol. Pharm. 64:183-185.

[5]. Bokhari, M.H. and Aslam, K.M. (1985). Neem (Melia Azadirachta A.Juss). A useful tree in Northern Nigeria. Annals of Borno II: 83-86.

[6]. David, H. (1983). The new holistic herbal. 3rd Ed. Findhorn press, USA. Pp241.

[7]. Dipalio, O.S. and Vilas, A.K. (2013). Phytochemical Screening of ethanolic extracts of stem, leaves, flower and seed kernel of mangifera indica.Int. J. Pharma and Bio. Sci., 4(2): pp 383-389.

[8]. Deng, X.Y., Cao, M., Shi, D.X. (2013); Toxicological Evaluation of Neem (Azadirachta indica) oil: Acute and Subacute Toxicity. Environmental Toxicology and Pharmacology, Vol. 35, No. 2, pp. 240 – 246.

[9]. Edeoga, H.O., Okwu, D.E. and Mbebie, B.O. (2005). Phytochemical constituents of Nigerian medicinal plants. African Journal of Biotech. 46:685-688.

[10]. Ejikeme, C. M.,. Ezeonu, C. S., and Eboatu, A. N. (2014); "Determination of physical and phytochemical constituents of some tropical timbers indigenous to Niger Delta Area of Nigeria," European Scientific Journal, vol. 10, no. 18, pp. 247–270.

[11]. Esan, H.M. (2014). "What are saponins and what are their health benefits?". http://www.researchgate.net/post.

[12]. Hamza, A.A. (2010). Ameliorative effects of Moringa oleifera Lam seed extract on liver fibrosis in rats. Food Chem. Toxicol. 48(1), pp 345 – 355.

[13]. Huang, G.I., Deng, J.S. and Huang, S.S. (2012). Protective effects of antrosterol from Antrodia camphorata submerged whole brougth against carbon tetrachloride-induced acute liver injury in mice. Food Chem. 132. pp709-716.

[14]. Harborne, J.B. (1973); Phytochemical Methods. A Guide to Modern Techniques of Plant Analysis. Chapman and Hall, London, UK. pp279.

[15]. Khawaja, T.M., Tahira, M., Ikran, U.K. (2010); Moringa oleifera: a Natural Gift – A Review. J. Pharm. Sci. Res. 2: 775 – 781.

[16]. Kim, S. Y., Kim, J. H., Kim, S. K., Oh, M. J. and Jung, M. Y. (1994); "Antioxidant activities of selected oriental herb extracts," Journal of the American Oil Chemists' Society, vol. 71, no. 6, pp. 633–640.

[17]. Knowledge Encyclopedia, (2016). "Secondary Metabolites". www.biologyreferenc.com

[18]. Krishnaiah, D., Devi, T., Bono, A. Sarbatly, R. (2009). Studies on phytochemical constituents of six Malaysian medicinal plants. J. Med. Plants Res. 3(2): 67-72.

[19]. Lai, T.Y., Weng, Y.J. and Kuoi, W.W. (2010). Taohe Chengqi Tang ameliorates acute liver injury induced by carbon tetrachloride in rats. J. Chin Integr Med., 8(): pp49-55.

[20]. Mamta, S., Jyoti, S., Rajeev, N., Dharmendra, S. and Abhishek, G. (2013). Phytochemistry of medicinal plants. Journal of Pharmacognosy and Chemistry. Vol. , No.6. pp168-182

[21]. Mishra, S.N. (1989). Analytical methods for analysis of total alkaloids in root of Withania spp. Proc. All India workshop on M & AP, Faizabad. Pp492-495.

[22]. Mohammad, A.A. (2016). Therapeutics Roles of Azadirachta indica (Neem) and Their Active Constituents in Disease Prevention and

Treatment. Hindawi Publishing Corporation. Evidence-Based Complementary and Alternative Medicine.
http://dx.doi.org/10.1155/2016/7382506.

[23]. National Research Council (1992). Neem: A tree for solving global problems. National Academy Press, Washington, DC. pp115.

[24]. Nwoekeabia, O.D. (1994). Annual Report. Federal Department of Forestry. Federal Ministry of Agriculture, Abuja. Nigeria. pp45

[25]. Paliwal, R., Sharma, V., Pracheta, S. (2011). Antinephrotoxic effects of administration of moringa oleifera Lam in amelioration of DMBA-induced renal carcinogenesis in Swiss albino mice, Biol Med., 3, pp27-35.

[26]. Prashant, T. (2011). Phytochemical Screening and Extraction; A Review International Pharmaceutical Science. 1(1).

[27]. Puri, H.S. (1999); Neem: The Divine Tree; Azadirachita indica. Amsterdam: Harwood Academic Publishers. pp 1 -3.

[28]. Ramadass, N. and Subramanian, N. (2018). Study of Phytochemical screening of Neem (Azadirachta indica). Int. J. of Zoology Studies, Vol.3, No.1, pp209-212.

[29]. Rausch, W., Liu, S., Gille, G. and Radad, K. (2006). Neuroprotective effects of ginsennosides. Acta. Neurobiol. Exp (Wars). 66:369-375.

[30]. Rhoades, D. F. (1979); "Evolution of plant chemical defense against herbivores," in Their Interaction with Secondary Plant Metabolites, G. A. Rosenthal and D. H. Janzen, Eds., p. 41, Academic Press, New York, NY, USA.

[31]. Sharma, V., Paliwal, R. , Janmeda, P. Sharma, S. (2012). Chemopreventive efficacy of moringa oleifera pods against 7, 12-dimethylbenz[a]anthracene induced hepatic carcinogenesis in mice. Asian Pacific J. Cancer Prev. 13:2563-2569.

[32]. Singh, G.P. and Sharma, S.K. (2012). Antimicrobial evaluation of leaf extract of moringa oleifera Lam. Int Res J. Pharm., 3. pp1-4.

[33]. Shoforowa, A. (1993); Introduction to Medical Plants and Traditional Medicine in Africa. (2nd ed.). Spectrum Books Limited. Ibadan, Nigeria. pp71-73.

[34]. Tijjan, M., Bello, I., Aluyu, A., Olurishe, T., Maidawa, S., Habila, J. and Balogun, E. (2009). Phytochemical and Antibacterial Studies of Root Extracts of Cochlosperm tinctorium A. Rich (cochlospermaceae). Res. J. Med. Plants. 3: 6 – 22.

[35]. Trease, G.E. and Evans, W.C. (1989). A textbook of pharmacognosy, (12th ed.). Bailliere Tindal Ltd., London. pp. 374-726.

[36]. Verkerk, R.H.J. and Wright, D.J. (1993). Biological activity of neem seed kernel extract and synthetic azadirachtin against larvae of Plutella xylostellal. Pesticide Science. 37:83-91.

[37]. Von Maydell, H.J. (1986). Trees and shrubs of the Sahel, their characteristics and uses. Eschborn Germany. pp. 173-175.

[38]. WHO, (2000). General Guideline for methodologies on research and evaluation of traditional medicine. World Health Organization. Geneva, pp41-45.

Cite this article as :

Uwague A, "Comparative Potential Qualitative and Quantitative Phytochemical Evaluation of Neem and Moringa Oleifera Leaf Plants in Ozoro, Delta State, Nigeria", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 6 Issue 6, pp. 269-274, November-December 2019. Available at doi : https://doi.org/10.32628/IJSRST196652
Journal URL : http://ijsrst.com/IJSRST196652