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Antifungal Potential of Aqueous Extract of *Mondia whitei* Root Bark: Phytochemical Analysis and Inhibition Studies

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ABSTRACT

Natural products have garnered attention as potential sources of novel antimicrobial agents amidst the global challenge of antimicrobial resistance. *Mondia whitei*, a plant indigenous to Africa, holds promise due to its diverse array of phytochemical constituents. This study investigated the antifungal properties of the aqueous extract of *Mondia whitei* root bark against Candida albicans and Sacromyces spp. Phytochemical screening revealed the presence of alkaloids, tannins, volatile oils, and flavonoids. Susceptibility testing demonstrated dose-dependent inhibition of both fungal strains by the extract. These findings underscore the therapeutic potential of *Mondia whitei* as a natural antifungal agent deserving further exploration.

Keywords: Antifungal, *Mondia whitei*, *Candida albicans*, *Sacromyces spp*

INTRODUCTION

Due to the fact that many infectious pathogens are developing resistance to synthetic medications, finding fresh sources of antibiotics is a worldwide problem that research institutes, pharmaceutical firms, and academia are occupied with [1, 2]. The main benefit is that plants continue to be the most affordable and efficient alternative source of medication [3]. In traditional medicine, contemporary pharmaceuticals and intermediate molecules needed to synthesise analogue drugs are derived from plant extracts or active principles [4]. For the purpose of finding new therapeutic drugs, medicinal chemistry development is essential [5]. The woody perennial climber Mondia whitei may grow up to 6 metres in height. It emerges from a massive tubercle bearing leaves shaped like an appealing heart and smelling of vanilla [6]. The blooms are clustered in panicles of cream-colored buds, which open to reveal deep reddish-purple inner petals. The Asclepiadaceae (Apacynaceae) family includes Mondia whitei [7]. It is known locally as banyankole, omurondo, in Uganda. This popular name is White's ginger. Africa is the natural home of Mondia whitei (South, Central, East, and West) [8]. This plant is usually found in the west and centre of Uganda; it grows in a variety of forest environments across East Africa. According to phytochemical studies, the following substances were found: phenanthrene, 2,4-dihydroxy-6-methyl benzaldehyde, 7,8-dihydroxy-6-methoxy coumarin, 3-hydroxy-4-methoxy benzaldehyde, coumarin, flavonoids, terpenoids, cardiac glycosides, steroids, phlobatannins, and phytosterols [9, 10]. M. whitei contains protein, minerals (iron, calcium, zinc, magnesium), and vitamins A, D, K, and E [7]. Aphrodisiacs utilise it to enhance libido, potency, or sexual pleasure [13], enhance appetite [12], treat diarrhoea [14], treat jaundice, constipation, bilharzia, anaemia, headaches, and urinary tract infections. In mouse toxicity studies, the aqueous extract's LD50 of 11.9 g/kg suggested a comparatively low fatal dosage [15]. Pharmacological characteristics of M. whitei have been documented to exist [16], including antibacterial [10, 17], inhibitory [11], and antidiarrheal [18] capabilities. The majority of antifungal medications now in use have a low specificity to fungi, which increases their potential for harmful side effects. The purpose of this research is to demonstrate that the dried bark of the Mondia whitei root has antifungal properties that can inhibit the growth of newer, more resistant fungal strains.

METHODOLOGY

Plant material identification and collection

Mondia whitei plant (root) was collected from Kashenyi forest at sunset and identified by a Botanist at Kampala International University-Western campus and a voucher sample was kept at the herbarium.

Preparation of the aqueous extract

The roots were washed and air dried for two months

until completely dried and it was powdered using a blender. The powder was weighed 200g and mixed with distilled water (800mls) to the ratio of 1:4, the mixture was put in a sonicator for stirring and was monitored with continual stirring for 48hrs. It was filtered with Whatman filter paper and dried in hot air oven. This extract was put in a refrigerator for storage until phytochemical screening was done.

Phytochemical Screening

Secondary metabolites screening was carried out according to standard procedures as described by Sofowara [19], Trease and Evans [20] and Harbone [21].

Microbial samples

The microorganisms (*Sacromyces spp and Candida albicans*) used were pure cultures.

Culturing of the test microorganism

Sabourad dextrose agar (SDA) culture media was aseptically prepared and used for sub-culturing.

Antimicrobial Susceptibility Test (AST) for the crude extract

This was carried out according to the method described by Opara and Anasa well method (Agar plate growth measurements) [22]. The relative susceptibility of the microorganisms to the plant extract was determined by measuring the zones of inhibition.

Quality assurance

The procedure was done to ensure no contaminations by microorganisms, particles and salts or any other impurities. The procedures were done under aseptic techniques.

Analysis of data

Test for significance in the zone of inhibition was done by measuring the minimum zones of inhibition to know the effectiveness of each plant extract and the susceptibility of the test organism.

RESULTS

Table 1. Phytochemical analysis of the dried root bark of crude extract of *Mondia whitei*

Phytochemical groups	Presence/absence
Saponin	-
Tannins	+
Phlobotannins	-
Alkaloids	+
Volatile oils	+
Reducing sugars.	-
Cardiac glycosides.	-
Steroids.	-
Flavonoids.	+

+ = Present; - = Absent.

Table 2. Minimum inhibitory concentration of the aqueous extract of *Mondia whitei* against the fungal isolates

Treatment (w/v)	*Candida albicans* (mm)	*Sacromyces spp* (mm)
0.4mg/ml extract	7	**0.03**
0.3mg/ml extract	5	**0.012**
0.2mg/ml extract	2	**0.005**
0.1mg/ml ketoconazole	**10**	**10**

Ketoconazole provided a zone of inhibition synonymous with its normal spectrum of activity as per in vivo by making a zone of inhibition of 10 mm on both *Sacromyces spp* and *Candida albicans*. The different concentration showed differing lower zones of inhibition for both *Candida albicans and Sacromyces spp*.

DISCUSSION

Mondia whitei has been for many centuries and have been used by indigineous communities to treatment a wide portfolio of ailments [7]. The phytochemical tests done established the existence of flavonoids, alkaloids, tannins and volatile oils. This finding is similar to those of other researchers [10] Flavonoids have been known to possess anti-inflammatory and anti-allergic properties and as a gastric mucosa protectant [23], this can be harnessed and provide cheaper medicaments with

higher efficacy for our societies. Further studies have shown that this and other plantscan be effective against malignancies other serious ailments [24].

The most prevalent fungus in humans is *Candida albicans*, which can cause illnesses ranging from systemic infections to mucosal illnesses [25]. This present study showed a zone of inhibition by different concentration of the extract for *Candida albicans* in a dose-dependent manner which is similar to those of other researchers in a dose-dependent manner [26, 27]. Sivareddy *et al.* [28] also reported the antifungal activity of solvent extracts of *P.betle* on *Candida albicans* which deduced the antifungal property of *M. whitei*. This study also showed a zone of inhibition by different concentration of the extract for *Sacromyces spp* in a dose-dependent manner which support the report of Gbadamosi and Erinoso [17] on the antimicrobial activity of the aqueous root extract of *M. whitei*. The higher the concentration, the higher the inhibitory effect. This study showed that *Sacromyces spp* exhibited a reduced sensitivity to the root extract of *M. whitei* and this could be due to the different membrane permeability of the two spp of fungus.

Many phytochemicals found in plants have been known to possess antibacterial, antifungal, antitumor and other medically beneficial properties [29-34]. This experimentally observed inhibitory effect on *Candida albicans and Sacromyces spp* may be traced to the existence of flavonoids and phytochemicals in *Mondia whitei*. [35-66].

CONCLUSION

This study showed that the root of *Mondia whitei* contained various phytochemicals which can be used as pharmaceutical agent. The hydro root extract of *M. whitei* possess antifungal properties as it significantly showed zone of inhibition on *C. albican* and *Sacromyces spp* in a dose-dependent manner.

RECOMMENDATIONS

Further research should explore the antifungal activity of specific phytochemicals present in *Mondia whitei*, investigate potential formulations for clinical use (e.g., creams, ointments, oral preparations) and conduct long-term safety and efficacy studies in diverse patient populations.

REFERENCES

1. Chinemerem Nwobodo, D., Ugwu, M. C., Oliseloke Anie, C., AlOuqaili, M. T., Chinedu Ikem, J., Victor Chigozie, U., & Saki, M. (2022). Antibiotic resistance: The challenges and some emerging strategies for tackling a global menace. Journal of clinical laboratory analysis, 36(9), e24655.
2. Salam, M. A., Al-Amin, M. Y., Salam, M. T., Pawar, J. S., Akhter, N., Rabaan, A. A., & Alqumber, M. A. (2023). Antimicrobial resistance: a growing serious threat for global public health. In Healthcare. 11(13), 1946.
3. Vaou, N., Stavropoulou, E., Voidarou, C., Tsigalou, C., & Bezirtzoglou, E. (2021). Towards advances in medicinal plant antimicrobial activity: A review study on challenges and futureperspectives. Microorganisms, 9(10), 2041.
4. Wainwright, C. L., Teixeira, M. M., Adelson, D. L., Braga, F. C., Buenz, E. J., Campana, P. R., David, B., Glaser, K. B., Harata-Lee, Y., Howes, M. J. R., & Izzo, A. A. (2022). Future directions for the discovery of natural product-derived immunomodulating drugs: An IUPHAR positional review. Pharmacological research, 177,106076.
5. Muhammad, F. (2024). Medicinal Chemistry is Shaping the World of Therapy. Journal of Kermanshah University of Medical Sciences, 28(1).
6. Watcho, P., Defo, P. B. D., Wankeu-Nya, M., Carro-Juarez, M., Nguelefack, T. B., & Kamanyi, A. (2013). Mondia whitei (Periplocaceae) prevents and Guibourtiates smannii (Caesalpiniaceae) facilitates fictive ejaculation in spinal male rats. BMC Complementary and Alternative Medicine, 13, 1-9.
7. Aremu, A. O., Cheesman, L., Finnie, J. F., & Van Staden, J. (2011). Mondia whitei (Apocynaceae): A review of its biological activities, conservation strategies and economic potential. South African journal of botany, 77(4), 960-971.
8. Esievo, K. B., Anthony, S. O, Fatokun, O. T. and Kunle, O. F. (2018). Pharmacognostic Studies of the Leaves and Roots of Mondia whitei (Hook.F.). International Journal of Pharmacy and Biological Science, 8(2), 253-258).
9. Aliero, A. A., Ntulume, I., Odda, J., & Okech, M. A. (2017). Production of novel antifungal compounds from actinomycetes isolated from waste dump soil in Western Uganda. African Journal of Microbiology Research, 11(30), 1200-1210.
10. Bashir, L. U., Abdulkadir, A., Shah, M. M., Hamisu, A., Sharif, U., & Kamalu, A. A. (2020). Phytochemical screening and antifungal potentials of Citrus limon peels against Fusarium oxysporum and Rhizopus stolonifer

causing rots in water melon (Citrullus lanatus L.). Journal of Experimental Sciences, 11, 1-5.
11. Oludele, O., Idris, B., Benard, O., Pius, U., & Olufunso, O. (2018). Mondia whitei, an African Spice Inhibits Mitochondrial Permeability Transition in Rat Liver. Preventive nutrition and food science, 23(3), 206–213.
12. Oketch-Rabah, H. A. (2012). Mondia whitei, a medicinal plant from Africa with aphrodisiac and antidepressant properties: a review. Journal of dietary supplements, 9(4), 272-284.
13. Watcho, P., Tchuenchie Gatchueng, M. A., DefoDeeh, P. B., Wankeu-Nya, M., Ngadjui, E., FozinBonsou, G. R. and Kamtchouing, P. (2019). Sexual stimulant effects of the mixture of Mondia whitei, Dracaena arborea, and Brideliaferruginea in normal and prediabetic male Wistar rats. Journal of Basic and Clinical Physiology and Pharmacology, 30(4), 20180222.
14. Kumari, A., Baskaran, P., Chukwujekwu, J. C., de Kock, C. A., Smith, P. J., & Van Staden, J. (2016). The changes in morphogenesis and bioactivity of Tetradeniariparia, Mondia whitei and Cyanoptisspeciosa by an aeroponic system. Industrial Crops and Products, 84, 199-204.
15. Watcho, P., Kamtchouing, P., Sokeng, S. D., Moundipa, P. F., Tantchou, J., Essame, J. L., & Koueta, N. (2004). Androgenic effect of Mondiawhitei roots in male rats. Asian journal of andrology, 6(3), 269-272.
16. Ngbolua, K. N., Liyongo, C. I, Bongo GN, Lufuluabo LG, Nsimba NK, Ashande CM, Mutanda SK, Gbolo BZ, Tshilanda DD and Mpiana PT 2018 Microscopy features, phytochemistry and bioactivity of Mondiawhitei L. (Hook F.) (Apocynaceae); a mini review. Discovery Phytomedicine 5(3): 34-42.
17. Gbadamosi, I. T., & Erinoso, S. M. (2015). In vitro antioxidant and antimicrobial activities of Mondia whitei (Hook. f.) Skeels. Journal of Basic & Applied Sciences, 11, 428.
18. Gakunga, N. J., Sembajwe, L. F., Kateregga, J., & Vudriko, P. (2013). Phytochemical screening and antidiarrheal activity of ethanolic fresh root bark extract of Mondia whitei in albino rats.
19. Sofowora, A. (1993). Recent trends in research into African medicinal plants. Journal of ethnopharmacology, 38(2-3), 197-208.
20. Trease GE, Evans WC. A Textbook of Pharmacognosy. Edn 13 BailliereTindall Ltd., London, 1989.
21. Harborne, J. B., & Harborne, J. B. (1973). Phenolic compounds. Phytochemical methods: A guide to modern techniques of plant analysis, 33-88.
22. Opara, A. A., &Ansa, M. A. (1993). The antibacterial activity of tea and coffee on selected organisms. J. Med. Lab. Sci, 3, 45-48.
23. Maleki, S. J., Crespo, J. F., & Cabanillas, B. (2019). Anti-inflammatory effects of flavonoids. Food chemistry, 299, 125124.
24. Chen, T., Mwenge, L., Lakhi, S., Chanda, D., Mwaba, P., Molloy, S. F., & ACTA Trial Team. (2019). Healthcare costs and life-years gained from treatments within the advancing cryptococcal meningitis treatment for Africa (ACTA) trial on cryptococcal meningitis: A comparison of antifungal induction strategies in sub-Saharan Africa. Clinical Infectious Diseases, 69(4), 588-595.
25. Talapko, J., Juzbašić, M., Matijević, T., Pustijanac, E., Bekić, S., Kotris, I., & Škrlec, I. (2021). Candida albicans—the virulence factors and clinical manifestations of infection. Journal of Fungi, 7(2), 79
26. Kakande, T., Batunge, Y., Eilu, E., Shabohurira, A., Abimana, J., Akinola, S. A., & Ntulume, I. (2019). Prevalence of dermatophytosis and antifungal activity of ethanolic crude leaf extract of Tetradenia riparia against dermatophytes isolated from patients attending Kampala International University Teaching Hospital, Uganda. Dermatology research and practice, 9328621 page 1-13. https://doi.org/10.1155/2019/9328621
27. Odaya Kumar, P., Srinivasu, K., Venkata, V., Rao, A., Onchweri, N., & Muchiri, J. N. (2016). Antifungal activities of Cyclea peltata leave extracts in Tirunelveli, Tamilnadu. India. Spec. fung. pathog. J., Volume 1, Issue, 1, Pages 0028-0031.
28. Sivareddy, B., Reginald, B. A., Sireesha, D., Samatha, M., Reddy, K. H., & Subrahamanyam, G. (2019). Antifungal activity of solvent extracts of Piper betle and Ocimum sanctum Linn on Candida albicans: An: in vitro: comparative study. Journal of oral and Maxillofacial Pathology, 23(3), 333-337.
29. Ugwu, CE., Sure, SM., Dike, CC., Okpoga, N. A., & Egba, S. I. (2018). Phytochemical and in vitro antioxidant activities of methanol leave extract of Alternanthera basiliana. Journal of Pharmacy Research, 12(6): 835-839.
30. Ogugua, V. N., Anaduaka, G. E., Agba, J. C., Apeh, O. V., Egba, S. I., Agu, C. V., & Ogbu, N. P. (2015). Preliminary In-vitro Assessment of Some Phytochemical Constituents and Radical Scavenging Activity of Methanol Extracts of Five Flowers Varieties. Annual Research and Review in Biology, **5(4):** 357-365

31. Ogugua, V. N., Egba, S. I., Anaduaka, E. G., & Ozioko, B. O. (2013). Phytochemical analysis, anti-hyperglycaemic and anti-oxidant effect of the aqueous extracts of Chromolaena odorata on alloxan induced diabetic Rats. Pharmanest, 4(5): 970-977.
32. Alum, E. U., & Ugwu, O. P. C. (2023). Beyond Nutrients: Exploring the Potential of Phytochemicals for Human Health. IAA Journal of Applied Sciences, 10(3),1-7. https://doi.org/10.59298/IAAJAS/2023/4.1.3211
33. Alum, E. U., Mathias, C. D., Ugwu, O. P. C., Aja, P. M., Obeagu, E. I., Uti, D. E., & Okon, M. B. (2023). Phytochemical composition of Datura stramonium Ethanol leaf and seed extracts: A Comparative Study. IAA Journal of Biological Sciences, 10(1),118-125. https://www.iaajournals.org/phytochemical-composition-of-datura-stramonium-ethanol-leaf-and-seed-extracts-a-comparative-study/
34. Asogwa, F. C., Okoye, C. O. B., Ugwu, O. P. C., Edwin, N., Alum, E. U., & Egwu, C. O. (2015). Phytochemistry and Antimicrobial Assay of Jatropha curcas Extracts on Some Clinically Isolated Bacteria - A Comparative Analysis. European Journal of Applied Sciences, **7**(1), 12-16. DOI: 10.5829/idosi.ejas.2015.7.1.1125.
35. Chimezie O. Onukwuli, Chisom E. Izuchukwu and Ugwu Okechukwu Paul-Chima (2024). Exploring Phytochemicals for Diabetes Management: Mechanisms, Efficacy, and Future Directions. NEWPORT INTERNATIONAL JOURNAL OF RESEARCH IN MEDICAL SCIENCES 5(2):7-17. https://doi.org/10.59298/NIJRMS/2024/5.2.0717
36. Chimezie O. Onukwuli, Chisom E. Izuchukwu and Ugwu Okechukwu Paul-Chima (2024). Harnessing the Potential of Indigenous African Plants in HIV Management: A Comprehensive Review Integrating Traditional Knowledge with Evidence-Based Medicine. IDOSR JOURNAL OF BIOCHEMISTRY, BIOTECHNOLOGY AND ALLIED FIELDS 9(1): 1-11. https://doi.org/10.59298/IDOSR/JBBAF/24/91.111
37. Chimezie O. Onukwuli, Chisom E. Izuchukwu and Ugwu Okechukwu Paul-Chima (2024) Advances in Analytical Techniques and Therapeutic Applications of Phytochemicals. IDOSR JOURNAL OF BIOCHEMISTRY, BIOTECHNOLOGY AND ALLIED FIELDS 9(1): 12-22. https://doi.org/10.59298/IDOSR/JBBAF/24/91.122
38. Okechukwu, P. U., Okwesili, F. N., Parker, E. J., Abubakar, B., Emmanuel, C. O., & Christian, E. O. (2013). Phytochemical and acute toxicity studies of Moringa oleifera ethanol leaf extract. *International Journal of Life Science BiotechNology and Pharma Research*, *2*(2), 66-71.
39. Odo, C. E., Nwodo, O. F., Joshua, P. E., Ugwu, O. P., & Okonkwo, C. C. (2013). Acute toxicity investigation and anti-diarrhoeal effect of the chloroform–methanol extract of the seeds of Persea americana in albino rats. *Journal of pharmacy research*, *6*(3), 331-335.
40. Adonu Cyril, C., Ugwu, O. P. C., Esimone Co, O., Bawa, A., Nwaka, A. C., & Okorie, C. U. (2013). Phytochemical analyses of the menthanol, hot water and n-hexane extracts of the aerial parts of cassytha filiformis (Linn) and leaves of cleistopholis patens. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, *4*, 1143-1149.
41. Orji, O. U., Ibiam, U. A., Aja, P. M., Ugwu, P., Uraku, A. J., Aloke, C., ... & Nwali, B. U. (2016). Evaluation of the phytochemical and nutritional profiles of Cnidoscolus aconitifolius leaf collected in Abakaliki South East Nigeria. *World Journal of Medical Sciences*, *13*(3), 213-217.
42. Offor, C. E., Ugwu, P. C., Okechukwu, P. M., & Igwenyi, I. O. (2015). Proximate and phytochemical analyses of Terminalia catappa leaves. *European Journal of Applied Sciences*, *7*(1), 09-11.
43. Nwali, B. U., Egesimba, G. I., Ugwu, P. C. O., & Ogbanshi, M. E. (2015). Assessment of the nutritional value of wild and farmed Clarias gariepinus. *International Journal of Current Microbiology and Applied Sciences*, *4*(1), 179-182.
44. Aja, P. M., Okechukwu, P. C. U., Kennedy, K., Ibere, J. B., & Ekpono, E. U. (2017). Phytochemical analysis of Senna occidentalis leaves. *IDOSR J Appl Sci*, *2*(1), 75-91.
45. Igwenyi, I. O., Isiguzo, O. E., Aja, P. M., Ugwu Okechukwu, P. C., Ezeani, N. N., & Uraku, A. J. (2015). Proximate composition, mineral content and phytochemical analysis of the African oil bean (Pentaclethra macrophylla) seed. *American-Eurasian J Agric Environ Sci*, *15*, 1873-1875.
46. Orji, O. U., Ibiam, U. A., Aja, P. M., Ugwu, P., Uraku, A. J., Aloke, C., ... & Nwali, B. U. (2016). Evaluation of the phytochemical and nutritional profiles of Cnidoscolus aconitifolius leaf collected in Abakaliki South East Nigeria. *World Journal of Medical Sciences*, *13*(3), 213-217.
47. Offor, C. E., Ugwu, P. C., Okechukwu, P. M., & Igwenyi, I. O. (2015). Proximate and phytochemical analyses of Terminalia catappa leaves. *European Journal of Applied Sciences*, *7*(1), 09-11.
48. Afiukwa, C. A., Ugwu, O. P., Ebenyi, L. N., Oketa, H. A., Idenyi, J. N., & Ossai, E. C. (2013). Phytochemical analysis of two wild edible mushrooms, Auricularia polytricha and

Pleurotus ostreatus, common in Ohaukwu area of Ebonyi state, Nigeria. *Res J Pharm Biol Chem Sci*, *4*(2), 1065-70.

49. Chukwuemeka, I. M., Udeozo, I. P., Mathew, C., Oraekwute, E. E., Onyeze, R. C., & Ugwu, O. P. C. (2013). Phytochemical analysis of crude ethanolic leaf extract of Morinda lucida. *Int. J. Res. Rev. Pharm. Appl. Sci*, *3*(4), 470-475.
50. Udeozo, I. P., Nwaka, A. C., Ugwu, O. P., & Akogwu, M. (2014). Anti-inflammatory, phytochemical and acute toxicity study of the flower extract of Newbouldia laevis. *Int J Curr Microbiol App Sci*, *3*(3), 1029-35.
51. Afiukwa, C. A., Ugwu Okechukwu, P. C., Ebenyi, L. N., Ossai, E. C., & Nwaka, A. C. (2013). Phytochemical analysis of three wild edible mushrooms, coral mushroom, Agaricus bisporus and Lentinus sajor-caju, common in Ohaukwu Area of Ebonyi State, Nigeria. *International Journal of Pharmaceutics*, *3*(2), 410-414.
52. Ugwu O.P.C. and Amasiorah, V. I. (2020). The effects of the crude ethanol root extract and fractions of *Sphenocentrum jollyanum* on hematological indices and glycosylated haemoglobin of streptozotocin-induced diabetic albino rats. *INOSR Scientific Research*, *6*(1), 61-74.
53. Ikechukwu, A. A., Ibiam, U. A., Okechukwu, P. U., Inya-Agha, O. R., Obasi, U. O., & Chukwu, D. O. (2015). Phytochemistry and acute toxicity study of Bridelia ferruginea extracts. *World J. Med. Sci*, *12*(4), 397-402.
54. Igwenyi, I. O., Dickson, O., Igwenyi, I. P., Okechukwu, P. C., Edwin, N., & Alum, E. U. (2015). Properties of Vegetable Oils from Three Underutilized Indigenous Seeds. *Global Journal of Pharmacology*, *9*(4), 362-365.
55. Ibiam, U. A., Alum, E. U., Aja, P. M., Orji, O. U., Nwamaka, E. N., & Ugwu, O. P. C. (2018). Comparative Analysis of Chemical Composition of Buchholzia Coriacea Ethanol Leaf-Extract, Aqueous And Ethylacetate Fractions. *Indo American Journal of Pharmaceutical Sciences*, *5*(7), 6358-6369.
56. Enechi, D. C., Ugwu, K. K., Ugwu, O. P. C., & Omeh, Y. S. (2013). Evaluation of the antinutrient levels of Ceiba pentandra leaves. *IJRRPAS*, *3*, 394-400.
57. Afiukwa, C. A., Oko, A. O., Afiukwa, J. N., Ugwu, O. P. C., Ali, F. U., & Ossai, E. C. (2013). Proximate and mineral element compositions of five edible wild grown mushroom species in Abakaliki, southeast Nigeria. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, *4*(2), 1056-1064.
58. Asogwa, F. C., Okechukwu, P. U., Esther, U. A., Chinedu, O. E., & Nzubechukwu, E. (2015). Hygienic and sanitary assessment of street food vendors in selected towns of Enugu North District of Nigeria. *American-Eurasian Journal of Scientific Research*, *10*(1), 22-26.
59. Afiukwa, C. A., Ogah, O., Ugwu, O. P. C., Oguguo, J. O., Ali, F. U., & Ossai, E. C. (2013). Nutritional and antinutritional characterization of two wild yam species from Abakaliki, Southeast Nigeria. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, *4*(2), 840-848.
60. Offor, C. E., Okechukwu, P. U., & Esther, U. A. (2015). Determination of ascorbic acid contents of fruits and vegetables. *Int. J. Pharm. Med. Sci*, *5*, 1-3.
61. Enechi, O. C., Peter, C. D., Ugwu, O. P. C., Udeh, S. M. C., & Omeh, Y. S. (2013). Evaluation of the nutritional potential of Ceiba pentandra leaves. *Mintage Journal of Pharmaceutical & Medical Sciences*, *2*(3), 25-27.
62. Offor, C. E. P. M., Aja, P. C., Ugwu, O., & Agbafo, K. N. (2015). The effects of ethanol leaf-extract of Gmelina arborea on total protein and albumin concentrations in albino rats. *Glob. J. Environ. Res*, *9*(1), 1-4.
63. Offor, C. E., Agidi, J. U., Egwu, C. O., Ezeani, N., & Okechukwu, P. U. (2015). Vitamin and mineral contents of Gongronema latifolium leaves. *World Journal of Medical Sciences*, *12*(2), 189-191.
64. Afiukwa, C. A., Ugwu, O. P. C., Okoli, S. O., Idenyi, J. N., & Ossai, E. C. (2013). Contents of some vitamins in five edible mushroom varieties consumed in Abakaliki Metropolis, Nigeria. *Res. J. Pharm. Biol. Chem. Sci*, *4*, 805-812.
65. Igwenyi, I. O., Nchi, P. O., Okechukwu, U. P., Igwenyi, I. P., Obasi, D. C., Edwin, N.and Ze, A. C. (2017). Nutritional potential of Azadirachta indica seeds. *Indo American Journal of Pharmaceutical Sciences*, *4*(2), 477-482.
66. Offor, C., Chukwu, B., Igwenyi, I., Ugwu, O. P., & Aja, P. (2015). Effect of Ethanol Leaf-Extract of *Annona muricata* on Serum Total Protein and Albumin Concentrations in Albino Rats. *Academic Journal of Oral and Dental Medicine*, *2*(1), 5-7.

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