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Antioxidative and Phytochemical Properties of Annona muricata (Soursop) Leaf and Anacardium occidentale (Cashew Nut)

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Abstract

The antioxidative and phytochemical properties present in annona muricata (sour sop) leaf and annacarduim occidentale (cashew nut). (Annona muricata Lin) is a plant belonging to the Annonacea family that has been midely used globally as a traditional medicine for many diseases. It contain phytochemical compound and antioxidant activity. Fresh sour sop leaves and cashew nut were collected after identification by a plant taxonomist. The leaves were dried under the room temperature and grounded while the cashew nut was fried and grounded both plant where extracted using ethanol. Preliminary photochemical screening was adopted to determine the photochemical constituents of the plant materials. The ethanol extracts were analyzed by 2,2-diphenyl-l picryhdrazyl(DPPH)assays. The ethanol extract of sour soup leaf had antioxidant activity by scavenging DPPH radical with ic50 of 141,127,µg ml . The cashew nut extract showed that ethanolic extracts had higher antioxidant activity and total phenolic content. The presence of anthranoids, phenols, cardiac glycosides and alkaloids were detected with sour sop leaf extract while the presence of anthranoids , anthraquinones, phenols, alkaloids and cardiac glycosides were detected in the cashew nut extract. This work indicated that the cashew nut and soursop leaf extracts has a potential to be used as an antibacterial and antifungal agent for the further application.

Keywords: Cashewnut, Soursop Leaf, Antibactenal, Extracts, Diseases, Properties

Introduction

Annona muricata (sour sop) belongs to the family of Annonaceae. It is used in traditional medicine in many regions. *Annona muricata* Linn is one of the herbal plants that are widely used as anti-diabetic, anti-inflammatory, anti-malarial, anti-cancer and antioxidant. Sour sop leaf has many benefits because it contains phytochemical compounds and antioxidant activity. This plant is reported very useful in various health disease treatment such as preventing and treating cancer, malaria, liver, heart and kidney infection. (Nge, 2024). Ethanol, water and n-hexane extract of sour sop leaf show anti-oxidative properties by neutralizing free radicals using DPPH method (Lannuzel et al.,2020).

Anacardium Occidentate L belongs to the family Anacardiaceac. It is one of the most important plantation crops in India, Brazil and Nigeria. Anacardiceae L is a medicinal plant with powerful anti-oxidative properties. Cashew nuts reduces the development of carrageenan – induced paw edema limiting the formation of edema and pain, (Chan, 2020). The phytochemical composition and biological activities of plants can be influenced by factors such as seasonal changes, stage of maturity, and environmental conditions. Although numerous studies have examined variations in phytochemical content across different parts of plants, particular attention has often been given to differences found in fruits (Balaguera-López & Fischer, 2024). Annona muricata (sour sop) and Anacardium

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occidentate have been reported to contain phytochemical and anti-oxidative properties, which are useful agents in treatment of cancer, heart and kidney infection. However, there is limited scientific information in the literature concerning active properties of sour sop and cashew nuts, hence there is need to evaluate the phytochemical and anti-oxidative properties of Anacardium occidentate and Annona muricata.(Matsushige et al.,2012)

Muricata leaves have a postive effects on reducing oxidative stress inn human erothrocytes and vital infections. Protective effects of Annona muricata linn. (Abba et al.,2018). upper A.muricata leaf has many benefits because it contiue phytochemical compounds. Sour sop leave is used locally for several ethno medicine purposes as a laxative and purgative, wound healing e.t.c. the health benefits of this plant have been attributed to their unique phytochemical composition (Ekeleme et al., 2017). Many bioactive compounds and phytochemical, majorly the annonaceous acetogenins and essential oils, have been isolated and elucidated from A.muricata. The phytochemical present in annona muricata are alkaloids, flavonoids, carbohydrates, cardiac glycosides, saponins, tannis, phytosterols and protein (Justino et al., 2018)

Anocardium occidentale L. (Cashew nut) is a medical plant with powerful anti-oxidative phytochemical properties. Anti-oxidavtive enzymes endogenous enzymes such as superoxide dismutase, catalase and glutathione, neutrophils infiltration, increase in the activities of myeloperoxidas, malonidialdehyde and pro inflammatory release. Cashew nut can modulate the risk of cardiovascular disease, including stroke and metabolic syndrome (RubioMelgarejo et al., 2020).

Methods and Materials

Collection of materials

Fresh soursop leaves and cashew nut were collected after identification by a plat taxonomist. The leaves were dried while the cashew nut was fried and kept for extraction.

Sterilization of glassware

Sterilization of glassware used in this study we sterilized using laboratory hot air oven at temperature of 160^{o}c for 1 hour (Cheesbrough, 2006)

Extraction of active ingredients in the leaf and nut

Soaking extration method described by Tafinta et al. (2020) was adopted. Twenty grams (20g) of the ground powders were subjected to extraction in 180 ml of ethanol in a sterile beaker. The content of the beakers were allowed to soak overnight. The content was filtered using muslin clothe and stored in a sterile container. This procedure was repeated with leaf and lower powder using ethanol, cold and hot water.

Antioxidative properties of the extracts

Preparation of DPPH solution of 0.4 mM

DPPH solution with a concentration of 0.4mM was made by weighing 7.9mg DPPH and dissolved with methanol p.a up to 50 mL in a measuring flask.

Determination of Antioxidant Capacity by the DPPH

To determine antioxidant capacity by the DPPH method, the protocol proposed by Brand-Williams et al. (1995) was used. The change in absorbance at 517nm was measured in a spectrophotometer. Antioxidant activity was determined using a calibration curve with ascorbic acid with concentration ranges from 0-100mg L-1. The results were expressed in mg equivalents of ascorbic acid on 100g of fresh weight (mgEAA/100g FW).

Qualitative phytochemical screening

Test for saponins

Ten milliliters (10ml) of distilled water was added to 2ml of each of the extracts in a test tube and shaken vigorously (Ekeleme et al., 2017). Persistent frothing, even after heating was an indication of Prescence of saponins

Test for anthropoids

The method of Ekeleme et al. (2017) was adopted for this test. To two milliliters (2ml) of each of the extracts, 5ml of 0.5M potassium hydroxide was added and mixed properly. Then 6 drops of acetic acid were added, followed by 2ml of toluene. The upper layer was decanted into another test tube and 2ml of 0.5M potassium hydroxide was added. A change in color of the mixture was an indication of absence of anthranoids.

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Test for anthraquinones
Five milliliters (5ml) of 10% ammonia was added to 2ml of each of the extract and was shaken vigorously. Two milliliters (2ml) of benzene was added thereafter. A colour change was an indication of a positive test (presence of anthraquinone), while none was an indication of absence of anthraquinones (Ekeleme et al., 2017)

Test for phenols
The method according to Ekeleme et al. (2017) was employed. Five milliliters (5ml) of each of the extracts were mixed with 8ml of distilled water in a test tube, and 6ml of ferric chloride was added to the mixture. A colour change to light brown was an indication of presence of phenols, while no change indicated absence of phenols.

Test for alkaloids
Five milliliters (5ml) of 1% aqueous hydrochloric acid was added to 2ml of each of the extracts in a beaker, this was placed in a water bath for 3 minutes and thereafter 3 drops of Mayer's reagent was added (Ekeleme et al., 2017). a white precipitate was an indication of a positive test while none indicated a negative test.

Test for tannins
The method according to Ekeleme et. (2017) was employed for this test. Two milliliters (2ml) of 1% ferric chloride was added to 1ml of each of the extracts in a beaker. A colour change was an indication of presence of tannis while none was a negative result.

Test or phlobatannins
One percent (1%) aqueous hydrochloric acid was added to 2ml of each of the extracts in a beaker and boiled. The presence of white precipitate was an indication of presence of phlobatannins while none was a negative result (Ekeleme et al., 2017).

Test for cardiac glycosides
The method described by Ekeleme et al. (2017) was employed. Two milliliters (2ml) of chloroform was added to 1ml of extracts in a beaker, then 2ml of concentrated tetraoxosulphate (VI) acid was added to form a lower layer. A reddish brown colour at the inter phase was an indication of presence of cardiac glycosides while none was an indication of absence.

Results
Table 1. showed the antioxidative properties of soursop leaf and cashew nut extracts. The anti-oxidative properties of leaf and nut extracts were analyzed by the 2,2-diphenyl-1-picryhydrazyl (DPPH) assays. The ethanol extract of soursop leaf had antioxidant activity by scavenging DPPH radical with IC_{50} of 141,127 µg/mL. The cashew nut extract showed that ethanolic extracts had higher antioxidant activity and total phenolic content.

Table 2. showed the phytochemical properties of the soursop leaf and cashew nut extracts. The presence of anthranoids, phenols, cardiac glycosides and alkaloids were detected with soursop leaf extract while the presence of anthranoids, anthraquinones, phenols, alkaloids and cardiac glycosides were detected in the cashew nut extract.

Table 1: Antioxidative properties of Ethanolic Extract of Sour Sop Leaf and cashew nut.

Plants extracts	Results (µg/ml)
Soursop	141,127
Cashew nut	132,312

Table 2: Phytochemical constituents of soursop leaf and cashew nut extracts

Phytochemicals	Plants/Results	
	Soursop leaf	Cashew nut
Saponins	-	-
Anthranoids	+	+
Phenols	+	+
Anthraquinones	-	+
Alkaloids	-	-
Tannins	-	-
Phlobatannins	-	-

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Cardiac glycosides	+	+

Key: + = Presence of phytochemicals - = Absence of phytochemicals

Discussion

The search for antimicrobial from natural sources has received much attention and efforts have been put in to identify compounds that can act as suitable antimicrobial agent to replace synthetic ones. This study evaluated the anti-oxidative and phytochemical properties of ethanoic extract of soursop leaf and cashew nut. Table 1 showed the anti-oxidative properties of soursop leaf and cashew nut extracts. The anti-oxidative properties of leaf and nut extracts were analyzed by the 2,2-diphenyl-1-picryhydrazyl (DPPH) assays. The ethanol extract of soursop leaf had antioxidant activity by scavenging DPPH radical with IC_{50} of 141,127 µg/mL. The cashew nut extract showed that ethanolic extracts had higher antioxidant activity and total phenolic content.

The parameters showed antioxidant activity of *A. muricata* L. leaf extract that were inhibitor concentration (IC50), which was the concentration of sample solution needed to inhibit 50% of DPPH free radicals (Andayani et al., 2008). if the antioxidant activity was higher, the IC_{50} value would be smaller. The IC_{50} value of *A. muricata* L. leaf extract and the comparative solution in the form of vitamin C were 141.127µg/mL and 2.597 µg/mL respectively. The intensity of antioxidant activity of *A. muricata* l. leaf extract included moderate antioxidants. While the positive control (comparative) namely vitamin c has the intensity of the ability of strong antioxidant activity. Where a compound was said to be an antioxidant was very strong if the IC_{50} value is less than 50µg/mL, strong antioxidant if the IC_{50} value was 50-100µg/mL, moderate antioxidant if the IC_{50} value was 100-150µg/mL. And the antioxidant is weak if the IC_{50} is more than 150µg/mL (Hassim et al., 2015).

Conclusion

The results of this study have shown that cashew nut and soursop leaf extract have important phytochemical constituents. The anti-oxidative properties of ethanoic extract antioxidant activity by scavenging DPPH radical. The results indicated that the cashew nut and soursop leaf extracts have the potential to be used as an antibacterial and anti-fungal agent for the further application.

Recommendations

1. There should be further studies on the antimicrobial properties of these plant extracts in order justify their anti-oxidative and phytochemical properties.
2. There is therefore need to consider this plant in alternative medicine for the treatment of infectious diseases in humans.

References

Abba, C. C., Eze, P. M., Abonyi, D. O., Nwachukwu, C. U., Proksch, P., Okoye, F. B. C., & Eboka, C. J. (2018). Phenolic compounds from endophytic Pseudofusicoccum sp. isolated from Annona muricata. Tropical Journal of Natural Product Research, 2(7), 332–337. https://doi.org/10.26538/tjnpr/v2i7.6

Andayani, R., Lisawati, Y., & Maimunah. (2008). Determination of antioxidant activity, total phenolic and lycopene content in tomato (Solanum lycopersicum L.). *Jurnal Sains dan Teknologi Farmasi*, *13*(1), 31–37.

Balaguera-López, H. E., & Fischer, G. (2024). *Environmental conditions during preharvest influence bioactive compounds in fruits: A review with emphasis on tropical and subtropical species*. **Agronomía Colombiana, 42**(3). https://doi.org/10.15446/agron.colomb.v42n3.116951

Brand-Williams, W., Cuvelier, M. E., & Berset, C. (1995). *Use of a free radical method to evaluate antioxidant activity*. *LWT – Food Science and Technology, 28*(1), 25–30. https://doi.org/10.1016/S0023-6438(95)80008-5

Chan, W.-J. J., McLachlan, A. J., Hanrahan, J. R., & Harnett, J. E. (2020). The safety and tolerability of Annona muricata leaf extract: A systematic review. Journal of Pharmacy and Pharmacology, 72(1), 1–16. https://doi.org/10.1111/jphp.13182

Cheesbrough, M. (2010). *District laboratory practice in tropical countries* (2nd ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511581304

Ekeleme, K., Tsaku, P., Nkene, I., Ufomadu, U., Abimiku, R., Oti, V., & Sidi, M. (2017). Phytochemical analysis and antibacterial activity of Psidium guajava L. leaf extracts. GSC Biological and Pharmaceutical Sciences, 1(2), 13–19. https://doi.org/10.30574/gscbps.2017.1.2.0024

Hassim, N., Markom, M., Anuar, N., Dewi, K. H., Baharum, S. N., & Mohd Noor, N. (2015). Antioxidant and antibacterial assays on *Polygonum minus* extracts: Different extraction methods. *International Journal of Chemical Engineering*, *2015*, 1–9. https://doi.org/10.1155/2015/826709

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Justino, A. B., Miranda, N. C., Franco, R. R., Martins, M. M., da Silva, N. M., & Espindola, F. S. (2018). Annona muricata Linn. leaf as a source of antioxidant compounds with in vitro antidiabetic potential. Biomedicine & Pharmacotherapy, 100, 83–92. https://doi.org/10.1016/j.biopha.2018.01.172

Lannuzel, A., Michel, P. P., Höglinger, G. U., Champy, P., Jousset, A., Medja, F., Lombès, A., Darios, F., Gleye, C., Laurens, A., Hocquemiller, R., Hirsch, E. C., & Ruberg, M. (2003). The mitochondrial complex I inhibitor annonacin is toxic to mesencephalic dopaminergic neurons by impairment of energy metabolism. Neuroscience, 121(2), 287–296. https://doi.org/10.1016/S0306-4522(03)00441-X

Matsushige, A., Kotake, Y., Matsunami, K., Otsuka, H., Ohta, S., & Takeda, Y. (2012). Annonamine, a new aporphine alkaloid from the leaves of Annona muricata. Chemical & Pharmaceutical Bulletin, 60(2), 257–259. https://doi.org/10.1248/cpb.60.257

Nge, F. J., Chaowasku, T., Damthongdee, A., Wiya, C., Soulé, V. R. C., Rodrigues-Vaz, C., & Couvreur, T. L. P. (2024). Complete genus-level phylogenomics and new subtribal classification of the pantropical plant family Annonaceae. TAXON, 73(6), 1341–1369. https://doi.org/10.1002/tax.13260

Rubio-Melgarejo, A., Balois-Morales, R., Apatzingan Palomino-Hermosillo, Y., López-Guzmán, G. G., Ramírez-Ramírez, J. C., Cervantes-García, E., Villalobos-Rosario, B. J., & Bautista-Rosales, P. U. (2020). Phytochemical and antioxidant dynamics of the soursop fruit (Annona muricata L.) in response to Colletotrichum spp. Journal of Food Quality, 2020, Article ID 3180634, 1–12. https://doi.org/10.1155/2020/3180634

Tafinta, I. Y., Okoye, N. H., Batagarawa, U. S., Hamma, I. I., & Abubakar, M. (2020). Phytochemical screening and antifungal activities of cashew (Anacardium occidentale Linn.) leaves extract on some fungal isolates. Asian Plant Research Journal, 5(3), 30–37. https://doi.org/10.9734/aprj/2020/v5i330108

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