Journal of Advanced Zoology
ISSN: 0253-7214
Volume 45 Issue 2 Year 2024 Page 1321:1325

Invitro Hydrogen Peroxide Radical Scavenging Activity Of *Annona muricata* L. Fruit Using Various Solvent Extracts.

Jerin Asha T[1*], Medo Merina R[2] and Bojaxa A Rosy[3]

[1]19223042262017, Ph.D Research Scholar, Department of Botany and Research Centre, Holy Cross College (Autonomous), Nagercoil, Tamil Nadu, India.*
[2] Assistant Professor, Department of Botany and Research Centre, Women's Christian College, Nagercoil, Tamil Nadu, India.
[3] Assistant Professor, Department of Botany and Research Centre, Holy Cross College (Autonomous), Nagercoil, Tamil Nadu, India.

***Corresponding Author** Jerin Asha T*
**19223042262017, Ph.D Research Scholar, Department of Botany and Research Centre, Holy Cross College (Autonomous), Nagercoil, Tamil Nadu, India. E-mail ID :aknaths.thileeban@gmail.com Affiliated to Manonmanium Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India.*

Abstract

The main objective of the present study is to spot light the antioxidant activity of *Annona muricata* L. in ethanol and ethyl acetate extracts. The invitro antioxidant activity was determined by hydrogen peroxide radical scavenging methods with various concentrations. In ethanol extract, the epicarp showed 102.155 µg/ml and the mesocarp showed 125.174 µg/ml. In ethyl acetate, the epicarp showed 133.606 µg/ml and the mesocarp showed 168.159 µg/ml. The results clearly indicated that IC_{50} value of the ethanol extract on epicarp showed the higher radical scavenging activity of 102.155 µg/ml than the mesocarp that indicated the value of 125.174 µg/ml. It also shown that the radical scavenging activity of ethanol extract is higher than the ethyl acetate extract. From the present study, it is clear that the antioxidant rich *Annona muricata* fruit possess anticancer activity and may leads to a promising effect in pharmacological drug discovery.

Keywords: Activity, Antioxidants, Inhibition, Scavenging, Pharmocognosy.

INTRODUCTION

An antioxidant is any substance which is capable of delaying and preventing the oxidative damage of lipids, protein and nucleic acids by reactive oxygen species (Lim *et al*., 2007). Reactive oxygen species (ROS) are free radicals, which derived either from normal metabolic processes or from external sources (Magalhaes *et al*., 2006). To neutralize the increase in free radicals and to protect the cells from the toxic effects antioxidants are produced. These antioxidants prevent diseases such as cancer, neurodegenerative disease, cardiovascular disease and metabolic disease (Winarsi, 2007).

The antioxidants from outside the body such as flavonoids, vitamin A, vitamin C and vitamin E are needed to suppress the oxidative stress in a healthier way. If the amount of free radicals in body is excessive which leads to oxidative damage. The human body needs antioxidant to ward off free radicals (Sayuti & Yenrina, 2015). In a pathological condition, the antioxidant system can be overwhelmed, which causes an imbalance between oxidants and antioxidants. In those cases, the human body needs an exogenous antioxidant to help ward off free radicals. Therefore, current research of exogenous natural antioxidants focuses on plants (Briben, 2012).

The soursop (*Annona muricata* L.) is considered a good source of natural antioxidants, and all parts of the fruit are used in traditional folk medicine (Baskar *et al*., 2007). The different parts of soursop (leaf, bark, root, fruit, and seed) are used in traditional medicine against several ailments including hypertension, inflammation, diabetes, gastrointestinal disorders, respiratory diseases, and cancers [Coria-Tellez *et al*., 2018; Chamcheu *et al*., 2018].

So the main objective of this work is improvise the health benefits of the people by analyse the hydrogen peroxide radical scavenging activity of epicarp and mesocarp of *Annona muricata* L. fruit. This work opens a new gateway for further relevant research.

MATERIALS AND METHODS

Collection and authentication of plant material

Fresh fruit of *Annona muricata* were collected from Thittuvilai (near Western Ghats), Kanyakumari District, Tamilnadu and were authenticated by experts. The fruit epicarp (peel) and mesocarp (pulp) were separated from the seeds and air-dried at room temperature (24ºc). Then it was crushed into fine powders and stored in air tight bottle and kept in a refrigerator.

Solvent extraction

The stored fine powder was used for extraction. The solvent used for extraction was ethanol & ethyl acetate and the solvent extraction was carried out using standard method (Selvakumar *et al*., 2019). The extracts were stored in refrigerator for further use.

Hydrogen peroxide radical scavenging activity:

The antioxidant activity of *Annona muricata* L. Fruit parts were studied by Hydrogen peroxide radical scavenging activity (Nabavi *et al*., 2008). The scavenging percentage was calculated according to the following formula:

Scavenging effect (%) = [(control OD−sample OD)/ (control OD)] ×100

RESULT AND DISCUSSION

The fruit parts of *Annona muricata* L. such as epicarp and mesocarp were analysed for its antioxidant potential. Ascorbic acid was used as the standard. The epicarp and mesocarp showed the significant percentage of radical scavenging activity. Orak *et al*. (2019) also previously carried out the antioxidant activity on fruit of *Annona muricata* using various solvent extracts which showed remarkable antioxidant activity.

Various concentrations of ethanol and ethyl acetate extracts were used. The results are reported in Tab. 1-3 & Fig. 1-3. The fruit parts like epicarp and mesocarp showed the inhibitory activity in all the concentrations (100 µg/ml, 200 µg/ml, 300 µg/ml). The 300 µg/ml concentration of sample extracts showed maximum inhibitory activity. It is similar to the work done by Hasmila *et al*. (2019) which showed that an increasing concentration of solvent extract increases the radical scavenging activity due to water concentration, varying polarity and extraction time.

The ethanol extract of epicarp showed 68.025 ± 3.258 percentage of radical scavenging activity is and in mesocarp it was 62.181 ± 0.178. In ethyl acetate extract of epicarp, the percentage of radical scavenging was

68.653 ± 0.509 and in mesocarp it was 67.905 ± 0.24. The radical scavenging activity was more in epicarp than the mesocarp is similar to the result of Akomolafe & Ajayi (2015) where the scavenging ability of the peel was higher than the pulp.

In ethanol extract, the epicarp showed IC_{50} value of 02.155 µg/ml and the mesocarp showed 125.174 µg/ml. In ethyl acetate extract, the epicarp showed IC_{50} value of 133.606 µg/ml and the mesocarp showed 168.159 µg/ml. From the results of the present study using ethanol and ethyl acetate extracts, it was found that the ethanol extract was highly effective than the ethyl acetate. It is similar to the report of Tejaputri *et al*. (2019). Qorina *et al*. (2019) also proposed that the *Annona muricata* fruit parts (epicarp and mesocarp) showed highest radical scavenging activity in ethanol extract than ethyl acetate due to its polarity. Therefore, an ethanolic extract of *Annona muricata* could be developed as the next promising natural antioxidant source.

The bioactive compounds such as flavonoids, phenolic compounds, tannins, vitamins and biological stress might be responsible for radical scavenging effects and made variation in inhibition potential (Adefegha *et al*., 2015). So the result suggest that the phytoconstituents present in the fruit extracts shows variation in its antioxidant activity and the epicarp was more effective than mesoacarp. This initiates a new opening for new research discovery of various therapeutic drugs.

Table.1 – Radical scavenging percentage of fruit in various concentration of ethanol extracts

Concentration	Sample	
	Epicarp	Mesocarp
100 µg/ ml	50.485 ± 1.272	45.54 ± 0.272
200 µg/ ml	57.233 ± 2.888	54.59 ± 1.018
300 µg/ m	68.025 ± 3.258	62.181 ± 0.178

Figure.1 – Radical scavenging percentage of fruit in various concentration of ethanol extracts

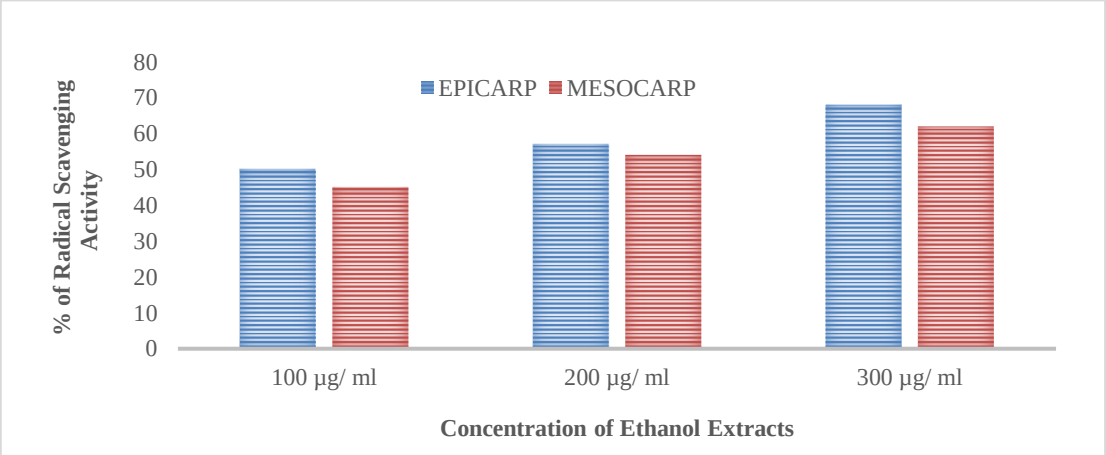


Table.2 –Radical scavenging percentage of fruit in various concentration of ethyl acetate extracts

Concentration	Sample	
	Epicarp	Mesocarp
100 µg/ ml	54.854 ± 0.9	38.607 ± 0.224
200 µg/ ml	64.965 ± 0.912	57.481 ± 1.236
300 µg/ ml	68.653 ± 0.509	67.905 ± 0.24

Figure.2 –Radical scavenging percentage of fruit in various concentration of ethyl acetate extracts

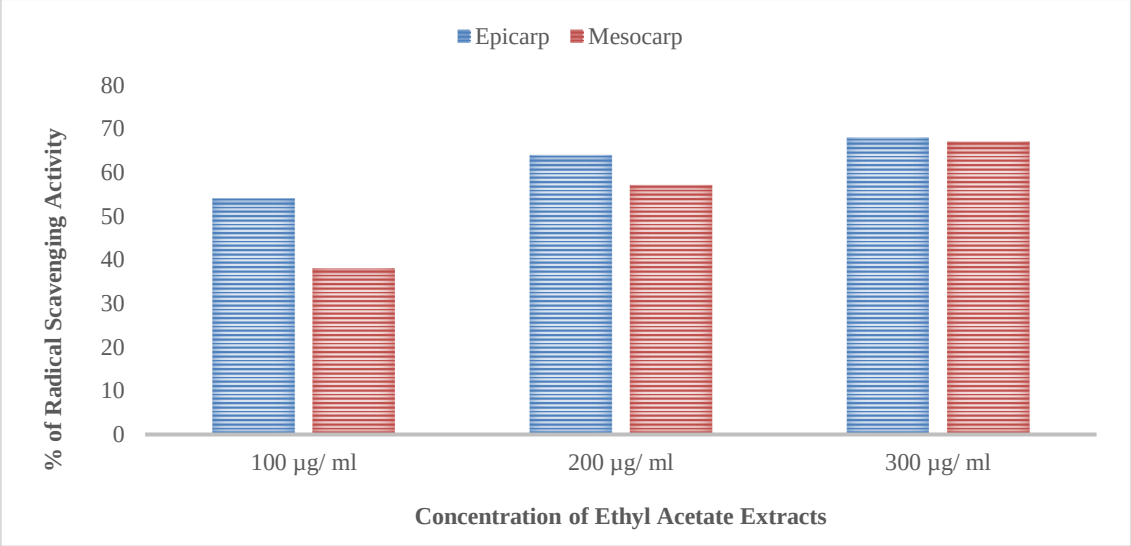
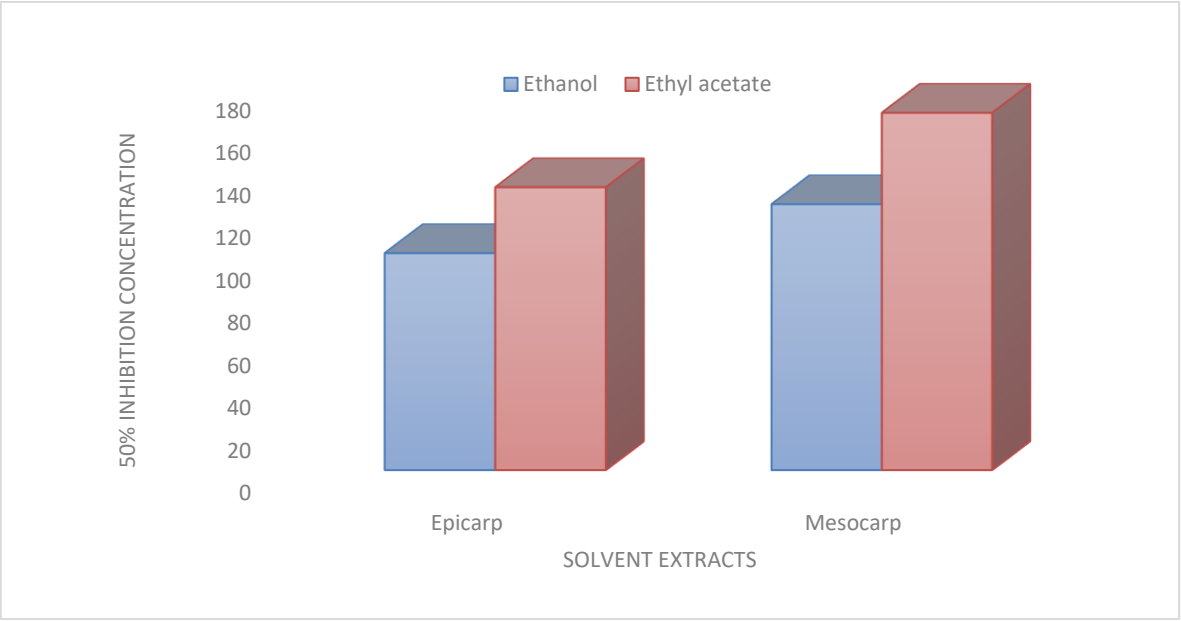


Table. 3- 50% Inhibition concentration of *Annona muricata* fruit in various solvent extracts.

Sample	IC_{50} Value	
	Epicarp	Mesocarp
Ethanol	102.155	125.174
Ethyl acetate	133.606	168.159

Table. 3- 50% Inhibition concentration of *Annona muricata* fruit in various solvent extracts.



CONCLUSION

The experiment results obtained from the study proved that the epicarp of *Annona muricata* plant extracts plays an important role in antioxidant activity which leads to the discovery of new pharmaceutical drugs for treating various ailments.

ACKNOWLEDGEMENT

The authors wish to thank Manonmanium Sundaranar University, Abishekapatti, Tirunelveli – 627012, Tamil Nadu, India.

REFERENCES

1. Adefegha, S A, Oyeleye, S I and Oboh, G, 2015, 'Distribution of phenolic contents, antidiabetic potentials, antihypertensive properties and antioxidative effects of soursop (*Annona muricata* L.) fruit parts invitro', Biochemistry Research International, Article ID 347673, pp.8.
2. Akomolafe, S F and Ajayi, O B, 2015, 'A comparative study on antioxidant properties, proximate and mineral compositions of the peel and pulp of ripe *Annona muricata* (L.) fruit', International Food Research Journal, vol. 22, no.6, pp. 2381-2388.
3. Baskar, R, Rajeswari, V and Kumar, T S, 2007, 'In vitro antioxidant studies in leaves of *Annona* species', Indian Journal of Experimental Biology, no. 45, pp. 480-485.
4. Birben E, Sahiner UM, Sackesen C, Erzurum S, Kalayci O. 2012, Oxidative stress and antioxidant defense. World Allergy Organ Journal, vol.5, pp. 9–19.
5. Chamcheu, J C, Roy, T, Uddin, M B, Banang-Mbeumi, S, Chamcheu, R N, Walker, A L, Liu, Y and Huang, S, 2019, 'Role and therapeutic targeting of the pi3k/akt/mtor signaling pathway in skin cancer: A review of current status and future trends on natural and synthetic agents therapy', MDPI, vol. 8, no. 8, pp. 803.
6. Coria-Tellez, A, Montalvo-Gonzalez, E, Yahia, E, Obledo-Vazquez, E, 2018, '*Annona muricata*: a comprehensive review on its traditional medicinal uses, phytochemicals, pharmacological activities, mechanisms of action and toxicity', Arabian Journal of Chemistry, vol.11, no. 5, pp. 662–691.
7. Halliwell B and Arnoma O L, 1987, 'The Deoxyribose method: A simple test tube assay for the determination of rate constant for reaction of hydroxyl radical', Analytical Biochemistry, pp.165 – 215.
8. Hasmila, I, Natsir, H and Soekamto, N H, 2019, 'Phytochemical analysis and antioxidant activity of soursop leaf extract (*Annona muricata* Linn.)', Journal of Physics: Conference Series, doi:10.1088/1742-6596/1341/3/032027.
9. Lim, Y Y, Lim, T T and Tee, J J, 2007, 'Antioxidant properties of several tropical fruits. A comparative study', Food Chemistry, vol. 103, pp. 1003–1008.
10. Magalhaes, L M, Segundo, M A, Reis, S, Lima, J L F C and Rangel, A O S S, 2006, 'Automatic method for determination of folin- ciocalteu reducing capacity in food products', Journal Of Agricultural And Food Chemistry, vol. 54, pp. 5241–5246.
11. Nabavi, S, M, Ebrahimzadeh, M, A, Nabavi, S, F and Jafari, M, 2008, 'Free radical scavenging activity and antioxidant capacity of *Eryngium caucasicum* Trautv. and *Froripia subpinnata'*, Pharmacognosy Magazine, vol. 4, no.18, pp. 123- 127.
12. Orak, H H, Bahrisefit, I S, Sabudak, T, 2019, 'Antioxidant Activity of Extracts of Soursop (*Annona muricata* L.) Leaves, Fruit Pulps, Peels, and Seeds', Polish Journal of Food and Nutrition Sciences', vol. 69, no. 4, pp. 359–366.
13. Qorina, F, Arsianti, A, Firthotunnisa, Q and Tejaputri, N A, 2019, 'Phytochemistry and Antioxidant Activity of Soursop (*Annona muricata*) Leaves', International Journal of Applied Pharmaceutical, vol. 11, no. 6, pp. 1-6.
14. Sayuti, K and Yenrina, R, 2015. Natural and Synthetic Antioxidants. Andalas University Press: Padang.
15. Selvakumar, S, Vimalanban, S, Balakrishnan, G 2019, 'Quantitative determination of phytochemical constituents from *Anisomeles malabarica*' MOJ Bioequivalence and Bioavailability, vol. 6, no. 2, pp. 19-21.
16. Tejaputri, N A, Arsianti, A, Qorina, F and Firthotunnisa, Q, 2019, 'Phytochemical Analysis and Antioxidant Properties by DPPH Radical Scavenging Activity of *Ruellia brittoniana* Flower', vol.11, no.6, pp.24-28.
17. Winarsi, H, 2007. Natural Antioxidants and Free Radicals. Kanisiusm: Yogyakarta.