IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

STUDY OF ANTIOXIDANT ACTIVITY OF CUSTARD APPLE (Annona reticulate) PEEL EXTRACTS OF JHARKHAND

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ABSTRACT:

Custard apple Annona reticulata can be called as a delicacy of dry region due to its very sweet delicate flesh. The peel of custard apple contains tannins, actogenin and alkaloids which is beneficial in the treatment of several types of diseases such as dy sentry, Cardiac problem, fainting, worm infections, constipation, hemorrhage dysuria, fever and Several types of cancer and tumor.

Present study was taken up to investigate / study of antioxidant activity of the fruit peel of custard apple. The antioxidant property of the Peel extract was evaluated using DPPH assay free radical scavenging and FRAP assay The research suggested here may use of raw fruits peel extracts possesses antioxidant and is therefore a major potential source of ingredients for the food and Pharmaceutical industry.

Key Words : Custard apple (Annona reticulata), Antioxidant, DPPH assay and FRAP assay.

INTRODUCTION :-

The custard apple of India, the Sitaphal or sugar apple is the one of the finest fruits introduced from tropical America in India and found in many parts of the country including Jharkhand. The custard apple fruit is rich in Carbohydrate mainly in form of sugar approx. 24%, protein 1.5% and others important forms Iron, phosphorus, Calcium etc one found in good quantity. The peel of custard apple is utilized for making herbal supplements product Due to above chemical composition functions as natural preferences for meals ingredients and influences on human fitness primary based on their antioxidant characteristics. Moreover, Scientific plant life play an important and critical function in health protection and Care global 1-7. Custard apple is very hardy and drought resistant crop and can be grown in undulated, marshy and problematic soil[8] Fruit contains minerals, vitamins, Sugar and Several bioactive compounds. Exploration of bioactive compounds such as phenols, antioxidants,

Vitamins and Certain other flavonoids from fruits has been attempted[9]. The bioactive compounds especially antioxidants can scavenge the free radicals and product the cells from oxidation and Custard apple is rich in Aox properties thus can be used as potential source of pharmaceutical industry.

Antioxidants play an essential position in the human Safety body against free radical disorders acting as radical scavengers. phenolics belongs to a type of chemical Compounds including simple phenols and polyphenols. polyphenols can limit and forestall damage to the human body due to free radicals promote. flavonoids can produce mechanisms that may additionally inhibit invasion and kill tumor cells.

The present Study was taken up to investigate the antioxidants activity of fruit peel of custard apple and thereby pave way for indirect waste management by transforming these wasts into a health resource The importance of food Sustainability and to increase the sustainability of food systems by making use of the custard apple peel (waste) that is taken for the study.

MATERIALS AND METHODS:

The mature, freshly harvested, uniform size and quality fruits of custard apple was purchased from Balidih Market of Jamshedpur, Jharkhand, India and free from insect pest etc. The peel was manually Separated and dried at room temperature 30°c for one days. The dried peel was Subjected to grinding and make fine powder of feel.

EXTRACTION BY SOXHLET APPARATUS:

The 500g dried powder was taken in soxhlet in three Solvent hexane, methanol and ethanol respectively for one day. The solvent was filtered using Whitman NO 42 filter paper. The collected Solvents were evaporated using rotary Eva-pour.

QUANTITATIVE ANALYSIS OF ANTIOXIDANT ACTIVTIES :

The antioxidant activity of the different Solvent extracts of custard apple peel was evaluated by DPPH free radical and superoxide onion radical Scavenging assays and isolated fractions were father evaluated by other antioxidant parameters like FRAP assay, Nitric oxide Scavenging assay and hydrogen peroxide Scavenging assay.

Application of DPPH :

Determination of 2,2-diphenyl -1- picrylhydrazyl (DPPH) free radical Scavenging activity, free radical scavenging activing of different solvent extracts was measured by using DPPH by the method described by 10. Absorbance Control/reference material and Sample was measured at 517 nm using UV visible spectrophotometer (Elico, India), against a blank Sample.

Aso Ascorbic acid (2 to 16 g ml-1) was used as positive Control[11]

The percentage inhibition was determined by comparing the results of the test and the control. percentage of inhibition was Calculated using the formula.

$$\text{inhibition \%} = \frac{\text{(Absorbance of Centro - Absorbance of sample)}}{\text{Absorbance of Control}} \times 100$$

Application of FRAP (Ferric Reducing Antioxidant Powder)

The reducing ability of different solvent extracts and fractions of the custard apple peel was determined by FRAP assay[12]. FRAP assay is based on the ability of antioxidants to reduce fe^{3+} to fe^{2+} in the presence of TPTZ, forming an intense blue fe^{2+} TPTZ complex with an absorption maximum at 593 nm. This reaction is pH dependent - (optimum pH 3.6) 0.1 ml extracted is added to 3.0 ml FRAP regent[11] parts 300 mM sodium acetate buffer at pH 3.6, 1 part 10 mm TPTZ (2,4,6- tripyridy) –S-triazine) in 40 mm HCl and 1 part 20 mm $fecl_3$. and the reaction mixture is incubated at 35 c for 15 minutes and then the absorbance was measured at 593 nm.

$FeSO_4$ (100 to 1000 ṵm -1) was used as a positive control. The antioxidant capacity based on ability to reduce ferric ions of Sample was calculated from the linear Calibration Curve and expressed as M $feSo_4$ equivalents per gram of extracted compound.

RESULT AND DISCUSSION :

Table - 1 Quantitative antioxidant Study of Custard apple (Annona reticulate) peel using DPPH assay

Solvent	Time in minutes						
	0	5	10	15	20	25	30
Ethanol	0.33	0.07	0.07	0.07	0.07	0.07	0.07
Petroleum ether	0.83	0.76	0.76	0.76	0.76	0.76	0.76
Ace lone	0.36	0.06	0.05	0.05	0.05	0.05	0.05
Chloroform	0.78	0.68	0.65	0.65	0.64	0.64	0.62
Aqueous	0.18	0.13	0.13	0.13	0.13	0.13	0.13

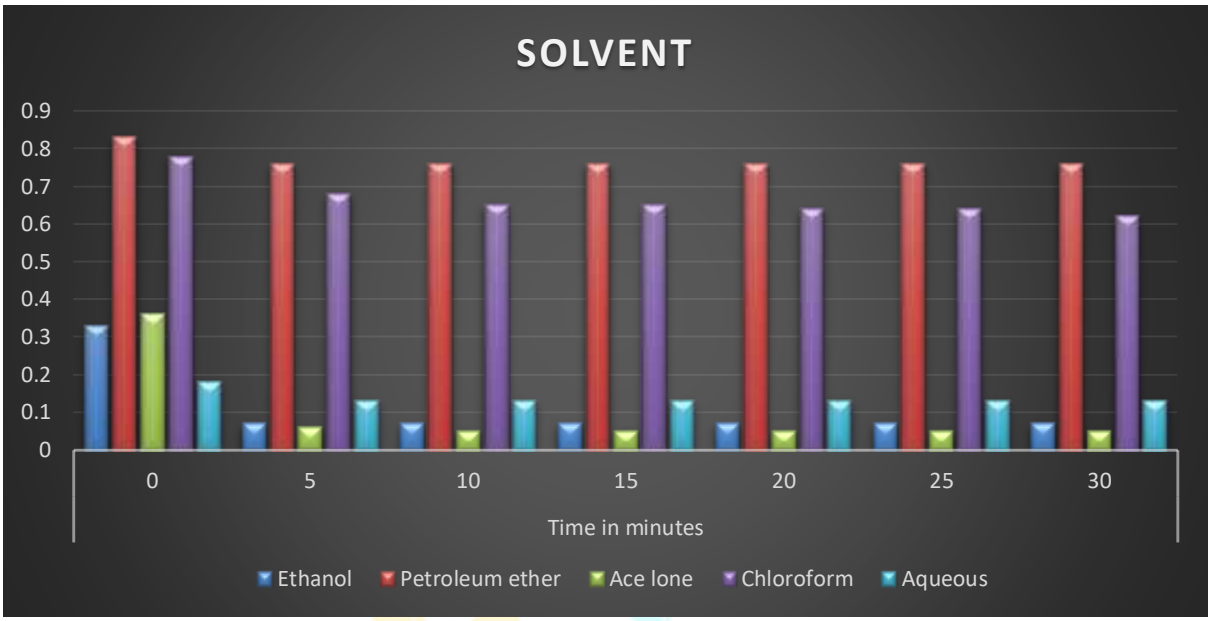

Table – 2

Activity of FRAP

Particulars	B	S-1	S-2	S-3	S-4	S-5	Acetone Extract
Working Standard		0.3	0.5	0.7	0.8	1.0	
Test Sample							0.4
	0.9	0.7	0.6	0.3	0.2		0.7
FRAP Request	0.5	0.5	0.5	0.5	0.5	0.5	0.5
OD at 765 nm	0.00	0.29	0.57	0.83	1.08	1.30	0.45
Concentration of the sample (mg/nm)							720

The result obtained from the DPPH assay illustrate a significant decrease in the Concentration of DPPH radical due to the scavenging ability of Standard Butylated Hydroxy Toluene (BHT). The Scavenging effect of the Standard on the DPPH radical decreased as table-1 and fig-1

The result obtained from this study shows that the acetone extract of the feel has highest radical scavenging activity- (720g/M $FeSo_4$ equivalents) as table 2.

CONCLUSION :

Annona reticula species are used for me preparation of medical products with high Value. Annona reticulate (Custard apple) peels investigated for antioxidant component and improve the health status of the consumer When consumed regularly. However, there is futher scope to elucidate the mechanism and regulatory processes at the genetic level, especial in minor fruits like Custard apple.

ACKNOWLEDGMENTS :

The authors are highly grateful to PG Department of chemistry Ranchi University ranchi and Sona Devi University- Jamshedpur for providing necessary facilities for the research.

References :

1. Tran TH, Ha LK, Nguyen DC, Dao TP, Nguyen PTN, Nguyen DH, et al. Processes. 2019;7:56.

2. Le VT, Bach LG, Pham TT, Le NTT, Ngoc UTP, Tran D-H N, et al. J Macromol Sci A; c2019.p. 1-7.

3. Dao TP, Nguyen DC, Nguyen DT, Tran TH, Nguyen PTN, Le NTH, et al. Asian J. Chem. 2019;31:977-981.

4. Tran TH, Nguyen PTN, Pham TN, Nguyen DC, Dao TP, Nguyen DT, et al. IOP Conf. Ser. Mater. Sci. Eng. 2019;479:012002.

5. Pham TN, Tran BP, Tran TH, Nguyen DC, Nguyen TNP, Nguyen TQ, et al. IOP Conf. Ser. Mater. Sci. Eng. 2019;479:012012.

6. Divya Sharma, Dr. Rati Mathur, Dr. Puneet Saxena. Study of significance of serum cystatin-C and vascular endothelial growth factor as an early marker of diabetic nephropathy in type 2 diabetes patients. Int. J Adv. Biochem. Res. 2021;5(1):09-11.

DOI: 10.33545/26174693.2021.v5.ila.57

7. Nguyen PM, Nguyen HA, Pham TLP, Bach LG. Res. on Crops. 2018;19:730-735.

8. Singh, S.P. 1992. Fruit crops for wastelands. Scientific Publishers, New Pali Road, Jodhpur-342001, India, 49-64

9. Chen, J., Y. Chen, and X. Li. 2011. Beneficial aspects of custard apple (Annona squamosa L.) seeds. Nuts and Seeds in Health and Disease Prevention. 439-445

10. Chang CJ and Mc Laughlin, J. L. Structure-activity relationships of diverse Annona ceousacetogenins against multi-drug resistant human mammary adenocarcinoma (MCF-7/Adr) cells. Journal Medical Chemistry. 1997; 40; 2102-2106.

11. George A, Broadley R, and Nissen, R. Preliminary review of the health and medicinal benefits of Annona spp. possible paths to commercialisation. A confidential report for the Australian Custard Apple Growers Association. (2006).

12. Alali, Liu, X and McLaughlin, J. L. Annonaceousacetogenins: recent progress. Journal of Natural. Products. 1999; 62: 504-540