Int J Pharma Res Health Sci. 2017; 5 (5): 1882-85
DOI:10.21276/ijprhs.2017.05.12
Devika and Parameswari
CODEN (USA)-IJPRUR, e-ISSN: 2348-6465

PHS Scientific House
PHARMAHEALTHSCIENCES

International Journal of Pharma Research and Health Sciences

Available online at www.pharmahealthsciences.net

Original Article

Evaluation of Bioactive Phytochemical Constituents from Sugarcane Bagasse

R Devika [1, *], P Parameswari [2]

[1]Department of Biotechnology, AarupadaiVeedu Institute of Technology, Paiyanoor, India
[2] Research scholar, Sathyabama University, Chennai, India.

ARTICLE INFO

Received: 16 Sep 2017
Accepted: 19 Oct 2017

ABSTRACT

Herbs are considered to be the backbone of traditional medicines from the immemorial time. India has 15 agroclimatic zones containing 1700- 18000 species of flowering plants out of which 6000-7000 are estimated to have medicinal usage in Ayurveda, Siddha, Unani and Homeopathy. In the present investigation, bagasse (Sugarcane waste fibre) has been analyzed for qualitative phytochemicals. About fifteen phytochemical analysis were conducted and recorded for their presences in three different solvents (Methanol, Ethanol and Chloroform). Carbohydrate, saponins, cardiac glycosides and steroids were recorded in all the three solvents. From the above investigation it was found that bagasse registered bioactive compounds like alkaloids, flavonoids, terpenoids, steroids, tannins, quinones etc. which proved that bagasse has high therapeutic value in near medical world.

Keywords: Bagasse, bioactive, phytochemicals, therapeutic, alkaloids, saponins.

1. INTRODUCTION

Plant origin biomolecules are known to have various applications in food commodities, plant protection, medicinal additives, antibiotic resistant etc[1]. Generally, the plants produces two types of metabolites (Primary and secondary), out which the secondary metabolites plays an important role and highly potential in the medicine from

Corresponding author *
R Devika
Department of Biotechnology, AarupadaiVeedu Institute of Technology, Paiyanoor, India
E-mail : vineethdevika@gmail.com

Hispanic era[2]. Globally, the traditional system of medicine has taken importance and the plant metabolites forms the basic source in the pharmaceutical industries[3,4]. About 25 years period prior to 2007, one half of the licensed drug were from plant based natural products[5]. The classification of secondary metabolites are on the basis of chemical structures, composition, solubility and the path of synthesis and they are categorized into three major groups[6]. *Ozaliscarniculata* Linn. is a medicinal herb and is known for its good appetizer, better for piles, dysentery, diarrhea and various skin diseases[7]. Artemisinin known for its antimalarial drug is abundant in *Artemisia annua* (0.5-1,16%) from the arial parts[8,9,10].

Saponins are steroids are highly known for its health beneficial effects such as enhancement of immunity, reduction in blood glucose, ant diabetic effects and reduction in blood cholesterol etc.[11,12]. The secondary metabolites such as phenols, terpenes, volatile oils, steroids, flavonoids, alkaloids, tannins etc. proved to be a natural antioxidants, inhibits oxidation of food and reduce the risk of age dependent diseases[13,14].*Tagetes* genus has a strong historic evidence for its religious and therapeutic values as astringent[15], epileptic fits[16] and cosmetics[17], food additives[18], pest control[19]. The essential oils extracted from cinnamom, thyme, clover, lavender, citral, geraniol, linalool, thymol are highly potent as antiseptic against microbes[20] and the oils are employed in number of ointment, creams and gels which have pain relieving capacities[21].

In the present investigation, the bagasse from sugarcane (*Saccharumofficinarum*) was identified for phytochemical analysis since the bagasse forms the raw material in paper industries and are found as waste in the road side. *Saccharumofficinarum*belongs to grass variety and it has originated from Southeast Asia and are cultivated from tropical and subtropical countries. The juice of sugarcane has a medicinal value in increasing the lactation in nursing mothers and it instantly energies in our body and provides strength keeping in mind the value of the species, the bagasse were subjected for qualitative phytochemical analysis.

2. MATERIALS AND METHODS

In the present investigation, the bagasse was collected from sugarcane juice shop (maintain hygienic). The bagasse was cut into very small pieces and was air dried for three weeks. The dried bagasse was ground into powder by using sterile electric blender. The powdered sample was stored in a air tight container for future investigations. The powdered bagasse was subjected to extraction with three different solvents (Methanol, chloroform and ethanol) and the extracts were stored in air tight bottles for further investigations.

Qualitative phytochemical analysis of the three solvents were carried out such as carbohydrates[21], tannins[22], saponins[23],Flavonoids[24], alkaloids [25], quinones[26], glycosides, cardiac glycosides, terpenoids [27], phenols and coumarins[26], steroids, phlobatannins and anthraquinone [27].

3. RESULTS AND DISCUSSION

The powdered bagasse was subjected to extraction with three different solvents like methanol, ethanol and chloroform. After a period of incubation the extracts where filtered with Whatman filter paper and the pure crude extracts were stored in different air tight containers and stored for further investigations. A known amount of the extracts weretaken in test tubes and was subjected to qualitative phytochemical analysis and the presence of them are tabulated in the Table1.In the present investigation it was found that the waste bagasse is found to have phytochemicals (secondary metabolites) and confirms that the bagasse can be used for medicinal investigations after clinical trailand isolation of particular components from the waste. From the above investigation it was found that all the three solvents recorded positive results for carbohydrates, cardiac glycosides and saponins.

The chloroform solvent was found to be less effective than the other two solvents. The tannins, alkaloids, cardiac glycosides and phenols showed positive results in the chloroform extracts. In both ethanol and methanol extracts showed common presence of phytochemicals throughout the study. The phytochemicals registered in methanol and ethanol were carbohydrate, saponins, flavonoids, cardiac glycosides, terpenoids, coumarins and steroids. Coumarins are found to be the precursor in the synthesis of anticoagulant[28], as edema modifier[29] and even they act as vitamin K antagonists[30]. Terprnoids are evidence of anti cancer properties and maintenance of oxidation / antioxidation balance[20].Cardiac glycosides are found in all the three solvents which indicates that the bagasse can be utilized for the treatment of cardiac failure and it also inhibits the sodium potassium pump by stabilizing E2-P transition state[31].The bioactive alkaloids can be employed in the treatment of ear inflammation[32], antihelminthic and carminative [33].

Table 1: Qualitative phytochemical analysis of Bagasse

S.No	PHYTOCHEMICALS	SUGARCANE BAGASSE		
		Methanol	Ethanol	Chloroform
1.	Carbohydrates	+	+	+
2.	Tannins	-	-	+
3.	Saponins	+	+	+
4.	Flavonoids	+	+	-
5.	Alkoloids	+	-	-
6.	Quinones	+	+	-
7.	Glycosides	-	-	-
8.	Cardioglycosides	+	+	+
9.	Terpenoids	+	+	-
10.	Phenols	-	-	+
11.	Coumarins	+	+	-
12.	Proteins	-	+	+
13.	Steroids	+	+	+
14.	Phylobatannins	-	-	-
15.	Anthraquinones	-	-	-

4. CONCLUSION

From the present investigation it has been revealed that a waste bagasse can be recycled for the isolation of bioactive constituents of the high therapeutic value. Further investigation in terms of specific phytochemical and in depth study with the cell lines will prove that the waste bagasse can be reused for human welfare which will pave a way for less cost medicine in near future.

5. REFERENCES

1. M P Raghavendra, S Satish and K A Raveesha.. Phytochemical analysis and antibacterial activity of *Oxalis corniculata*a known medicinal plant. myScience,2006; 1(1): 72-78.
2. Gwi-Teak Jeong and Don Hee Park. Enhancement of growth and secondary metabolite biosynthesis. Effect of elicitors derived from plants and insects. Biotechnology and Bioprocess Engineering.2005; 10: 73-77.
3. R Devika and Justin Koilpillai. An overview on plant secondary metabolites: Its medicinal importance. Journal of Pharmacy Research. 2012; 5(2): 984-986.
4. R S Ramchandra and G A Ravishankar. Plant cell cultures chemical factories of secondary metabolites. Biotechnology Advances,2002; 20: 101-153.
5. David O Kennedy and L Emma Wightman. Herbal extracts and phytochemicals: Plant secondary metabolites and the enhancement of human brain function. Plant Physiology. 2001; 126: 485-493.
6. Bidlack and Wayne R. Phytochemicals as bioactive agents. Lancester PA. Technomic Publishers.2000.
7. Kirtikar and Basu. Indian medicinal plants. 3rd edition. M.S. Periodical experts. New Delhi.1975; 32(1): 437-443.
8. Mohammad Yaseen Khan, Saleh Aliabbas, Vimal Kumar and ShaliniRajkumar. Recent advances in medicinal plant biotechnology. Indian Journal of Biotechnology. 2009; 8: 9-12.
9. J C Laughlia. Agricultural production of Artemisia in A Review. Trans R Soc Trop Med Hyg. 1994; 88: S21-S22.
10. T E Wallart, Pras N, Beekman AC and Quax W J. Seasonal variations of artimisinin and its biosynthetic precursors in plants of *Artimisiaannua*of different geographical origin. Proof for the existence of chemtypes. Planta Med. 2000; 66: 2237-2242.
11. H P S Makkar, T Norvsambuu, S Lkhavatseran, K Beeker. Plant secondary metabolites in some medicinal plants of Mongolia used for enhancing animal health and production. Tropicultura.2009; 27(3): 159-167.
12. G Francis, Z Kerem, H P S Makkar, K Becker. The biological action of saponins in animal systems-A review. British Journal of Nutrition, 2002; 88: 587-605.
13. M Abdul Halim. The use of plants in traditional health carte practice of the shaiji community in Southwestern Bangladesh. Journal of Tropical Forest Science. 2007; 19(3): 168-175.
14. J G Pausas and M Austin. Patterns of plant of plant species richness in relation to different environment: An Appriasal. Journal of Vegetation Science. 2001; 12 153-166.
15. FarjanaNikkon, Insecticidal activity of flower of *Tageteserecta L*. against *Triboliumcastaneum* (Herbst.). Research Journal of Agriculture and Biological Science, 2009; 5(5): 748-753.
16. H J D Dormans and S J Deans .Antimicrobial agents from plants; Antibacterial activity of plant volatile oils. Journal of Applied Microbiology. 2000; 88(2): 308-316.
17. M S H Chowdhury. Use of plants in healthcare: A traditional ethno-medicinal practice in rural areas of Southeastern Bangladesh. International Journal of Biodiversity Science and Management.2009; 5(1): 41-51.
18. NilaniPackianathan and SaravananKarumbayaram. Formulation and evaluation of herbal hair dye-An ecofriendly process. Journal of Pharmacy Science and Research.2010: 2(10): 648-656.
19. Rosa Martha Perz and Gutierrez. Antioxidant activity of *Tageteserecta* essential oil. Journal of the Chilean Chemical Society.2006 ;51(2): 883-886.
20. Zelena, Kateryna, Hardebusch, Berger Ralf andZomHolger. Generation of norisoprenoid flavors from carotenoids by fungal peroxidases. Journal of Agriculture and Food Chemistry.. 2009;57(21):9951-9955
21. M S Isman. Plant essential oils for pest and disease management. Crop Protection, 2000; 9: 603-608.
22. A Sofowora..Medicinal Plants and Traditional Medicinal in Africa. 2nd Ed. Sunshine House, Ibadan, Nigeria. Spectrum Books Ltd. Screening Plants for Bioactive Agents.1993; 134–156.
23. J B Harborne. Phytochemical Methods: A guide to modern techniques of plant analysis. Chapman and Hall, New York, 3rd Edition, 1973; 279-281.
24. K SamiellaBrancalo and Jorge E Albina. Wound macrophages as key regulators of repair, Origin phenotypes and function. American Journal, 2011; 32: 543-547.
25. Sonali Jana and G S Shekhawat.. Phytochemical analysis and antibacterial screening of in vivoand in vitro extracts of Indian medicinal herbs: *Anethumgraveolens.* Research Journal of medicinal plants. 2010; 4(4): 206-212.
26. C A Suresh kumar,RVaradharajan, P Muthumani,RMeera, P Devi and BKameswari.Pharmacognostic and Preliminary Phytochemical Investigations on the stem of *Saccharumspontaneum.*Journal of Pharmaceutical Science Research.2009;1(3):129-136.

27. G AAyoola1,H A B Coker. S A Adesegun, A AAdepoju-Bello, K Obaweya1,E C Ezennia1. And T O Atangbayila. Phytochemical screening and antioxidant activities of some selected medicinal plants used for malaria therapy in Southwestern Nigeria. Tropical Journal of Pharmaceutical Research. 2008; 7 (3):1019-1024
28. C S Lino,.M L Taveira, S B Viana and J AMatos. Analgesic and anti-inflammatory activities of JusticiapectoralisJacq. And its main constituents: Coumarin and Umbelliferone. Phytotherapy Research.1997; 11(3): 211-215.
29. L K Leal, G Ferraira, A Bezerra, J A MatoandS B Viana.Anticiceptive, anti-inflammatory and bronchodilator activities of Brazilian medicinal plants containing coumarin: A comparative study. Journal of Ethnopharmacology.2000; 70(2): 151-159.
30. W H Perkin. On the artificial production of coumarin and formation of its homologous. Journal of the chemical society.1968:21: 53-63.
31. Z N Wang, M Y Wang, W L Mei, Z HanandH F Dai. A New Cytotoxic Pregnanone from *Calotropis gigantean.* Molecules.2008; 13(12): 3033–3039.
32. H M Burkil. The useful plants of West Tropical Africa Vol.1. Families A – D. Royal Botanical Garden Kew, 1984; 415-441.
33. L S Gills. Ethnomedical uses of plants in Nigeria. University of Benin Press. Nigeria. 1992; 276-278.

Conflict of Interest: None

Source of Funding: Nil