PRELIMINARY PHYTOCHEMICAL ANALYSIS OF ANTIFERTILITY PLANTS

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Abstract

The objective of this study was to investigate the presence of various phytochemicals obtained from ethanol (E), ethyl acetate (ET), methanol (M), and chloroform (C) extracts of the Datura Stramonium and Musa Paradasica.

Methods: *The freshly collected plant materials were subjected to successive extraction separately using E,ET, M and C with soxhlet apparatus. Using the standard protocols, the leaf extracts obtained were subjected to preliminary phytochemical analysis to detect the presence of carbohydrates, proteins, steroids, flavonoids, tannins, and alkaloids.*

Results: *The phytochemical analysis showed the presence of tannins, flavonoids, alkaloids, terpenoids, glycosides, saponins, resins, carbohydrates and proteins. The Datura Stramonium and Musa Paradasica plants showed the presence of flavonoids, terpenoids, glycosides, carbohydrates and proteins. Flavonoids, alkaloids, terpenoids, glycosides, resins, carbohydrates and proteins are found in the leaves of Datura Stramonium. Flavonoids, glycosides and resins were found in the leaves of Musa Paradasica. Ethanol and methanol leaf extracts from Datura Stramonium and Musa Paradasica indicated that they contained most of thephytochemicalcompounds.*

Conclusion: *The different extracts of plants have clearly indicated the presence of all the major phytochemicals; hence, these plants can be used for the extraction of bioactive compounds.*

Keywords: *Phytochemicals,Datura Stramonium and Musa Paradasica*

Introduction

The plant realm is considered an asset for various kinds of potential drugs. In ancient days, many of thediseases were cured using plant products, and now again, there is an increasing awareness among peopleabout the importance of plants and their medicinal values [1]. An indigenous part of ancestral medicine isherbal medicine. In 2008, according to the World Health Organization, more than 80% of the world'spopulation went back to traditional medicines [2]. The crude forms of plants that are usually used as foodsupplements are known as herbal therapy in today's world [3]. In ethnomedicine, many of the plants usedcontain useful chemotherapeutants, which, in turn, are used in orthodox medical practice [4]. The wholeplants in crude forms (containing both the active and non-active components) show higher efficacy than the plant products in semi-crude or pure form[5]. The phytochemical constituents in medicinal plants heal and cure human diseases, and these constituents [6] are non-phytotoxic and hence readily biodegradable. Both primary and secondary compounds form phytochemicals, wherein the primary constituents includechlorophyll, proteinsand commonsugarsandthe secondarycompounds areterpenoid, flavonoids, alkaloids, phenolic compounds, glycosides, gums, tannins and essential oils among others [7]. The mostof the active components are found concentrated in the storage organs of the plants [8].

These active secondary compounds determine the medicinal properties of plants. Therefore, there is a need for treasuring these medicinal plants not only to determine the scientific basis for their usage but also to discover freshor lead compounds for treating various diseases in humans [9]. Added advantage is that these readilyavailable plant medicines are less expensive, safe to use, and biodegradable and rarely have side effects[10]. In this work, five plants were considered for the qualitative phytochemical analysis, namely, Datura Stramonium and Musa Paradasica.

Methods

Collection of the plant materials

The whole plants of Datura Stramonium and Musa Paradasica was collected from local areas.

Preparation of the extract

The freshly collected plant materials were thoroughly was held thrice in distilled water, shade dried, cut into fine pieces and powdered using a mechanical blender. The shade dried plant materials were pulverizedand subjected to successive extraction separately using ethanol (E), ethyl acetate (ET), methanol (M), andchloroform(C)withSoxhletapparatus.

Phytochemical analysis of leaf extract

The leaf extracts obtained from E, ET, M, and C were subjected to preliminary qualitative tests to detectthepresenceof carbohydrates,proteins,steroids, flavonoids, tanninsand alkaloids.

Test for carbohydrates

Molisch'stest

Few drops of Molisch's reagent and concentrated Sulphuric acid (H_2SO_4) were added to 2ml

of methanol extract. Reddish violet ring was observed at the junction of two layers indicating the presence of carbohydrates[11].

Reduction of Fehling's solution
About 10 ml of Fehling's solution (copper sulphate in alkaline condition) were added to the concentrated extracts and heated on a steam bath. Brick-redprecipitatesindicatedthepresenceof carbohydrates[11].

Test for proteins
Biuret test
To 3ml of the extract,4% NaOH and few drops of 1% $CuSO_4$ solution were added. Violet or pink indicates the presence of proteins[12].

Ninhydrin test
To1ml of the extract 1% reagent was added and heated on a steam bath. Violet indicates the presence of proteins[12].

Test for glycosides
Keller-Killani test
About 1 ml of glacial acetic acid containing traces of $FeCl_3$ and 1 ml of concentrated H_2SO_4 were addedcarefully to the extracts. A reddish- brown is formed at the junction of the two layers and the upper layer turns bluish-green indicating the presence of glycosides[12].

Test for tannins
To1ml of the extract, 2ml of 5% FeCl3 was added. A dark blue or green-black indicates the presence of tannins[13].

Test for alkaloids
To2ml of the extract, 2ml concentrated HCl and few drops of Mayer's reagent were added. A green or white indicates the presence of alkaloids[13].

Test for flavonoids
To 2 ml of the extract, 1 ml of 2N NaOH was added. The appearance of yellow indicates the presence of flavonoids[12].

Test for terpenoids
About 2ml of each extract is mixed with 5ml of chloroform and few drops of concentrated H_2SO_4 is carefully added to form a layer. A reddish-brown coloration formed in the interface shows the presence of terpenoids[14,15].

Test for saponins
Foam test
The crude extract is mixed with 5ml of distilled water and shaken vigorously, resulting in the

formation of a stable foam which is a positive indication for saponins[14,15].

Froth test

About 2g of the powdered sample is boiled with 10 ml of distilled water and then filtered which is mixed with 5 ml of distilled water and few drops of olive oil, shaken vigorously, and then observed for the formation of emulsion[14,15].

Test for resins

Acetone-water test

Extracts are to be treated with acetone followed by the addition of 500 µl water added and mixed well. Turbid appearance of the extract indicates the presence of resins [14,15].

Results and discussion

The phytochemical constituents of the plants tested are summarized in Table1. In the present study, it was observed that the ethanol extract of the whole plant of *A. lanata* has flavonoids, carbohydrates and proteins but lacks tannins, alkaloids, glycosides, terpenoids, saponins and resins. Similarly, other studies Ragavendran *et al*. and Koperuncholan *et al*. [16,17] reported the presence oftannins, flavonoids, saponins, terpenoids, alkaloids, carbohydrates, proteins and the absence of resins and glycosides. In thecurrent study, ethyl acetate extract of whole plant of *A. lanata* contained tannins, flavonoids, saponins, terpenoids, carbohydrates, and alkaloids but resins, proteins and glycosides were absent.

Similarly, the results of Ragavendran *et al*.[16] also showed that the ethyl acetate extract of the whole plant extract had tannins, flavonoids, saponins, terpenoid, carbohydrates and alkaloids but resins, proteins and glycosideswere absent. In the current study, the methanol extract of the whole plant of *A. lanata* possessed tannins and alkaloids, terpenoids, carbohydrates, saponins and resins whereas proteins were absent in concurrence with the Yamuna devi *et al*.[18] that also have shown the absence of tannins, carbohydrates, saponins, proteins and resins.

Although the study Yamuna devi *et al*. [18] has reported the presence of flavonoids and glycosides as in the current study, they have also shown the presence of terpenoids and alkaloids. The chloroformextract of the Datura Stramonium and Musa Paradasica possessed only carbohydrates and proteins in contrast to anotherstudy Battu and Kumar [19] that showed the presence of tannins, alkaloids and flavonoids apart from carbohydrates and has shown the absence of alkaloids, proteins, saponins and resins but tannins, flavonoids, glycosides, saponins, resins, terpenoids, and alkaloids were absent in the present study.

In this study, it was observed that the ethanol extract of the leaves of Datura Stramonium contained onlycarbohydrates and proteins but other compounds - such as tannins, alkaloids, flavonoids, glycosides, saponins, terpenoids and resins - were absent. In contrast, one study Emimal [20] has reported that the ethanol extract of leaves showed the presence of alkaloids, flavonoids, glycosides, carbohydrates and saponins and absence of tannins, proteins, resins and terpenoids. The ethyl acetate extract of the leaves of Datura Stramonium contained terpenoids and glycosides but other components-such as alkaloids, tannins, saponins,

carbohydrates, flavonoids, proteins and resins - were absent. In contrast, another study Bharathi *et al*. [21]has reported the presence of alkaloids, tannins, saponins, flavanoids, proteins, and carbohydrates.

In the current investigation, the methanol extract of the leaves of Datura Stramonium possessed alkaloids, where as tannins, flavonoids, terpenoids, carbohydrates, glycosides, saponins, proteins and resins were absent. A study bySubhashini *et al*. [22] has shown that the methanol extract of leaves showed the presence of alkaloids,carbohydrates, flavonoids, glycosides, proteins and terpenoids and theabsence oftannins and saponins.In the current study, the chloroform extract of the leaves of Datura Stramonium andshowed only flavonoids, tannins,carbohydrates, resins, terpenoids, glycosides and proteins and alkaloids were absent, but Emimal [20] has reported the presence of alkaloids and flavonoids and absence of resins, carbohydrates, glycosides, tannins, proteins, and saponins.

In the current investigation, the ethanol extract of the leaves of Musa Paradasica contained flavonoids and absence of tannins, alkaloids, terpenoids, glycosides, saponins, resins, carbohydrates and proteins were noted. Poongothai and Shubashini [23] have reported the absence of alkaloids and terpenoids. The ethyl acetate extract of the leaves of Musa Paradasica contained glycosides and resins, whereas tannins, flavonoids, alkaloids, terpenoids, saponins, carbohydrates and proteins were absent. The methanol extract of the leaves of Musa Paradasica possessed flavonoids and resins but tannins, alkaloids, terpenoids, glycosides, saponins, carbohydrates andproteins were absent. In this study, no phytochemical constituents were extracted in chloroform in contrastto the study of Poongothai and Shubashini [23] who have reported the presence of flavonoids, tannins, alkaloids, trepenoids, carbohydrates and proteins.

Conclusion

The phytochemical analysis of the crude extracts of Datura Stramonium and Musa Paradasica indicates the presence of major phytochemical compounds such as tannins, flavonoids, alkaloids, terpenoids, glycosides, saponins, resins, carbohydrates and proteins which are secondary metabolites. These compounds are associated with anti-fertility, antioxidant, antimicrobial activities, antidiuretic, anti-inflammatory, anti-analgesic, anti-cancer,antiviral, anti-malarial and anti-fungal activities. Thus, the traditional system of medicine provides biologically active molecules that are promising sources of potential secondary metabolites which can be used as medicinal compounds. Further studies aim at identifying the anti-microbial and anti-oxidant compounds which may be exploited in herbal formulations.

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Table 1: Phytochemical constituents of *A. lanata, A. vasica, P. alba, S. grandiflora, I. aspalathoides*

Phytochemical tests																
Paradasica									***D. Sramonium***						***M.***	
Solvents	**E**		**ET**		**M**		**C**		**E**		**ET**		**M**		**C**	
Tannins	-		-		-		-		-		-		-		-	
Flavonoids																
Alkaline reagent test	+		-		+		-		-		-		-		+	
Lead acetate testAlkaloids	+	-				+	-		-		-		-		+	
Mayer' test Terpenoids Salkowski test																
lycoside Liebermann's test	-	-				-	-		-		-		+		-	
	-	+				-	-		-		+		-		-	
	-	+				+	-		-		+		-		-	
Salkowski test	-		+		+		-		-		+		-		-	
Keller-Kiliani testSaponins	-	+				+	-		-		+		-		-	
Foam test																
	-	-				-	-		-		-		-		-	
Froth testResin	-	-				-	-		-		-		-		-	
Acetone-water testCarbohydrates																
Molish's test	-	-				-	-		-		-		+		+	
	+	-				-		+	+		-		-		+	
Fehling's testProteins	+	-				-	+		+		-		-	+		
Ninhydrin test																
	+	-				-	+		+		-		-	+		
Biuret test	+		-		-			+	+		-		-		+	

E: Ethanol, ET: Ethyl acetate, M: Methanol, C: Chloroform,