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Study of Phytochemicals Analyzed in Leaf Extract of Medicinal Herbs-Tridax Procumbens l. and their Health Effects

Vaishali Agme Ghodke[1] and Rupali N. Agme[2]

[1]Department of Applied Science, BVCOE, Navi Mumbai, India.

[2]RAIT, Navi Mumbai, India.

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ABSTRACT

The use of medicinal herbs to treat disease is almost universal among non industrialized societies and is often more affordable than purchasing expensive modern pharmaceuticals. Most of the countries all over the world still rely on traditional medicines for their primary health care's with the knowledge passed by the ancients. The current study is aimed to make aware about the presence of certain bioactive compounds in plants which attribute them medicinal values & can provide alternative pathway for the replacement of synthetic drugs. With the help of literature reviews mentioning the importance of medicinal plants in socio-cultural, spiritual and health care of rural peoples of the world, a well known medicinal herb-Tridax Procumbens L. commonly known as tridax daisy is studied with the analysis of phytochemicals like alkaloids, tannins, steroids, flavanols, diterpenes, coumarins, anthocynins, amino acids, syringic acid, phenol, saponin, polysaccharides, pectins, hemicellulse etc - biologically active chemical compounds having disease preventative or protective properties and their general health effects.

Introduction

The medicinal plants have always played an important role in socio-cultural, spiritual & health care needs of rural & tribal people of emerging & developing countries. In many developing countries, a large section of populations still relies on traditional system of medicine to meet their health care needs; also more & more people have turned to alternative therapies as herbal medicines resulting in demand of medicinal plants & their products in various parts of world. The use of medicinal plants play important role in the lives of rural people, particularly in remote parts of developing countries which are poorly served with health facilities[5]. The world health organization (WHO) estimates that herbal medicines is still mainstay of about 75-80% of world population, mainly in developing countries, for primary health care because of better cultural acceptability, better compatibility with human body & lesser side effects[3]. Herbal medicines are convenient to replace synthetic drugs because of its effectiveness, easily availability, low cost & devoid of serious toxic effects. Considering the facts about the importance of herbal medicines & its role since from ancient time, authors have studied various phytochemicals like Glucoside, Cynogenic glucoside, Acubin type glucoside, Phenol, Flavanol, Syrengic acids, Alkaloids, Steroids, Tannins, Coumarins, Diterpenes, Anthocyanins & Saponins etc present in leaf extract of traditional medicinal herbs-"Tridax Procumbens L." used by various tribal communities all over the world for their primary health cares. From the present study, it has been observed that Tridax Procumbens L possess various medicinal properties like anti-biotics ,anti-bacterial, anti-viral, anti-fungal, anti-pyretic, anti-cancer, anti-dandruff, anti-healing, anti-ulcer, anti-AIDS & also can be used against various disorders.

Selected Medicinal herb: Tridax Procumbens L.which is also known as "Coat button"/Wild daisy/ Tridax daisy[12].

Distribution: Tropic & subtropics throughout the world [2].

Systematic Classification[2]**:**

Kingdom Plantae

Subkingdom TraCheobionta

Super division spernmatophyta

Division Magnoliophyta

Order Asteridae

Family Asteraceae

Species Tridax Procumbens L .

Dig. Tridax Procumbens L.

Materials & methods

1. Collection of plant sample on the basis of oral data provided by tribes & literature survey.
2. Proximate analysis of leaf sample.
3. Various chemical tests carried out for the detection of Phytochemicals in leaf extract of Tridax Procumbens L.

"Phytochemicals are naturally occurring biologically active chemical compounds in plants responsible for attributing them medicinal values or protective and disease preventive properties".

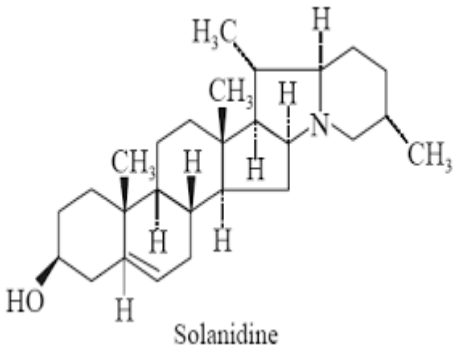
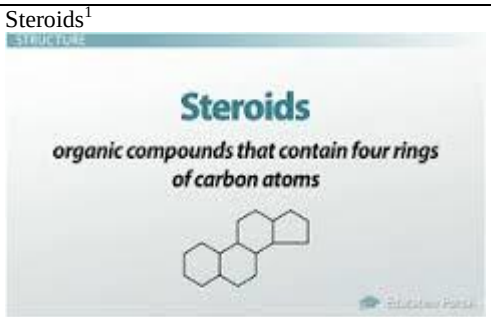
Current Status

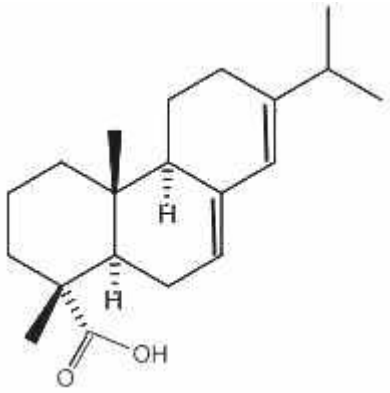
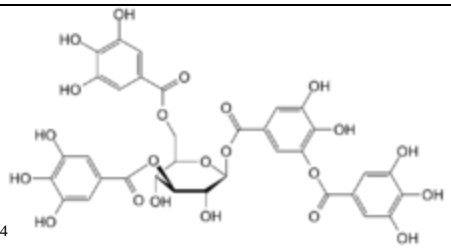
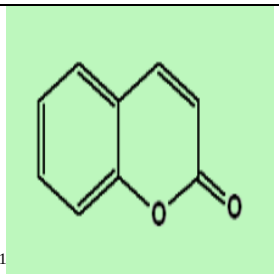
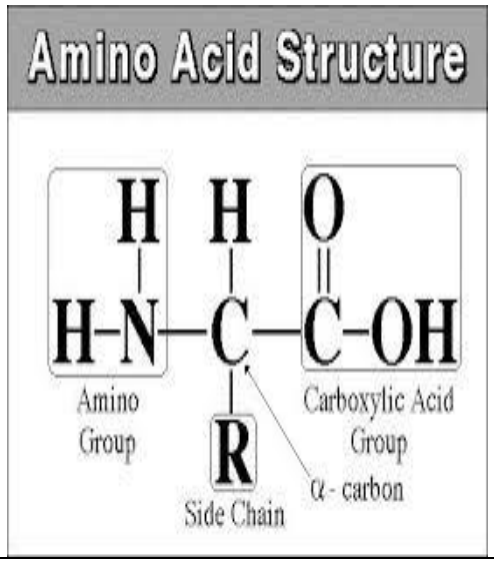
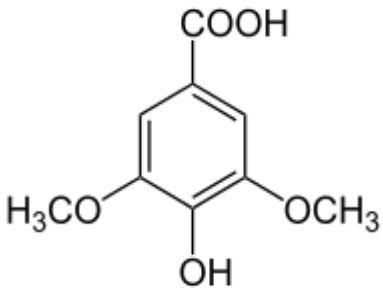
➢ Now a day's researchers are trying to find out more convenient platform for studying Anti-diabetic activity of Tridax Procumbens L.

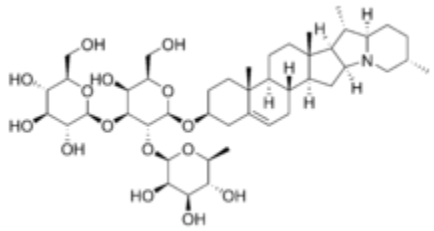
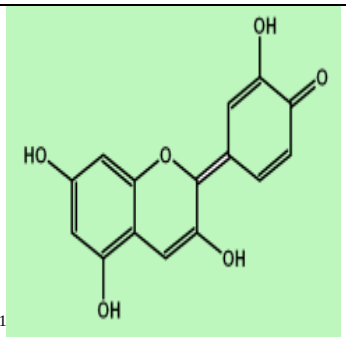
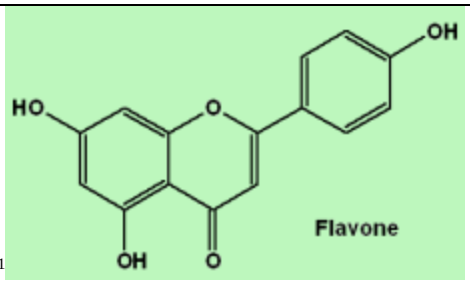
Tele:

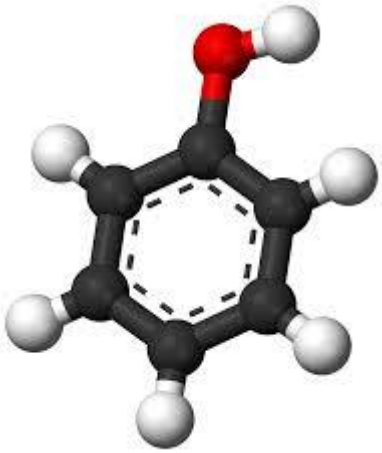
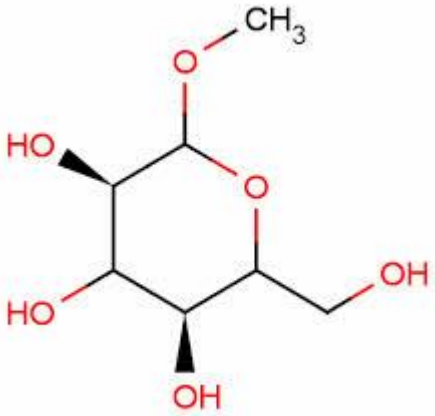
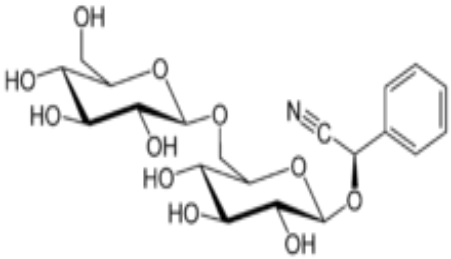
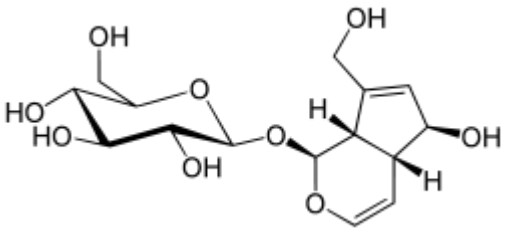
E-mail addresses: agmepooja@gmail.com

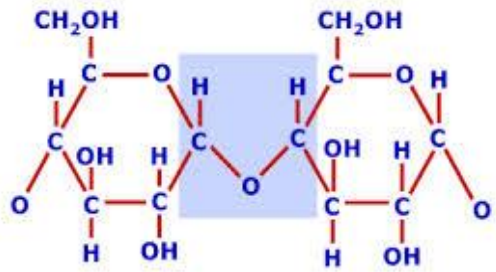
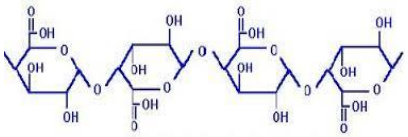
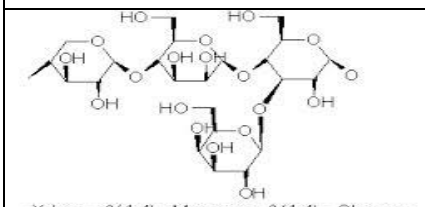
S/N	Leaf sample	Formula		Result
1	% of Moisture	% of M= Loss in wt of sample×100 / Wt of sample taken = 0.3832×100 / 1gm	38.32%	% of these parameters clearly indicates that TPL is the best for drug action & effects.
2	% of Ash	% of ash= Loss in wt of sample×100 / Wt of sample taken = 0.029×100 / 1gm	2.9%	
3	Cold water solubility	% of CWS= Loss in wt of sample×100 / Wt of sample taken = 0.532×100 / 1gm	53.2%	These results are best for transport & drug receptor interaction controlling force in dilute solutions which increases potency & drug action & also drug effects.
4	Hot water solubility	% of HWS= Loss in wt of sample×100 / Wt of sample taken = 0.591×100 / 1gm	59.10%	
5	1% NaOH solubility	% of 1%NaOH Sol.= Loss in wt of sample×100 / Wt of sample taken = 0.899×100 / 1gm	89.9%	These results are directly related to stability of drug influence & stability of drug directly on drug potential, drug action & drug effect.
6	1% HCl solubility	% of 1%HCl Sol.= Loss in wt of sample×100 / Wt of sample taken = 0.984×100 / 1gm	98.4%	

S/N	Phytochemicals	Test	Result	Functions
1	 Alkaloids[1] Solanidine	Leaf extract+ Mayer's reagent (Pot. Mercuric iodide), formation of yellow coloured ppt.	Present	➢ Basic heterocyclic compound of plant origin having physiological effects on human. ➢ More than 3000 types of alkaloids have been identified e.g. Morphine, Quinine, Caffeine, Solanidine etc. ➢ Anti-biotic activity ➢ Anesthetic activity ➢ Analgesic/Pain killer ➢ Anti-malarial ➢ Protect against chronic disease ➢ Cyto-toxic nature
2	Steroids[1] 	Leaf extract+ Sodium sulphate +Libermann Buccard's reagent+ formation of blue colour.	Present	➢ Antibacterial properties. ➢ Anti-oxidant.
3	Diterpenes[6]	Leaf extract+ water+10 drops	Present	➢ Anti-microbial.

	e.g. Abietic acid 	of copper acetate solution– formation of green colour.		➢ Anti-inflammatory. ➢ E.g.abietic acid, cafestol, cembrene, ginkgolides etc. ➢ selective antagonistic activity toward platelet-activating factor increasing in conditions of shock, burns, ulceration, and inflammation skin diseases
4	 Tannins[4]	Leaf sections dipped in alkaline aqueous ferric chloride solution, developed bluish colour./ 5ml leaf extract + few drops of 1% lead acetate –formation of yellow colour.	Present	➢ Antibacterial ➢ Antimicrobial ➢ Accelerate blood clotting. ➢ Reduce blood sugar ➢ Decrease serum lipid level
5	 Coumarine[1]	2ml leaf extracts+ 3ml 10% NaOH –formation of yellow colour.	Present	➢ It Anti-fungicidal [1]. ➢ Anti-tumor activity. ➢ Blood thinning. ➢ Increases blood flow in veins. ➢ Decreases capillary permeability. ➢ It can be toxic when used at high doses for a long period.
6	Amino acid[8] 	Leaf extract spotted on Whatmans filter paper No.1, Separation achieved by using phenol, mix of butane& acetic acid+water, Chromatograms were sprayed with ninhydrin in acetone, violet & pink spots were developed.	Present	➢ E.g Arginine, Alanin, Aspartic acid etc ➢ Amino acids the building blocks of protein. ➢ Essential for normal immune system activity. ➢ Necessary for wound healing ➢ Assists with regeneration of damaged liver. ➢ Necessary for production and release of growth hormone. ➢ Essential in growth, maintenance, and repair of skin. ➢ Helps promote skin healing. ..
7	 Syringicacid[9]	Leaf sections mounted by 50% aq.sulphuric acid, studied under microscope, sections developed bluish colour.	Present	➢ Anti-oxidant activity.
8	Saponins[1]	5ml leaf extracts + 20ml distilled water –agitation for	Present	➢ Wound healing. ➢ Property of precipitating &

		15 minutes-formation of foam.		Coagulating Red blood cells. ➢ Hemolytic activity. ➢ Protection against hypercholesterolemia. ➢ Anti-biotic. ➢ Effect on blood cholesterol levels, cancer, bone health & stimulation of immune system. ➢ Anti-tumor & Anti-mutagenic activist. ➢ Lowers the risk of human cancer. ➢ Immunity boosters:-seem to help our immunity system & to protect against viruses & bacteria. ➢ Plants produce saponins to fight infections by parasites. ➢ In plants, protect against microbes & fungi Also for Nutrient absorption.
9	Anthocyanins[1] 	2ml extracts + 2ml HCl+NH_3, appearance of pink colour turning into blue violet.	Present	➢ Belongs to group of flavanoids. ➢ Cardiovascular health:- Biological effects of Anthocynins on cardiovascular health may be driven by their affinity for proteins & their antioxidant activity. It can act on different cells involved in development of arthrosclerosis. ➢ Anti-cancer: It may act as anticancer agent by inhibiting promotion & progression of tumor cells by stopping the growth of pre-malignant cells, increasing apoptosis of cancer cells & inhibiting growth of new blood vessels that nourish tumors. ➢ Anti-inflammatory: anti-inflammatory action of anthocyanins may be attributed to its direct & strong anti-oxidant action but also its regulatory effects on expression of genes involved in inflammatory response.
10	Flavanol[1] 	Leaves extracts + pinch of boric acid+ few drops of acetic acid, developed green fluorescence with yellow colour.	Present	➢Anti-oxidant property ➢Anti-cancer ➢Anti-allergic ➢Anti-inflammatory ➢Anti-viral ➢Anti-carcinogenic ➢To ease menopausal symptoms.
11	Phenol[4]	Leaf extract +2-3 drops of Ferric chloride solution developed violet colour.	Present	➢ Play important role in prevention of cancer. ➢ Anti-oxidant property. ➢ Phenols have been investigated as drugs. For instance, Crofelemer (USAN, trade name Fulyzaq) is a drug under development for the treatment of diarrhea associated with anti-HIV drugs. [14]

				
12	Glucoside[2] 	Leaf sections immersed in picric acid + washing with distilled water+ placed in sod. Carbonate, gives red colour with HCl.	Present	➢A glucoside is a glycoside that is derived from glucose. ➢any of an extensive group of glycosides that yield glucose upon hydrolysis ➢Anti-oxidant activity.
13	Cynogenic Glucoside[9]: e.g. Amygdlin 	Leafextract+distilled water+tolune+chloroform for 3o min in test tube. Filter paper treated with picric acid & sod. Carbonate was fixed in test tube & allowed for 4 days.Strip became red in colour.	Present	➢ In Cyanogenic Glucosides nitrogen occurs as prussic acid (hydrocyanic acid) - one of the most toxic plant compounds. The occurrence of cyanogenic Glucosides is wide spread in the plant kingdom and is present in many plants and foods in the seeds of many stoned fruits (apricots, almonds and prunes to mention a few) as well as many seeds of grasses and legumes. ➢ These are bioactive plant products derived from amino acids. ➢ It is an effective defense against generalist herbivores but less effective against fungal pathogens or It can act as a protective device for the plants against predators like herbivorous.
14	Acubin type Glucoside[2] 	Leaves sample+reflux with dil HCl+cooled+filtered+addition of isoamyl alcohol shaking+ development of red colour.	Present	➢ Anti-oxidant activity.

15	Polysaccharides[2] e.g. Starches, Cellulose **Simple starch** 	Leaf sample taken in filter paper, put in Soxhlet extractor, extracted with benzene,powder left dried, refluxed with water, cooled, filtered & addition of ethanol, formation of white ppt,	Present	➢ They are common sources of energy. ➢ Anti-oxidant activity.
	 Pectin (polygalacturonic acid)	Dried residue of leaves+ aq. Ammonium oxalate +filtration+ acidification+ ethanol+ formation of pale yellowish ppt.	Present	➢ It can reduce blood cholesterol levels. ➢ Anti-oxidant activity.
	 - Xylose - ß(1,4) - Mannose - ß(1,4) - Glucose - - alpha(1,3) - Galactose **Hemicellulose**	Residue of leaves+ NaOH+ cooling+ filtration+ acetic acid+ ethanol+ formation of white coloured ppt.	Present	➢ *They* function as supporting material in the cell wall or strengthen cell wall by interacting with cellulose..

- All over the world, researches are also going on the study of "Larvicidal activity of Tridax Procumbens L. in its leaf extract against dengue vector".

Future aspects

- Many of the modern medicines are produced indirectly from medicinal plants, e.g. Aspirin; the present medicinal plant can have ability to replace synthetic drugs.
- It can be a good resource of new drugs.
- With the more inventive study & methodology, the natural products derived can provide therapeutic products attacking different targets in cancer cells or it can be helpful in cancer therapy without any side effects also.

Result & Discussion

The present study is the collection, identification, extraction & evaluation of few phytochemicals in leaf extract of Tridax Procumbens L. Which seem to have the ability to act as a source of useful drugs and also to improve health status as a result of showing various phytochemicals tested above those are vital for good health. The study reveals the presence of some phytocompounds like Alkaloids, Steroids, Tannins, Flavanol, Phenol, Anthocyanins, Coumarins, Syringic acid, Amino acid, Diterpenes, Glucosides, Acubin type glucoside, Polysaccharides, Hemicellulose, Pectins etc.The results obtained in this investigation clearly indicates that the medicinal values of Tridax Procumbens L. lies in some chemical compounds that have definite physiological action on human body.Diffrent phytochemicals found in leaf extract have found to possess a wide range of activities which may help in protection against various diseases for e.g. Alkaloids are responsible for protection against chronic diseases, Saponins for anti-biotic, Steroids show analgesic & wound healing & tannins for accelerating blood clotting rate. Tridax procumbens L from the above investigation can show the potential to replace synthetic drugs. On comparison with phytochemicals screened in leaf extract of Tridax Procumbens L, It can be also stated that Phytochemicals are nonnutritive plant's chemicals that have protective or disease preventive properties e.g the presence of Flavanols, Coumarin & Anthocyanins possess anti-cancer activity. Cancer is one of the major causes of death & number of cancer patients is in continuous rise[10]. The available treatments methods include surgery, chemotherapy, & radiation but increasing costs of treatments & lack of effective drugs to cure cancer, people in different countries depend more on folk medicines, hence the above mentioned plants have almost unlimited capacity to produce phytochemicals that attracts researchers in quest for new & novel chemotherapeutics. On Further spectroscopic analysis provide more confirmations about the structure elucidation of phytocompounds.

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