REVIEW ON CHEMICAL NSTITUENTS, ANTITUMOR,ANTIMICROBIAL AND OTHER CHARACTERIZATIONS OF BUTEA MONOSPERMA (PALASH)

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ABSTRACT

The present paper mainly focus on Reviews of Butea Monosperma formerly known Butea Frondosa which has been traditionally reported as to possess antibacterial,antimicrobial,anticonvoluscent,antifungal,astringent,anticonceptive, antifertility,hepatoprotective,radical scavenging,antitumor,wound healing activity.The plant also knows by different name in India such as Flame of Forest,Dhak,Palas,Potent substances present in various plants.Modern medicines are generally not free from adverse effects,thatswhy herbal formulation one of the traditional medicinal plant which regain its past glory once again. Methodology includes collection of sample,phytochemical screening. This method is now increases day by day.People in large scale wanted potent drug which is to be safe.So Butea Monosperma is provided evidence that plant has potential source for herbal formulations.

Keywords : Isolation, Characterization, Antibacterial, Antimicrobial, Butea Frondosa

Introduction

Potent substances are present in various plants. Recent medicines always shows somewhat adverse effect on human health, Thatswhy people demand increases day by day for herbal formulation. Because they wanted potent drugs. But at the same time they want drugs to be safe. .So Butea Monosperma is one of the traditional medicinal plant which regain its past glory once again. According to Ayurvedic literature 'PALASH' - ("Butea monosperma") is used to treat various diseases. It is widely and abundantly available.It can be used to

treat various skin diseases. An antimicrobial agent is one that inhibits or kills microbes but causes minimum harm to normal tissues of human being. As many micro organisms have become resistant to the newest antimicrobial agent.So now we have taken furthers step towards inventing new antimicrobial agents from the field of Ayurveda without isolating active constituents.

Phytochemicals which possess many ecological and physiological roles are widely distributed as plantconstituents. Woody plants can synthesize and accumulate in their cells a great variety of phytochemicals including alkaloids, flavonoids, tannins, cyanogenic glycosides, phenolic compounds, saponins and lignins . Over 50% of all modern clinical drugs are of natural product origin . Natural products play on important role in drug development programmes in the pharmaceutical industry. There are a few reports on the use of plants in traditional healing by either tribal people or indigenous community . The antimicrobial activity have been screened because of their great medicinal relevance with the recent years, infections have increased to a great extent and resistant against antibiotics, becomes an ever increasing therapeutic problem . Natural products of higher plants may give a new source of antimicrobial agents. There are many research groups that are now engaged in medicinal plants research (10-12). The development of drug resistance in human pathogens against commonly used antibiotics has necessitate the search for new antimicrobial substance from other sources. Screening of medicinal plants for antimicrobial activities and phytochemical is important for finding potential new compounds for therapeutic uses.

Chemical Constituents of Butea Monosperma

Flower: Triterpene, butein, butin, isobutrin, coreopsin, isocoreopsin (butin 7-glucoside), sulphurein, monospermoside (butein 3-e-D-

glucoside) and isomonospermoside, chalkiness', aureoles, flavonoids (palasitrin, prunetin) and steroids.[1]

Gum: Tannins, mucilaginous material, pyrocatechin.[1]

Seed: Oil (yellow, tasteless), proteolytic and lypolytic enzymes, plant proteinase and polypeptidase. (Similar to yeast tripsin). A nitrogenous acidic compound, along with palasonin is present in seeds. It also contains monospermoside (butein 3-e-D-glucoside) and so monospermoside. [1]

Resin: Jalaric esters I, II and laccijalaric esters III, IV, From seed coat allophanic acid has been isolated and identified. Z- amyrin, e-sitosterone its glucoside and sucrose; lactone-nheneicosanoic acid-delta-lactone.[1]

Sap: Chalcones, butein, butin, colourless isomeric flavanone and its glucosides, butrin[1]

Bark: Kino-tannic acid, Gallic acid, pyrocatechin. The plant also contains palasitrin, and major glycosides as Butrin, alanind, allophanic acid, butolic acid, cyanidin, histidine, lupenone, lupeol, (-)-medicarpin, miroestrol, palasimide and shellolic acid.[1]

Stem: 3-Z-hydroxyeuph-25-ene and 2, 14-dihydroxy-11, 12-dimethyl-8-oxo-octadec-11-enylcyclohexane. Stigmasterol-D-glucopyranoside and nonacosanoic acid.[1]

Leaves: Glucoside, Kino-oil containing oleic and linoleic acid, palmitic and lignoceric acid. [1]

Materials and Methods

The leaves, flower, and Gum of Butea monosperma plant were collected from the Melghat region of Amravati, and Marathwada region of

Maharashtra, India, in the month of December – February and it was authenticated by the taxonomists Dr. S. P. Rothe from the Department of botany, Shri Shivaji College Akola and flora of Marathwada The leaves, flower, and Gum of Butea monosperma plant were shade dried at room temperature, ground in a manual mill to get coarse powder. The powder were kept in the air tight polythene bags and stored at dry place. The powder was extracted with solvent water and methanol by using soxhlet apparatus. The extracts were concentrated for further studies at 40 oC in water bath. Test extracts were then dried, crushed and stored in air tight bottle for further study. The water extracts of flower were screened for different phytochemical constituents. All the extracts were characterized for different constituents and screened for antimicrobial tests.[9]

Priliminary Phytochemical Screening

1. Tests for Flavonoids :

(a) Shinoda test : Test solution with few fragments of magnesium ribbon and conc. HCL shows pink to magenta red colour. [9]

(b) Zn/HCL reducing test : Test solution with Zinc dust and few drops HCL shows magenta red colour.

(c) Alkaline reagent test : Test solution when treated with sodium hydroxide solution shows increase in the intensity of yellow colour, which becomes colourless on addition of few drops of dilute acid.

2. Test for Triterpenoids :

(a) Salkowski test : Few drops of concentrated sulphuric acid was added to the test solution of the extract, shaken and on standing lower layer turns golden yellow. [9]

(b) Liebermann Burchard Test : To the test solution of the extract, few drops of acetic anhydride was added and mixed well. Then 1 ml of concentrated sulphuric acid was added from the sides of the test tube, a red colour is produced in the lower layer indicate Triterpenes.[9]

(c) Tschugagiu test : Excess of acetyl chloride and pinch of zinc clroride added to the test solution of extract, kept aside for reaction to subside and warmed on water bath, eosin red colour produced.

(d) Briekorn and Brinar test : To the test solution of extract, few drops of chlorosuphonic acid in glacial acetic acid (7.3) red colour is produced.

3. Tests for Glycosides:

(a) Baljet's test : The test solution treated with sodium picrate gives yellow to orange colour. [9]

(b) Bromine water test : Test solution dissolved in brominoine water gives yellow precipitate.

(c) Raymond's test : Test solution treated with dinitrobenzene in hot methanolic alkali gives violet colour.

(d) Legal's test : Test solution when treated with Pyridine (made alkaline by adding sodium nitroprusside solution) gives pink to red colour.

4. Tests for Anthraquinones :

(a) Borntrager's test : Boiled test extract solution with 5 ml of 10% sulphuric acid for 5 mins. Filtered while hot, cooled the filterate shaked gently with equal volume of benzene. Separated the benzene layer and when treated with half of its volume solution of ammonia (10%). Allowed to separate ammoniacal layer aquires rose pink colour due to the presence of anthraquinones.

5. Tests for Saponines :

(a) Foam test : Test solution and shaken shows the formation of foam, which is stable an least for 15 mins.

6. Tests for Carbohydrates :

(**a) Molisch's test** : Test solution with few drops of Molisch's reagent and 2ml of concentration H2SO4 added showly from the sides of the test tube shows a purple ring at the junction of 2 liquids.

(b) Barfoed's test : Test solution treated with Barfoed's reagent, on boiling on a water bath shows brick red colour precipitate.

(c) Benedict's test : The test solution treated with Benedict's reagent and boiling on water bath shows reddish brown precipitate.

(d) Fehling's test : The test solution when heated with equal volume Fehling's A and B solutions, gives orange red precipitate presence of reducing sugars.

(e) Selivinoff's test : A crystal of resorcinol is added to the test solution and warmed on a water bath equal volume of conc. HCL a rose colour is produced that showed ketone is present.

7 Tests for pentoses : Heat the test solution with a equal volume of HCL containing little phloroglucinol. Formation of red colour lidicates the present pentoses.

8. Tests for Alkaloids : [9]

(a) Mayer's test : Test solution with Mayer's reagent (Potassium Mercuric iodide) gives cream coloured precipitate.

(b) Hager's test : The acidic solution with Hager's reagent (Saturated picric acid solution) gives yellow precipitate.

(c) Dragendorff's test : The acidic solution with Drogendroff's reagent (Potassium bismuth iodide) shows reddish brown precipitate.

9. Tests for Phytosterols :

(a) Salkowaski Test : To the test extract solution added few drops of conc. H2SO4 shaken and allowed to stand, lower layer turn red indicating the presence of sterols.

(b) Liebermann - Burchard test : The test solution treated with few drops of acetic anhydride and mixed, when conc. H2SO4 is added from the sides of the test tube, it show a brown ring at the junction of the two layers and the upper layer turns green.

(**c) Sulphur test** : Sulphur when added in to the test solution, it sinks in it.

10. Tests for Phenolics:

(a) FeCl3 test : Test solution treated with few drops of FeCl3 solution gives dark colour.

(b) Gelatin test : Test solution treated with gelatin gives white precipitate.

11. Tests for Proteins :

(a) Millon's test : Test solution when treated with Millon's reagent and heated on a water bath, Protein is stained red on warming.

(b) Xanthoproteic test : Test solution treated with conc. HNO3 and boiled gives yellow precipitate.

(c) Biuret test : Test solution treated with 40% NaOH and dilute CuSO4 solution gives blue colour.

12. Tests for Amino acids and Imides :

(a) Ninhydrin test : Test solution treated with Ninhydirn reagent gives blue colour.

Pharmacological activity of different part of Butea Monosperma:

Butea Monosperma tree possess various pharmacological characteristics from its different parts such as leaves,Seeds,Flowers,Bark,Stems,etc.

1) Antimicrobial,Antifungal activity : [22]

The antimicrobial activity of a drug is generally expressed as its inhibiting effect towards the growth of bacterium in

nutrient broth or on nutrient agar.

For this study, following conditions are observed for :

1) The substance or extract must be in contact with the test organism.

2) Conditions must be favourable for the growth of microorganisms in the absence of Antimicrobial substances.

3) There must be means of estimating the amount of growth and thereby percentage of growth of inhibition.

4) The activity of extract should be observed and determined by the growth response of microorganisms.

Different methods employed in the study are agar streak. serial agar diffusion, paper disc, cup-plate,

strip diffusion, cylinder plate and turbidimetric methods.

2) Anticonvulsive activity :[17]

Presence of triterpene shows anticonvulsive activity . The ethanolic extracts of leaves of Albizzia lebbeck and flowers of Hibiscus rosa sinesis and the petroleum ether extract of flowers of Butea monosperma exhibited anticonvulsant activity. The acetone soluble part of petroleum ether extract of Butea monosperma flowers showed anticonvulsant activity. The fractions protected animals from maximum electro shock, electrical kindling pentylenetetrazole and lithium–pilocarpine induced convulsion but failed to protect animals from strychnine-induced convulsions. The fractions raised brain contents of gamma-aminobutyric acid (GABA) and serotonin. [17]

3) Antidiabetic activity [18] [20]

Single dose treatment Ethanolic extract of Butea monosperma of (200 mg/kg, p.o.) significantly improved glucose tolerance and caused reduction in blood glucose level in Alloxan-induced diabetic rats. Repeated oral treatment for 2 weeks significantly reduced blood glucose, serum cholesterol and improved HDL-cholesterol and albumin as compared to diabetic control group. Ethanolic extract of leaves also have antidiabetic and antioxidant potential in Alloxan-induced diabetic mice. Ethanolic extract of seeds (300mg/kg b.w.) exhibited significant antidiabetic, hypolipidemic and antiperoxidative effects in non-insulin dependent diabetes mellitus rats. Aqueous extract significantly decreases blood glucose level both in normal ($p<0.01$) and Alloxan induced diabetic ($p<0.001$) mice at 2 and 5 hr respectively. However, the hypoglycemic

effect is peaked at 90min and is not sustained as observed for the standard drug Metformin. The effect of Butea monosperma(Lamk.) Taub on blood glucose and lipid profiles in normal and diabetic human volunteers was evaluated which indicated a significant decrease ($P < 0.05$) in 2 h post- prandial blood glucose (mg/dl) on 21st day in the diabetic subgroups treated with 2 g and 3 g of powdered Butea monosperma (Lamk.) Taub. A significant decrease in total cholesterol (mg/dl) was observed in normal and diabetic subgroups on day 21st post treatment. Both normal and diabetic groups exhibited a significant decrease in total lipids on day 21st. This study indicates that B. monosperma (Lamk.)Taub might possess important hypoglycemic and hypolipidemic properties [17].

4) Antiesterogenic and antifertility activity [21]

Methanolic extracts of Butea monosperma exhibited effect on uterotropic and uterine peroxidase activities in ovariectomized rats & determine estrogenic/antiestrogenic potential of antifertility substances using rat uterine peroxidase assay. Alcoholic extract of flowers of the title plant has also been reported to exhibit antiestrogenic and antifertility activities. Butin isolated from its flowers show both male and female contraceptive properties [2].

5) Radical scavenging activities [19]

Ethyl acetate, Butanol and aqueous fractions derived from total methanol extract of Butea monosperma flowers were evaluated for radical scavenging activities using different in vitro models like reducing power assay, scavenging of 2,2 diphenyl-1- picrylhydrazyl (DPPH) radical, nitric oxide radical, superoxide anion radical, hydroxyl radical and inhibition of erythrocyte hemolysis using 2,2' azo-bis (amidinopropane) dihydrochloride (AAPH). Methanol extract along with its ethyl acetate and butanol fractions showed potent free radical scavenging activity, whereas aqueous fraction was found to be devoid of any radical scavenging

properties. The observed activity could be due to the higher phenolic content in the extracts and 17.74% w/w in methanol extract, ethyl acetate and butanol fractions respectively) [2].

6) Antitumor activity

Intraperitonial administration of the aqueous extract of flowers of Butea monosperma in the X-15-myc onco mice showed antitumorgenic activity by maintaining liver architecture and nuclear morphometry but also down regulated the serum VGEF levels. Immuno-histochemical staining of liver sections with anti-ribosomal protein S27a antibody showed post-treatment abolition of this proliferation marker from the tumor tissue [2].

7) Wound healing

Topical administration of an alcoholic bark extract of Butea monosperma on cutaneous wound healing in rats increased cellular proliferation and collagen synthesis at the wound site, by increase in DNA, total protein and total collagen content of granulation tissues, the tensile strength also increased significantly & histopathological examinations also provide favourable result So, it possesses antioxidant properties, by its ability to reduce lipid peroxidation [2].

8) Anti-diarrhoeal activity

Ethanolic extract of stem bark of Butea monosperma(Lam) Kuntz at 400 mg/kg and 800mg/kg inhibited castor oil induced diarrhoea due to inhibiting gastrointestinal motility and PGE2 induced enteropooling and it also reduced gastrointestinal motility after charcoal meal administration in Wistar albino rats Butea monosperma gum has also been found useful in cases of chronic diarrhoea. It is a powerful astringent and also decreases bilirubin level [2].

Conclusion :

The phytochemically active constituents of Butea monosperma were qualitatively analyzed by different preliminary screening

Methods which includes different tests such as test for Flavonoids,Triterpenoids,Glycosides,Anthraquinones,Saponines, Carbohydrates, Pentoses,Alkaloids,Phytosterols,Proteins,Amino acids,etc. The preliminary phytochemicals screening of both ethanolic and water extract show presence of tannins, carbohydrates, Terpenoids, Glycosides and Alkoloid present in aq. extract and Streroil present in alcohol extract.

Scope for further study :

As every human being weants potent substances in the form of drug which is to be safe for human health because most Of the synthetic drug shows adverse effect on human health .Butea monosperma contain different phytochemical constituents which attracts researcher and again it regain its glory traditionally by herbal formulation.

(a) To study more for their single drug efficacy clinically.
(b) Comparative study with patra, flowers can be done.
(c) Extraction by different solvents to find extract base for their antimicrobial acitivity.
(d) In vitro study for their antimplantation, aphro disiac and antioxidant property.
(e) It will be better to repeat the same procedure for 3 to 4 times and then arrive to conclusion.

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