

BUCHANANIA LANZAN : AN ENORMOUS MEDICINAL VALUE

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ABSTRACT

Traditional indigenous knowledge reveals the immense value of almost all parts of the plant i.e. roots, leaves, fruits, seeds and gum for various medicinal uses. Buchanania lanzan, being a vulnerable medicinal plant, is included in the Red Data Book published by International Union for Conservation of Nature and Natural Resources (IUCN). A dry deciduous forest tree of family Anacardiaceae is widely used by Indian tribes for treating various diseases. Three major chemical constituents of potent medicinal value, namely celidoniol, vomicine, epinitol have been characterized from an organic extract of leaves. Such extracts mainly exhibit antidiabetic, antihyperlipidemic, antioxidant, anti-inflammatory, wound healing, antidiarrheal, antivenom activity including a host of other curative properties. The present paper thorough updated account of ongoing and emerging areas of research of this plant, especially in the field of phytomedicines and pharmaceuticals. Buchanania lanzan Spreng, commonly known as char, and chironji. This species has high socioeconomic value providing livelihood to tribal population of the area and has high potential as commercial horticulture species.

Key words: *Buchanania lanzan Spreng, antihyperlipidemic, phytomedicines, socioeconomic, tribal population, etc.*

INTRODUCTION

The tribes around the Dnyanganga wild life sanctuary often consumed and sale the highly nutritious plant *Buchanania lanzan* to sustain and also to earn their livelihood. They possess 3.0% moisture and are rich in lipid/fat (59.0%), protein (19.0-21.6%), starch/carbohydrate (12.1%), fibre (3.8%), minerals such as calcium (279.0 mg), phosphorus (528.0 mg), iron (8.5 mg) and vitamins such as thiamine (0.69 mg), ascorbic acid/vitamin C (5.0 mg), riboflavin (0.53 mg), niacin (1.50 mg) and also contain 34-47% fatty oil. The seeds are used as expectorant and tonic. The oil extracted from kernels is applied on skin diseases and also used to remove spots and blemishes from the face. The juice of the leaves is digestive, expectorant, aphrodisiac, and purgative. The gum after mixing with goat milk is used as an analgesic .

This review is an attempt to present an updated comprehensive account about the ethnomedicinal and phytochemical investigation carried out on *B. lanzan*. The leaves are reported to contain tannins, triterpenoids, saponins, flavonoids, kaempferol-7-o'-glucosides, quercetin-3-rahmnoglucoside, quercetin, gallic acid, kaemferol, and reducing sugars, including a new glycoside, and myricetin-3'-rhmnoside-3-galactoside (Nazim .*et.al* 1992, Mehta *et. al* 2010)

MEDICINAL AND CURATIVE PROPERTIES

Buchanania lanzan is a widely used plant with a history of traditional medicinal use for the treatment of various diseases. It is used in the form of decoction to treat intrinsic haemorrhage, diarrhoea with blood and as tonic. Grown up child who has left the breast milk should be given sweet bolus prepared of *B. lanzan* kernels, madhuka (*Glycyrrhiza glabra*) honey, parched paddy and sugar candy. Kernels made into a powder and used with milk as aphrodisiac and in case of fever and burning sensation. Powder of the bark mixed with honey is useful in blood dysentery (Warokar *et. al* 2010). This plant has a long history of folk use in tribal societies across tropical regions of the world. At present, in this era of herbal science, in depth research is being carried out in every such plants to discover pharmaceutically active novel magic drugs. In this review, we tried to project a comprehensive account of the global effort already undertaken to explore the phytochemical wealth of *B. lanzan*. (Khare *et. al* 2007)

Anti-inflammatory and analgesic activities

Inflammation is considered as a primary physiologic defence mechanism that helps body to protect itself against infection, burn, toxic chemicals, allergens, or other noxious stimuli. The methanolic extract of the leaves of *B. lanzan* at different doses used showed good anti-inflammatory activity (Shekhar *et. al* 2012). These results are also comparable to aspirin, the reference drugs used in this study. It indicates the efficacy of the methanolic extract as a therapeutic agent in acute as well as chronic inflammatory conditions. The methanolic extract isolated from *B. lanzan* roots showed significant anti-inflammatory activity and analgesic activity. (Mehta *et. al* 2011).

Antioxidant activity

Antioxidants help to deal with oxidative stress which is caused by free radical damage. In vitro antioxidant activity is performed on methanolic extract of *B. lanzan* kernel by 1, 1-diphenyl-2-picryl-hydrazyl (DPPH) and reducing power method. Quantitative estimation of total polyphenolic content of the extract is estimated by Folin-Ciocalteu method. The extract exhibits significant antioxidant activity. Total polyphenolic content is found to be $16.82\% \pm 23$ mg of gallic acid equivalent/100. Presence of phytochemicals such as triterpenoids, saponins, and tannins in the extract might contribute to the observed antioxidant activity (Warokar *et. al* 2010).

Antidiabetic and antihyperlipidemic activity

Diabetes mellitus is a chronic metabolic disease caused by an absolute or relative lack of insulin and or reduced insulin activity. Hyperlipidemic condition is metabolic complication of both clinical and experimental diabetes (Gandhi *et. al* 2001).

Adaptogenic activity

Adaptogens cause an adaptive reaction to a disease and are useful in many unrelated illness and appear to produce a state of non-specific increased resistance during stress resulting in stress protection (Alexander *et. al* 2010). The methanolic extract of *B. lanzan* leaves are evaluated for adaptogenic activity using the swim endurance model in all groups under normal and stressed conditions. Urinary vanillyl mandelic acid (VMA) and ascorbic acid are selected as non-invasive biomarkers to evaluate the antistress activity. The 24 hrs urinary excretion of VMA and ascorbic acid are determined by spectrophotometric methods. Daily administration of the extract at doses of 10, 20, 30, 40 and 50 mg/kg body weight prior to induction of stress inhibited stress-induced urinary biochemical changes in a dose-dependent manner without altering the levels in normal control groups. The methanolic extract exhibited significant anti-stress activity (Mehta *et. al* 2011)

Antiulcer activity

Peptic ulcer disease is a serious gastrointestinal disorder that requires a well-targeted therapeutic strategy. The ethanolic extract of *B. lanzan* roots is investigated for its antiulcer activity. To assess the antiulcer activity of varied concentrations of the extract (200 and 400 mg/kg orally) evaluated for ethanol induced ulcer in mice and pylorus ligation induced ulcer in rats. The ethanolic extract showed a dose-dependent protection against gross damaging action of ethanol and pylorus ligation on gastric mucosa of animals. The treatment with the extract showed significant protection of ulcer index in both the models as well as also inhibited the pylorus ligation-accumulated

gastric secretion. Thus, the extract is in possession of good preventive and therapeutic action on the gastric ulcers (Kodati *et.al* 2010).

Antidiarrheal activity

Diarrhea is defined as an increase in the frequency, fluidity, or volume of bowel movements and is characterized by increased frequency of bowel sound and movement, wet stool, and abdominal pain (Fontaine *et. al* 1988). The ethanolic extract of *B. lanzan* roots significantly reduced fecal output in castor - oil induced diarrhea and also reduced the number of diarrheal episodes. *B. lanzan* significantly delayed the onset of diarrhea induced by castor oil and reduced the number of animals exhibiting diarrhea. *B. lanzan* efficiently reduced the intestinal propulsion of charcoal meal in mice. The data obtained indicate that the ethanolic extract of *B. lanzan* roots has antidiarrheal activity. Tannins present in *B. lanzan* probably contribute to its antidiarrheal property (Kodati *et. al* 2010)

Wound healing activity

The ethanolic extract of *B. lanzan* fruits was used in Albino rats for wound healing activity and used to study the effect in dexamethasone suppressed wound healing. Three wound models viz., incision, excision and dead space wounds were used in this study. The parameters studied are breaking strength in case of incision wounds, epithelialization and wound contraction in case of excision wound and granulation tissue dry weight, breaking strength and hydroxyproline content in case of dead space wound. (Chitra *et.al* 2009)

Memory booster

Alzheimer's disease is a progressive neurodegenerative brain disorder that occurs gradually and results in memory loss, unusual behavior, personality changes, and ultimately death (Reddy *et.al* 1997). Biochemical abnormalities such as reduction of acetyltransferase, acetylcholine biosynthases and increase in acetyl cholinesterase (AChE), and metabolism are strongly associated the degree of cognitive impairment (Ellen *et.al* 1997]. Petroleum ether extract of seeds of *B.lanzan* (PEB) (500 mg/kg, oral) is studied for its neuro-psychopharmacological effect in experimental rats. Activity of seeds extract on memory acquisition and retention is studied using elevated plus maze and step down apparatus models, and AChE enzyme level at discrete parts of brain is also estimated. Administration of PEB (500 mg/kg) to positive control and treated groups showed significant reduction in transfer latency in elevated plus maze, increase in step down latency in step down apparatus models and reduction of acetylcholine esterase enzyme activity in different regions of the brain as compared with the other groups (Neelkanth *et. al* 1997).

Antivenom activity

B. lanzan includes in the list of the plants which have anti-snake venom activity. Fruit and bark extract of *B. lanzan* is used for the treatment of snake bite in Chhattisgarh region (Minu *et.al* 2012). The ethanolic extract of *B. lanzan* bark was studied against toxicity induced by *Naja kaouthia* snake venom by various *in vivo* and *in vitro* studies. The extract was evaluated for neutralization of lethality, myotoxicity, phospholipase A2 activity and human red blood cell lysis produced by *N. kaouthia* snake venom. The extract at 200 mg/kg and 400 mg/kg significantly neutralized the lethality produced at different concentration of snake venom. Myotoxicity also decreased up to a significant level characterized by decline in creatine phosphokinase level. *In vitro* models for assessing hemolytic activity were found to be significantly decreased in the presence of the extract. Both direct and indirect hemolytic study was performed at various concentration of extract. More than 50% of hemolysis was significantly neutralized by the extract. Results showed significant neutralization of toxicity produced by *N. kaouthia* snake venom (Hegde *et. al* 2014).

Diuretic effect

A diuretic is any substance that promotes the production of urine. The alcoholic fruit extract and n hexane fractions of *B. lanzan* and *Buchanania angustifolia* produced significant diuretic effect at a dose of 500 mg/kg, which appeared to be comparable with that of the standard drug furosemide. With the same dose *B. angustifolia* was found to be better diuretic than *B. lanzan*. However, further studies are encouraged to isolate the active phytochemical constituent for exploring exact mechanism of diuresis (Hullatti *et. al* 2014).

CONCLUSION

The present review attempt to assess enormous research interest on *B. lanzan* highlighting current achievements, especially in the field of traditional medicines, phytomedicines and other emerging area across the world. The information that we presented here definitely exhibits immense prospect of organic solvent extracts in curing and/or mitigating various human problem. One of the most significant findings is the antidiabetic property of the leaf extracts. The fact that tribal regularly consumes leaf decoctions for general well-being may be correlated with this antihyperlipidemic activity. In conclusion, we observed that, like many other unexplored forest plants, *B. lanzan* holds real promise as a enormous store house of magic chemicals that will surely benefit mankind in coming decades. Hence it can be stated that *B. lanzan* a herbal drug which is already used by traditional *vaidya* and tribes in India, though there is further need of documentation and validity.



Fig. 1 Occurrence of *Buchanania lanzan* in India



Fig. 2 A plant portion of *Buchanania lanzan*

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