



IPOMOEA RENIFORMIS: A SCIENTIFIC REVIEW

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ABSTRACT

Traditionally "underkani", *Ipomoea reniformis* chois (Convolvulaceae) is reported to possess anti-inflammatory, diuretic, anti-epileptic, anti-pyretic and laxative properties. Since there is no compiled data regarding this plant, our efforts were devoted to compile all the information reported on its phytochemical, biotechnological and pharmacological activities, so that interest could be diverted towards this ignored herb for the treatment and relief from various ailments and diseases.

Keywords: Underkani, *Ipomoea reniformis*, Convolvulaceae, Anti-inflammatory.

INTRODUCTION

Ipomoea reniformis chois (Convolvulaceae) is a perennial, much branched herb (creeper). It is found widely distributed all over the India, specially in damp places in upper gangetic plain, Gujarat, Bihar, West Bengal, Western- Ghats, ascending up to 900m in the hills, Goa, Karnataka in India, Ceylon and Tropical Africa^{1-7, 9}. *Ipomoea reniformis* is also known as *Merremia emarginata* Hallier f. In India it is known by various names in different regions viz., Mooshakarni in Sanskrit, Underkani in Bombay, Indurkani in Bengal, Underakani in Gujarat, Toinnuatali in Telugu, Chukakani in Urdu, Goromusha in Persian, Mushkani in Hindi, Paerattae-kirae in Tamil, Yellikadukirai in Madras^{2, 5,7, 8,10}. It is adulterated with *Centella asiatica*⁵. It is reported to have many important medicinal properties. In the Indigenous system of Medicine, *Ipomoea reniformis* has been claimed to be useful for cough, headache, neuralgia, rheumatism, diuretic, inflammation, troubles of nose,

fever due to enlargement of liver and also in kidney diseases. Powder of leaves is used as a snuff during epileptic seizures, Juice acts as purgative and the root is having diuretic, laxative, and applied in the disease of the eyes and gums. The whole plant decoction is mainly responsible for its medicinal uses^{7, 8, 9, 10, 11}. Although, *Ipomoea reniformis* growing all over the India, but little work is done on the chemical examination of it.

Phytochemistry

Little work is done in the field of phytochemical investigation of the plant. Shah et al., have showed the presence of resin, glycosides, reducing sugars and starch while alkaloids are absent, ^{5, 13}. Petroleum ether extract was reported to contain fats and fixed oil while aqueous extract was reported to contain amino acids, tannins (condensed tannins, pseudo tannins), and starch¹². Chemical investigation of *Ipomoea reniformis* shows the presence of caffeic, p-coumaric, ferulic and sinapic acid esters identified in seeds¹⁴.



Fig. 1: *Ipomoea reniformis*

Pharmacology

In the indigenous system of medicine, *Ipomoea reniformis* has been used for treatment of inflammation, epilepsy, diuretic, laxative etc. A little pharmacological investigation has been carried out on this plant. But a lot more can still be explored and utilized. Babu et al.,¹⁵ studied biological activities of different solvent extracts isolated from *Ipomoea reniformis*. They have examined, Hexane (IA), Ethyl acetate (IB), Methanol (IC) and (25%) aqueous methanol (ID) extracts of *Ipomoea reniformis*. Anti oxidant properties of the extracts were studied by DPPH (1, 1-Diphenyl-2-Picrylhydrozyl) radical scavenging activity method. Methanol extract exhibited

better anti oxidant activity than other extracts with IC₅₀ of 8.59 µg mL⁻¹ in DPPH radical scavenging method. Methanol and hexane extract exhibited α- amylase inhibitory activity with IC₅₀ of 104.5 and 133.4 µg mL⁻¹, respectively. Ethyl acetate extract showed cytotoxicity with ED₅₀ of 34.29 µg mL⁻¹ in brine shrimp lethality assay. The present study showed that the extracts IB and IC of *Ipomoea reniformis* were found to be showed most promising biological activities. Methanol extract of this plant might be used for anti oxidant and anti obesity activities with minimal toxicity. Sukkawala et al.,⁵ studied the alcoholic extract of *Ipomoea reniformis* (whole plant) which showed general depressant action in rats, a reversible inhibitory effect on the heart of frog and rabbit and also

constriction of the coronary vessels in rabbit heart. The extract also had spasmolytic action on guinea pig ileum but hypotensive effect not influenced by atropine sulphate in cats. The alcoholic extract appeared to be more musculotropic than neurotropic. The effect of aqueous extract however was lower than that of alcoholic extract. Aswal et al.,^{5,16} showed that the 50% ethanolic extract of *Ipomoea reniformis* (whole plant excluding roots) was screened for anti protozoal, anti viral, diuretic and effects on CVS, CNS and smooth muscles and was found inactive. The LD₅₀ of extract was found to be >1000mg/kg i.p. in albino mice.

Biotechnology

Patel et al.,¹⁷ showed that *Ipomoea reniformis* plants were treated with different plant growth regulators (PGRs), naphthyl acetic acid (NAA), phenyl acetic acid (PAA), and gibberellic acid (GA₃). To determine the role of wall stiffening enzymes in internodes elongation, IAA (indole acetic acid) oxidase and peroxidase in the presence of different hydrogen donors like caffeic acid, chlorogenic acid and guaiacol were assayed. The levels of total, mono and dihydroxy phenols were also determined together with the assay for the presence of IAA protectors. There was no significant difference in internodes length upon PGRs treatment. Peroxidase assayed using caffeic acid as hydrogen donor after GA₃ treatment showed inhibition in both cytoplasmic and wall bound fraction was observed NAA and PAA treated internodes with the other two substrates. IAA oxidase activity was significantly inhibited by GA₃ treatment in the wall bound fractions. The IAA protectors correlated well with total phenol and diphenols showed almost similar contents.

CONCLUSION

The extensive survey of literature revealed that *Ipomoea reniformis*, as an important source of so many pharmacologically and medicinally important phytoconstituent. This plant has been studied for its anti oxidant effect. It has been also treated with different plant growth hormones to determine the role of wall stiffening enzymes in internodes elongation of *Ipomoea- reniformis*. But researches are insufficient in terms of its Phytocological aspect. In the recent years, the importance of herbal drugs increases. Around 47% of the prescription contains at least one ingredients derived from the

herbal source. So it can be further exploited for the welfare of human race.

REFERENCES

1. Kirtikar KR, Basu BD, Indian medicinal plants, 2nd ed., Vol. 2, Lalit Mohan basu, Allahabad, India, 1702 (1935).
2. Shah GL, Flora of Gujarat State 1st ed., Vol. 1, Sardar Patel university, Vallabh vidyanagar, 459-460 (1978).
3. Ansari SH, Essential of Pharmacognosy, 5th ed., Birla publication, Delhi, 408-410 (2005-2006).
4. Agarwal VS, Drug plants of India, 1st ed., Vol. 2, Kalyani printings, New Delhi, 499 (1997).
5. Satyvati VG, Gupta K. A., Medicinal Plants of India 1st ed., Vol. 2, Indian council of Medical research, New Delhi, 241 (1987).
6. Backer CA, Flora of Java, 576-578
7. Chattertee A, The Treatise of Indian medicinal plants, 1st ed., Vol. 4, National Institute of Science Communication And Information Resources, New- Delhi, 148-149 (2003).
8. Nadkarni KM, Indian Material Medica, 3rd ed., Bombay Popular Prakashan, Bombay, 690 (1954).
9. Agarwal VS, Drug Plants of India, 1st ed., Vol. 1, Kalyani Publishers, New Delhi, 440 (1947).
10. Warden HJ, Hooper D, Pharmacographia Indica, Vol. 2, Bishen Singh, Delhi, 539 (1890).
11. Dutta AC, Botany, 6th ed., By Oxford University Press, Calcutta, 576-577 (2000).
12. Usnale SV, International Journal of Pharmaceutical and Clinical Research, 1(2): 65-67 (2009).
13. Shah CS, Sukkawala VM, Chavan AR, Pharmacognostic Study of *Ipomoea reniformis* And Comparision With Centella Asiatica Linn, 22 (1962).
14. Rastogi PR, Mehrotra BN, Compendium of Indian Medicinal Plants, 1st ed., Vol. 2, Published By Indiancouncil of Medical Research, New Delhi, 241 (1993).
15. Babu Av, Research Journal of Medicinal Plant, (2009).
16. Aswal BS, Goel AK, Mehrotra BN, Screening of Indian Plants For Biological Activity, Part XI, Indian J Exp Biol 22, 487 (1984).
17. Patel D, Gen. Appl. Plant Physiology, 33(1-2): 25-39 (2007).