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A REVIEW ON IMPORTANCE OF IPOMOEA CARNEA

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Abstract:
The uses and ecology of Ipomoea carnea is reviewed based on published data. It was used in ancient system of medicine and the fact that the plant had immense potential for pharmacological and insecticidal Properties. Ipomoea carnea has great importance in Ayurveda.

Key Words: Ipomoea Carnea, Uses, Chemical Constituents & Pharmacological Properties.

Introduction:

Ipomoea carnea, is a species of morning glory. This flowering plant has heart-shaped leaves that are a rich green and 6–9 inches long. It can be easily grown from seeds which are toxic and it can be hazardous to cattle; the toxicity is related to the bioaccumulation of selenium species in leaves but mostly in seeds (Sabogal, Ana and Dunin Borkowski,2007; https://en.wikipedia.org). This plant commonly found in waste lands (Figure 1).

The plant Ipomoea carnea belongs to family Convolvulaceae. Ipomoea carnea grows to a height of 6 m on terrestrial land, but acquires a shorter height in the aquatic habitats. The stem is thick and develops into a solid trunk over several years with many branches from base. The stem is erect, woody, hairy, and more or less cylindrical in shape and greenish in colour. It has alternate leaves. Normally it attains 1.25 - 2.75 m long and 0.5 - 0.8 cm diameter. The leaf is simple and petiolate, petiole is cylindrical, attains 4.0 - 7.5 cm length and 2.5 – 3.0 mm diameter. The upper surface of leaf is dull green and the lower surface is paler. The leaves which receive lesser sunlight may grow larger than the leaves which receive full sunlight (Afifi et al., 1988; Chaudhuri et al., 1994; Sharma and Bachheti, 2013). The objective of this study is to review the uses of Ipomoea carnea and other activities.

Uses of Ipomoea Carnea:

- The stem of I. carnea can be used for making paper (Chand, Navin and Rohatgi , 2005).
- Stem is also used as fire wood.
- It contains a component identical to marsilin, a sedative and anticonvulsant (Chand, Navin and Rohatgi, 2005).
- A glycosidic saponin has also been purified from I. carnea with anticarcinogenic and oxytoxic properties (Chand, Navin and Rohatgi , 2005).
- The leaves are used as fertilizer.
- The plants are also used for fencing.
- Colorful flowers are often grown as ornamentals, and a number of cultivars have been developed. Their deep flowers attract Butterflies and hummingbirds.

As a Raw Material for Paper Making:

Soda lignin and Soda Anthraquinone lignin obtained from wood and Ipomoea carnea is almost same. Their functional groups are highly similar. In both the lignin samples the presence of vanillin and syringaldehyde was found. Addition of anthraquinone to the

pulping process does not affect the quality of lignin precipitated from soda black liquor; even though it nearly doubles the amount of lignin precipitated from black liquor. Rate of delignification was higher with 0.1% addition of anthraquinone (Nand Kumar, 2011a). Ipomoea carnea had been found that very useful for paper making (Nandkumar, 2011b; Deepa Srivastava and Shukla, 2015).

Raw material for Activated Carbon:

Ipomoea carnea is effective in the removal of copper from aqueous solution. It was concluded that the activated carbon produced from morning glory by zinc chloride activation has better adsorbing capacity of copper than the raw adsorbent. After activation with zinc chloride lot of micro pores were produced. With the increase in micro pores the adsorption percentage of copper was increased. The adsorption of copper was found to be maximum at its natural pH. The adsorption of copper by raw adsorbent and activated carbon both follows pseudo second order rate kinetics (Miranda, et al., 2012; Deepa Srivastava and Shukla, 2015).

As a potential source of Energy:

Ipomoea carnea is a potential biogas source of Energy. Ipomoea carnea biomass and distillery waste admixture proved to be the best substrate. The plant has a suitable methane content which makes Ipomoea carnea suitable for energy production (Deshmukh, 2012; Deepa Srivastava and Shukla, 2015).

As a Biocompost:

Ipomoea carnea is useful to increase the microbial activity of biocompost. The organic content of biocompost also increases after treatment of Ipomoea carnea. The thermophilic bacteria are in highest number in Ipomoea carnea compost their number is (43x106) at 50^{0} C biocompost of 30^{th} day. Ipomoea carnea is also useful in germination of different seeds. Such as in groundnut Ipomoea Carnea compost mixture showed highest (83%) percentage of germination when compare to OS (49%) in 5th day (Moindi et al., 2012; Sharma and Bachheti, 2013).

Insecticidal Property:

Sahayaraj and Ravi (2008) reported that in Ipomoea carnea benzene and chloroform extracts yielded the compounds such as neophyadiene, 1-decanol, tetradecanoic acid, pentadecane, 1-iodo-2-methylundecane, trans-caryophyllene, eicosane, 2-butenoic acid and cholestan-3-one. Cholestan-3-one is a steroidal compound and it has a high insecticidal property.

Mechanical Properties:

Cellulose content of this shrub is over 55% and lignin content is about 17% which indicates it is a fibrous material and can be used as filler for making light weight polymer composite which provides an effective means of utilization of a large quantity of this diffuse shrub (Kamal Kumar Basumatary and Acharya, 2013).

Kamal Kumar Basumatary and Acharya (2013) investigation can be used as an effective reinforcement in polymeric composite creating a variety of technological applications beyond its traditional uses. It can also be used as a substitute for wood based composite. The composite prepared have low density compared to synthetic fibers and also to some natural fibers. Therefore, it can judiciously be used for producing light weight composite materials. Reinforcement of Ipomoea carnea particulate into the epoxy matrix shows improvement in both the tensile and flexural properties compared to pure epoxy (Kamal Kumar Basumatary and Acharya, 2013).

Proximate Chemical Analysis:

Proximate Chemical analysis includes- Cold water solubility , Hot water solubility, Ether Solubility, Alcohol benzene solubility, 1% NaOH solubility, Pentosan

Content ,Lignin content ,Holocellulose ,Hemicellulose, Alpha cellulose ,Acetyl content ,Methoxyl content, Uronic anhydride and Ash Content were 8.43, 12.60 ,3.04, 8.46, 28.6, 17.60, 18.08, 67.49 ,22.40 ,46.45, 4.32, 4.76, 3.45 and 6.14 respectively. The values are expressed in % on OD woody material basis (Nandkumar, 2009; Deepa Srivastava and Shukla , 2015).

Pharmacological Profile:

The plant had immense potential as an Anti-inflammatory Activity, Antioxidant Activity, Antidiabetic Activity, Antimicrobial Activity, Wound Healing Activity, Immuno modulatory Activity, Cardiovascular Activity, Embryotoxic effect, Antifungal Activity, Hepatoprotective Activity, Inhibition Activity and Anxiolytic Properties (Sharma and Bachheti, 2013).

Adsull et al. (2012) reported that the acetone extract shows antimicrobial activity against two strains, Ptroteus vulgaris and Salmonella typhimurium. Ethanol extract also exhibits indicative activity against Pseudomonous auroginosa. N-Hexane and ethyl acetate extracts do not show any antimicrobial activity against the said strains.

Ambiga and Jeyaraj (2015) studied in vitro antioxidant activity of Ipomoea carnea using different models of screening viz. DPPH radical scavenging, ABTS radical scavenging, iron chelating activity, nitric oxide scavenging assay, and alkaline DMSO assay. Their results showed good dose dependant free radical scavenging property in all the models. Phytochemical analysis revealed the presence of major phytocompounds like alkaloids, glycosides, phenolics and saponins. The antioxidant property may be related to the polyphenols and flavonoids present in the extract.

Conclusion:

The plant has many chemical constituents and shows various mechanical, insecticidal & pharmacological properties. Moreover, this plant can be used as biofertilizer and the stem is also used as fire wood by the poor peoples. Flowers attract the butterflies and humming birds. This plant used as a raw material for activated carbon. Hence, Ipomoea carnea has a capacity for the development of new medicines in future.

References:

1. Adsull,V.B., E.Khatiwora , Rasika Torane , N.R. Deshpande.2012. Antimicrobial activities of Ipomoea carnea leaves. J. Nat. Prod. Plant Resour., 2 (5):597-600.
2. Afifi M. S, Amer M. M. A and El-Khayat S.A. 1988. Macro-and micro morphology of Ipomoea Carnea Jacq. Growing in Egypt. Part I. Leaf and flower. Mansoura Journal of Pharmaceutical Science, 3:41-57.
3. Ambiga, S and M. Jeyaraj.2015. Evaluation of in vitro Antioxidant Activity of Ipomoea carnea Jacq. Int.J.Curr.Microbiol.App.Sci 4(5): 327-338.
4. Chand, Navin and P. K. Rohatgi .June 20, 2005. "Impact toughness of Ipomoea carnea particulate-polyester composite". Journal of Materials Science Letters (Netherlands: Springer Netherlands) **6** (6): 695–697. doi:10.1007/bf01770929. ISSN 0261-8028.
5. Chaudhuri H, Ramaprabhu T, and Ramachandran V, Ipomoea Carnea Jacq. A new aquatic weed problem in India.Journal of Aquatic Plant Management, 32:37-38, (1994).
6. Deepa Srivastava and K. Shukla. 2015. Pharmaceutical efficacy of Ipomoea carnea. Biological Forum – An International Journal vol 7(1): 225-235.

7. Deshmukh, H.V. 2012. Economic Feasibility and Pollution Abetment Study of biogas Production Process utilizing Admixture of Ipomoea carnea and Distillery Waste, Journal of Environmental Research and Development. 7(2): 222-23.
8. https://en.wikipedia.org/wiki/Ipomoea_carnea.
9. Kamal Kumar Basumatary and S. K. Acharya.2013. Investigation into mechanical properties of Ipomoea carnea reinforced epoxy composite. International Journal of Macromolecular Science 2013; 3(3): 11-15.
10. Miranda, M.A., Dhandapani, P., Kalavathy, M.H. & Miranda, L.R.2012. Activated Ipomoea carnea a biosorbent for the copper sorption from aqueous solution (www.ntu.edu.sg/pbast/_abstract/104.Lima.Mira nda.pdf.).
11. Moindi J, Onyambu E, Kiprono S. J, Titus S. K, Onyancha W.2012. Studies of Biodegradation of Ipomoea carnea Weed from Kavinadu Big Tank in Pudukkottai District (India) Journal of Natural Sciences Research, Vol. 2, No.6.
12. Nandkumar, P. 2009. Pulp Blending and its Effects on the Strength Properties of Ipomoea carnea jacq. Journal of Environmental Research and Development. 3(4):1088-1093.
13. Nandkumar, P. 2011a. Comparative Study between soda Lignin and soda Anthraquinone lignin in terms of Physiochemical Properties of Ipomoea carnea. International Journal of Chemical, Environmental and Pharmaceutical Research. **2**(1) 26 – 29.
14. Nandkumar, P. 2011b. Studies on the Chemical Constituents and the Pulp and Paper Making Characteristics of Ipomoea carnea Jacq. Oriental Journal of Chemistry. 27(1): 149 – 154.
15. Sabogal, Ana and Dunin Borkowski .December 2007. "Estado actual de la investigación sobre Ipomoea carnea: toxicidad en ganado caprino]". Revista de Química (Lima, Perú: Pontificia Universidad Católica Del Perú) (January-December 2007): 29–35. ISSN 1012-3946.
16. Sahayaraj, K and C. Ravi.2008. Preliminary phytochemistry of Ipomoea carnea Jacq. and Vitex negundo linn. Leaves. Int. J. Chem. Sci.: 6(1):1-6.
17. Sharma, A and R. K. Bachheti. 2013. A review on Ipomoea carnea. Int J pharm Bio sci; 4(4): 363 – 377.

Figure 1: Ipomoea Carnea in Waste Land