Abstract

In vitro culture and bioactivity studies on Hybanthus enneaspermus (L.) F. Muell

*Hybanthus enneaspermus* (L.) F. Muell (Violaceae) is a medicinal herb having aphrodisiac, demulcent, tonic and diuretic properties, known as ‘padmacarini’ in Sanskrit. The species is under threat in the natural habitat and in Ayurveda, the botanical identity of ‘padmacarini’ is controversial. Therefore, a detailed authentication of the drug is quite essential. It is envisaged that development of mass propagation techniques and alternate methods for the production of raw drugs/metabolites should definitely improve the threat status of the plant. Considering the prospects of the multifarious biological properties reported from the herb, further scientific studies are necessary to exploit the unknown activities. Hence, in the current study, investigations were conducted initially to authenticate the plant using various pharmacological tools, secondly, to standardise the micropropagation technique for the rapid multiplication and production of biomass and finally to evaluate the bioactivities such as antioxidant capacity and anticancer property.

The pharmacognostical standards evolved in the present study can be utilized for identifying the genuine drug, *H. enneaspermus*. An efficient and reproducible *in vitro* regeneration protocol using nodal explants on MS medium containing 1.5% glucose and 1.5% fructose along with 3 mg/l 2-ip was developed, which facilitated fast multiplication (14.3 shoots after 60 days) of *H. enneaspermus*. Preliminary phytochemical screening and HPTLC profile of the methanol extract of *H. enneaspermus* were conducted. *In vitro* antioxidant activities of the methanol extract were tested and the results revealed that *H. enneaspermus* is a potent source of natural antioxidants. Cytotoxic and anticancer potential of the methanol extract of *H. enneaspermus* was explored in the current study. An attempt was also made to compare the antioxidant and cytotoxic potential of the methanol extracts of the field grown plant and *in vitro* grown calli samples and the observations revealed the enhanced activity of samples collected from stress induced calli. Detailed findings of the above investigation are discussed in detail in the thesis.

**Key words:** antioxidant, anticancer, *in vitro* stress, proline, HPTLC, pharmacognosy.