

## **ABSTRACT**

Keeping in view the medicinal values of *Silybum marianum* L. this study was carried out to investigate the bioactive compound silymarin and elemental analysis of *in vitro* cultures of *S. marianum*

Weedy nature and seed dormancy of *S. marianum* made germination problematic. Conditions were optimized for *in vitro* germination. Hundred percent seed germination was recorded with 16 hour cool period of 17 °C alternating with 8 hours warm period of 37°C on cotton pad soaked with distilled water in petriplates. In MS medium supplemented with 2mg/L GA3 seed germination was achieved in 5 days. Plantlets thus obtained were used for the subsequent experiments.

Callus induction was studied using different explants from *in vitro* and *in vivo* grown seedlings. Callus formation from cotyledons was observed in 2.5mg/L BAP and 1.5mg/L NAA when used singly, as well as, callus formation from leaf, stem and hypocotyls when used in combinations. Best samples of calli and plant material (seeds, leaves and shoot) were investigated by PIXE (Proton Induced X-Ray Emission). About 9 PIXE spectra were obtained from 9 samples of calli and plant tissues with an irradiation of 3MeV protons from 6S DH2 pelletron accelerator. A total of 19 elements (Na, Mg, Si, P, Cl, K, Ca, Sc, V, Cr, Mn, Fe, Ni, Cu, Zn, Sr, Al and Ti) were detected in *in vitro* and *in vivo* plant material. Maximum number of elements were detected in the stem and callus obtained from stem.

Best grown calli and different plant parts were selected for silymarin estimation through UV- Visible spectrophotometer. Results showed that seeds contained maximum amount of silymarin and *in vitro* cultures also do retain the property of producing silymarin of medicinal value but at earlier stages calli do not have silymarin.