

Seed Treatment to Improve Germination in Liquorice (*Glycyrrhiza glabra* L.)

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The roots of Liquorice (*Glycyrrhiza glabra* L.) are economically important mainly due to the presence of a triterpenoid called "Glycyrrhizin" which is calcium and potassium salts of glycyrrhizic acid. It has been used as tonic, laxative, demulcent, emollient, in genito-urinary disease, peptic ulcer, coughs, sore throat, scorpion sting, preparation of alcohol, insecticides and yeast cultures. Keeping in view the wide range of utility of the roots of liquorice; the present investigation was undertaken to find out the possibilities of propagation of liquorice through seed as its seed show poor germination.

Physiologically mature seeds of liquorice (*Glycyrrhiza glabra* L.) were collected from the research farm of CCS HAU, Hisar during July, 2001. The seeds were subjected to the following dormancy breaking treatments:

- 1) Mechanical scarification by scarifier at 1425 rpm for 3-4 seconds.
- 2) Acid scarification: Seeds were subjected to the conc. sulphuric acid for 120 seconds followed by thorough washing in running water.
- 3) Acid scarification: Seeds were subjected to the conc. sulphuric acid for 150 seconds followed by thorough washing in running water.
- 4) Cold treatment by keeping seeds at 10°C for a week before putting for germination.
- 5) Hot water treatment: Seeds were dipped in hot water upto 80°C for 2 minutes.

The germination test was carried out at 25°C in dark. One hundred (100) seeds in three replications were put to standard germination test between two germination paper moistened with water at 25°C. The percentage of normal seedlings and hard seeds were calculated. The root and shoot length of each of the five seedlings were measured. To determine the dry matter of seedlings, these five seedlings were placed in oven at 80°C for 27 minutes and then weighed. Vigour index was calculated by multiplying the germination and seedling length. Statistical analysis was performed as per standard procedure [1].

Statistical analysis of data showed remarkable differences in percentage of normal seedlings and hard seeds in various treatments (Table 1). The initial percentage was 78.3 per cent and the normal seedling was only 2 per cent. Out of the five treatments tried, only two treatments showed positive effects. Immersing seeds in hot water (80°C) and prechilling (10°C) did not result in improved germination. There was a considerable improvement in seed germination by pre-treatment of mechanical scarification of seed i.e. 38.8 per cent. Treatment of conc. sulphuric acid when given for 120 seconds has less effect on germination (12.3%).

The most effective treatment in breaking of seed dormancy was found to be of conc. sulphuric acid for 150 seconds, where the number of hard seeds reduced to 7 per cent. Similar effect of conc.

Table 1. Effects of various pre-treatments on germination of liquorice

Treatments	Normal seedling (%)	Hard seed (%)	Root length (cm)	Shoot length (cm)	Vigour index (%)	Dry root weight (mg)
Hot water (80°C)	4.6	66.6	4.1	5.3	90.90	6.3
Mechanical scarification	38.8	19.0	4.6	6.4	315.52	6.1
H ₂ SO ₄ (conc.) 120 seconds	12.3	57.6	3.9	5.2	110.36	5.6
H ₂ SO ₄ (conc.) 150 seconds	60.6	7.0	4.9	6.9	459.54	6.4
Prechilling (10°C)	7.3	59.6	3.8	5.1	91.29	6.2
Control	2.0	78.3	3.5	4.5	38.69	5.3
CD at 5%	1.15	2.22	1.45	0.23	7.79	0.74
CV (%)	2.96	2.61	16.47	2.33	0.76	0.36

sulphuric acid on germination in *Solanum* has been reported [2]. All the treatments showed increased values for root length and shoot length and correspondingly higher values of vigour index. Maximum value of root (4.9 cm), shoot (6.9 cm) length and vigour index (459.54%) were recorded in conc. sulphuric acid (150 seconds). This enhancement in germination due to pre treatments may be attributed to the easy imbibitions of water through scarified seed surface in acid treatment thereby facilitating the onset of germination due to mobilization of the food resources [3]. Similar promotary effects of acid treatments are reported in *Catharanthus roseus* [4].

In the present study mechanical and conc. sulphuric acid scarification treatment not only increased germination with an enhanced hypocotyl and radicle but also resulted in significant reduction in the total germination time over control. This could be of great significance and of practical use in rapid multiplication of Liquorice.

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