

Effect of chemical treatment on germination of nutmeg (*Myristica fragrans* Houtt.) seeds

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Abstract

Studies were undertaken to evaluate the influence of pre-sowing treatment of nutmeg (*Myristica fragrans*) seeds with various chemicals on the viability of seeds and seedling vigour. Among the various chemicals evaluated, gibberellic acid (100 ppm) was most effective and resulted in significantly higher germination (85%) and vigour index value (3945).

Key words: germination, *Myristica fragrans*, seed treatment.

Abbreviation: GA - Gibberellic acid

Seeds of nutmeg (*Myristica fragrans* Houtt.), an important tropical tree spice, normally germinate slowly. Pre-sowing chemical treatment of seeds is known to improve germination and quality of seedlings in many crop species. The present study was undertaken to determine the effect of pre-sowing seed treatment with various chemicals for producing elite seedlings of nutmeg in the nursery.

Fully matured nutmeg seeds were collected from State Horticultural Farms, Kallar and Burliar (Tamil Nadu, India) and the studies were carried out at the Department of Seed Technology, Tamil Nadu Agricultural University, Coimbatore. The seeds were exposed through fortication technique to the following six pre-sowing treatments namely, water soaking; GA (50 ppm); GA (100 ppm); KNO₃ (0.5%); KNO₃ (1.0%); FeSO₄ (1.0%). Untreated seeds served as control. For each treatment 20 seeds

were used with four replications. After the treatment the seeds were sown in sand and kept in the germination room maintained at a temperature of 25±2°C and relative humidity 90±3%. Seed germination was recorded daily and speed of germination was calculated as per the formula suggested by Maguire (1962).

$$\text{Speed of germination} = (X_1 \setminus Y_1) + \{(X_2 - X_1) \setminus Y_2\} + \{X_n (X_n - 1) \setminus Y_n\}$$

Where X_n = Number of seeds germinated at nth count

Y_n = Number of days from sowing on nth count

At 60 days after sowing, the effect of various treatments on seed germination was evaluated. Ten normal seedlings were selected at random in each replication and length of root and shoot were measured. The seedlings were then dried

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Table 1. Effect of chemical treatment on seed germination and seedling vigour in nutmeg.

| Treatment | Germination (%) | Speed of germination | Root length (cm) | Shoot length (cm) | Dry weight (mg) | Vigour index |
|--------------------------|-----------------|----------------------|------------------|-------------------|-----------------|--------------|
| Untreated | 72 (57.86) | 0.54 | 13.3 | 26.6 | 687.3 | 2855 |
| Water soaking | 70 (56.92) | 0.45 | 13.5 | 26.6 | 842.6 | 2810 |
| GA (50 ppm) | 75 (60.08) | 0.53 | 15.0 | 26.5 | 822.3 | 3118 |
| GA (100 ppm) | 85 (67.41) | 0.63 | 16.0 | 30.3 | 1001.9 | 3945 |
| KNO ₃ (0.5%) | 65 (53.76) | 0.44 | 13.9 | 25.4 | 670.6 | 2554 |
| KNO ₃ (1.0%) | 68 (55.77) | 0.48 | 14.8 | 26.1 | 617.4 | 2802 |
| FeSO ₄ (1.0%) | 72 (57.86) | 0.55 | 15.9 | 30.4 | 898.5 | 3075 |
| F Test | * | ** | ** | ** | ** | ** |
| CD (P=0.05) | 7.08 | 0.08 | 1.6 | 2.3 | 107.9 | 608 |

Figures in parentheses are arc sine values

* = $P < 0.05$; ** = $P < 0.01$.

in an oven maintained at $85 \pm 1^\circ\text{C}$ for 48 h and the dry matter content of seedlings were calculated. The vigour index values were calculated as per Abdul-Baki & Anderson (1973) and the data obtained were statistically analysed for 'F' test of significance.

Soaking seeds in GA (100 ppm) registered significantly higher germination (85%) and vigour index (3945) compared to other treatments. There was no significant difference in the speed of germination, root and shoot length and dry weight of seedlings between soaking seeds in GA (100 ppm) and FeSO₄ (1.0%). However, the latter was also on par with the untreated for germination, speed of germination, vigour index and superior with respect to other characters. Soaking seeds with KNO₃ (0.5% and 1.0%) had deleterious effect on germination and all seedling vigour parameters.

The enhancement of germination may be attributed to stimulation of hydrolytic enzyme activity or synthesis known to be induced by GA

which is well known in cereal crops. Pre-sowing seed treatment with GA has been reported to be beneficial in some crops, although the results varied with cultivar, concentration of chemical and period of soaking (Bradford & Ewing 1958; Cole & Wheeler 1974). Higher germination combined with vigour index obtained with GA (100 ppm) treatment indicated the suitability of this treatment to enhance germination of nutmeg seeds.

References

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