

**EFFECT OF NITRIC OXIDE DONOR SODIUM NITROPRUSSIDE ON  
GERMINATION DYNAMICS AND SEEDLING ATTRIBUTES OF  
RUBBER (*Hevea brasiliensis*)**



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## ABSTRACT

Rubber (*Hevea brasiliensis*) is an economically important tropical tree. For producing high quality rubber plants, both rootstock and budwood should be of high quality. Rubber seeds are used to generate rootstock plants. Rubber seeds lose their viability within a few days after falling from the tree and therefore, they are classified as recalcitrant seeds. For government rubber nurseries, seeds are purchased from suppliers who collect and store seeds for few days to weeks before supplying in bulk quantities. These inferior quality seeds require more time to start germination and results in low germination percentage. Nitric oxide (NO) is a signaling molecule which has proved to be involved in biological processes from seed germination up to senescence. Redox priming with Nitric oxide donor Sodium nitroprusside has been shown to increase germination dynamics in crop seeds. The experiment was carried out on exploring the effect of NO donor sodium nitroprusside (SNP), as a chemical priming agent, on germination and storage life of rubber seeds and subsequent growth of seedlings under nursery conditions. Fresh rubber seeds were soaked in SNP solutions at different concentrations viz., 50, 100 and 150  $\mu\text{M}$  for 24 hours and were sown in a germination bed after storing at different time intervals viz., 0, 7, 14, 21 and 28 days respectively. For mock treatment, seeds were soaked in water (hydropriming) and control seeds were devoid of priming treatments. Treatment were arranged in Randomized Complete Block Design (RCBD) with four blocks. No germination was recorded after 28 days of storage irrespective of priming treatments. At zero day of storage, there was no significant difference ( $P > 0.05$ ) in germination percentage. However, after the seventh day of storage, a significantly ( $P \leq 0.05$ ) higher germination percentage was recorded with SNP at 50  $\mu\text{M}$  (80.7% and 99.2% after 7 and 14 days of sowing respectively) as compared to control (60% and 75.7% after 7 and 14 days of sowing respectively). At

the fourteenth day and twenty-first day of storage, highest significance germination percentage was recorded with SNP at 50 and 100  $\mu\text{M}$  with compared to control and mock treatment (hydropriming) after 21 days of sowing.

After one, two and three months from transplanting, plants were sampled to assess the effect of SNP on growth, root architecture and some physiological parameters. At zero day of storage, there was no significance difference in growth and root architecture. At seventh day of storage, significantly ( $P \leq 0.05$ ) higher values were recorded for chlorophyll content at 50  $\mu\text{mol}$  and 100  $\mu\text{mol}$  concentrations with compared to control, after two months of transplanting. Significantly higher stem diameter values were recorded at 50  $\mu\text{mol}$  SNP concentration compared to control, after one month of transplanting. After fourteenth day of storage, significantly ( $P \leq 0.05$ ) higher values were recorded for chlorophyll content at 50  $\mu\text{mol}$  and 100  $\mu\text{mol}$  SNP concentrations with compared to control, after two months of transplanting. There was a significant difference ( $P \leq 0.05$ ) in numbers of leaves at 50  $\mu\text{mol}$ , after one month of transplanting and stem diameter at 100  $\mu\text{mol}$  SNP, after one month of transplanting. At twenty one day of storage, there was no significant difference ( $P > 0.05$ ) in growth attributes *viz.*, stem diameter, shoot height, number of leaves, leaf area, internodal length, chlorophyll content, dry weight of roots and shoots of rubber seedlings after two months from planting. Therefore, NO treatment could effectively be utilized to improve the germination and short-term storage life of rubber seeds to raise high quality budded plants for productivity improvement in rubber industry.

Key words: Germination, Nitric Oxide, Rubber, Sodium Nitroprusside.

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