How to Use Potassium Nitrate to Enhance Papaya seeds Germination

Potassium nitrate, or KNO3, is better known as Saltpetre. It soften tough seed coats that might otherwise have to pass through a bird's digestive system or several years of exposure to the elements to break their dormancy. The salt-like substance should be handled with care, as it can irritate the skin and is toxic in large doses.

1) - Wear gloves, goggles and a dust mask when handling Saltpetre to avoid getting it in your eyes and nose, or on your skin. Use a measuring spoon to transfer 1/2 teaspoon of the crystalline white powder from its container into a 1 pint / 0.5 liter bucket or jar. Cap the saltpetre container, set it aside and fill the bucket or jar with warm water to dissolve the Saltpetre.
2) - Drop the seeds you wish to treat into the bucket or jar. Soak the papaya seeds in the potassium nitrate solution for about 30 minutes. Sow them while they are still damp.
3) - Fill 1-gallon containers with a sterile, soil-less potting mixture of equal parts sphagnum moss and perlite or vermiculite. Use at least three containers for best success because papaya plants might be female, bisexual or male, and only the females and bisexuals produce fruit. Do not start seeds in seedling trays because papayas transplant poorly; 1-gallon containers ensure the plant requires transplanting only once from the container to the ground.
4) - Evenly space two to four seeds in each container and cover the seeds with 1/4 to 1/2 inch of potting mix. Place the containers in full sun to partial shade in temperatures above 70 degrees Fahrenheit; choose full sun when possible to achieve maximum fruit production and sweetness.
5) - Water the seeds to moisten the soil. Apply water regularly to keep the soil damp, but avoid over watering because soggy soil can cause seedlings to dampen off.
6) - Thin the seedlings to leave only the best container when seedlings reach a few inches high or have two sets of leaves. Papaya seeds can germinate in about two weeks with the potassium nitrate treatment. Without the treatment, germination can take up to five weeks.
7) - Transplant the new papaya plants into the ground in full sun and well-drained soil when they outgrow the original containers. Amend poorly drained, clay soils with organic materials, such as compost, straw, leaf mold and grass clippings worked into the soil with a rotor tiller. Or you can transfer the plants to larger pots, choosing at least a 5-gallon container for each plant to accommodate it at mature size.

Another conclusion:

Potassium Nitrate enhanced dormancy breaking and seed germination of papaya seeds.

The objectives of this study were:
1) To investigate and enhance seed germination in two commercially grown papaya genotypes ("Solo" and "007") of importance in Queensland, Australia.

2) To study the effects of potassium nitrate on breaking dormancy and improving germination of fresh seed pre-storage.
Seeds were pre-soaked in aqueous solutions of potassium nitrate at a range of concentrations (0; 0,25; 0,5; 1,0; 1,5 M) for 0, 15, 30, 60 min, 2, 3, 6, 14 or 24 h prior to germination testing.

The mean percentage of germination increased above control levels for both varieties after pre-treatment in either 0,25M or 0,5M potassium nitrate. The highest mean percentage of germination was seen after pre-treatment at 0,25M potassium nitrate for 2 or 3 h (64% and 65% for “Solo”, 58% and 64% for “007”, Figure 1). Dormancy in fresh seeds of papaya cultivars when freshly harvested, could be broken to give acceptable levels of germination when potassium nitrate was used; potassium nitrate gave the highest levels of germination for “007” seeds and may be the preferred treatment for application in papaya.

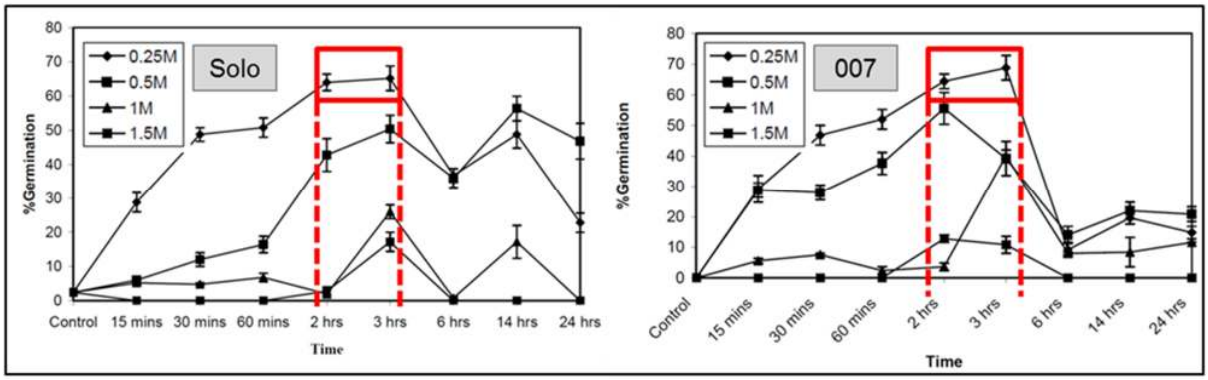

Figure 1. Mean percentages of germination of fresh seeds of Solo and 007 varieties of Carica papaya after pre-treatment for various times in a range of concentrations of KNO_3. Each data point is the mean of 10 replicates of 25 seeds. Error bars are standard errors of the means (SEM).

Ashmore, S. E., R.A. Drew, C. O’Brien, and A. Parisi. 2008. Cryopreservation of papaya (Carica papaya L.) seed: overcoming dormancy and optimizing seed desiccation and storage conditions. Acta Hort 839: 229-235.