



Effect of Seed Treatments on Germination of Custard Apple (*Annona squamosa* L.)

(*Shyam Sundar, Dr. Devi Singh and Dr. Saket Mishra)

Department of Horticulture, SHUATS, Naini, Prayagraj, Uttar Pradesh

*Corresponding Author's email: shyamchoudhary1010@gmail.com

Abstract

An investigation was carried under the supervision of Dr. Devi Singh, (Associate Professor) SHUATS out to see the effect of GA₃, Thiourea and KNO₃ growing media on seed germination, survivability and physiological parameters of Custard apple (*Annona squamosa* L.) from August 2023 to October 2023 at Naini Agricultural Institute, Department of Horticulture, SHUATS, Prayagraj (U.P.) Amongst different growing media, percent of germination, survivability percentage, Leaf Area Index (LAI), Leaf Area Duration (LAD), Light transmission ratio (LTR), Energy Interception (Ei), Seedling vigour index I (cm) and Seedling vigour index II (g) were found significantly superior under M5 growing media comprising soil + vermicompost + AZO + PSB followed by M2 (soil + vermicompost), M4 (soil + FYM + AZO + PSB), M1 (soil + FYM), M3 (soil + AZO + PSB) and M0 (only soil). Survival of seedling and germination percentage was highest in media M5 which was at par with M4. As regards the interactions, germination percentage, survivability, Seedling vigour index I (cm) and Seedling vigour index II (g) were found not significant. However, G2M5 treatment combination [seed soaked in 400 ppm GA and sown in soil + vermicompost + AZO + PSB] recorded superior and G0M0 combination (control) was found inferior in respect to survival and most of growth parameters. In some physiological parameters like Leaf Area Index (LAI), Leaf Area Duration (LAD), Light transmission ratio (LTR) and Energy Interception (Ei), interaction was found significant. In respect to germination, G3M5 treatment combination [Seeds soaked in 600 ppm GA concentration and sown in soil + vermicompost + AZO + PSB] showed superiority over rest of the treatment combinations whereas minimum was observed in control (G0M0).

Keywords: Seed treatments, germination, custard apple

Introduction

Custard apple (*Annona squamosa* L.) is an important fruit crop and cultivation spread in tropical and subtropical zones around the world. The edible fruits of genus *Annona* are collectively known as annonaceous fruits and it belongs to the family annonaceae. There are an estimated 2200 species of annonaceae in the world, but mainly three species are cultivated viz., *Annona squamosa*, *Annona cherimoya* and *Annona muricata* (Mahdeem, 1994) [7]. The custard apples are mainly grown in tropical parts of America, Australia, Brazil, Egypt and India. The major custard apple growing states in India are Maharashtra, Gujarat, Andhra Pradesh, Karnataka, Uttar Pradesh, Bihar and Assam with an area of 41 thousand hectares with an annual production of 347 thousand MT and in Andhra Pradesh it is growing in an area of 1.68 thousand hectares with an annual production of 16.67 thousand MT (NHB, 2019-20).

Custard apple is a drought tolerant, hardy fruit crop and grows well even in shallow and sub marginal soils without much care. The plant is erect, with a round or spreading crown and height ranges from 4.5-6 m and trunk size is 25-35 cm, leaves are oblong or narrow-lanceolate with 10-20 cm long and 2-5 cm wide with conspicuous veins. The flowers are hermaphrodite and appear singly or in small drooping clusters and exhibit protogyny. The fruit is an aggregate, which is composed of peel, pulp and seeds, of which 45% are the edible portion. The edible fruit contains 23.5g carbohydrates, 3.1g fibre, 1.6g protein and 0.4g fat per 100g of pulp and it is also rich in minerals like 17mg calcium, 47mg phosphorous, 37mg vitamin-C and provides 104 k Cal of energy (Pareek and Sharma, 1993).

The custard apple tree is a small to medium-sized evergreen tree that can reach a height of 15 to 30 feet (4.5 to 9 meters). It has a dense canopy with broad, glossy, dark green leaves. The tree produces fragrant flowers that are pale green or yellowish and are often hidden within the foliage.

The fruit of the custard apple is the main attraction. It is typically heart-shaped or rounded, with a bumpy or scaly skin that may range in color from green to yellowish-green. The flesh is creamy white and has a custard-like texture, hence the name "custard apple." The fruit is divided into segments, each containing a shiny black seed. The edible flesh has a sweet, aromatic flavor reminiscent of a combination of banana, pineapple, and strawberry.

Custard apples are usually harvested when fully ripe. The fruit can be eaten fresh, scooping out the flesh with a spoon, or used in various culinary applications such as desserts, smoothies, ice creams, and beverages. It is also sometimes used to make jams and jellies. When it comes to cultivation, custard apples thrive in warm tropical and subtropical climates.

They prefer well-drained soil and can tolerate a variety of soil types, including sandy or loamy soils. The trees require regular watering, especially during dry periods, but excessive waterlogging should be avoided. They also benefit from regular fertilization and pruning to maintain their shape and promote fruiting.

Custard apple is generally classified as semi arid fruit fit very well to the waste land utilization programme which is currently being emphasized by Government also as way for solving unemployment problem of people in rural area in semi arid region. Seed germination of custard apple is uneven and irregular making sexual propagation difficult. Much experimental evidences support the concepts that specific endogenous growth promoting and inhibiting compounds are involved directly in the control of seed development, dormancy and germination (Black, 1980). Custard apple requires 35-50 days for potential germination (Hernandez, 1983). Irregular germination, in custard apple seeds may be due to dormancy or due to hard seed coat. Very limited work has been carried out on this aspect in different parts of the world indicating, the utility of GA3 from 150-500 ppm is helpful for getting better germination of custard apple seeds (Banker, 1987; Stino et al., 1996; Pawshe et al., 1997; Ratan and Reddy, 2004a) [2, 26, 23, 24]. Therefore, pre treatment of custard apple seed with different organics and also chemicals is very important to improve germination.

Custard apple trees are propagated through seeds or grafting. Seed-grown trees may take longer to bear fruit compared to grafted trees. However, grafted trees tend to be more reliable in terms of fruit quality and consistency.

Custard apple crops have gained popularity due to their delicious flavor, nutritional value, and potential medicinal properties. The fruit is a good source of dietary fiber, vitamins, and minerals such as vitamin C, potassium, magnesium, and iron. It is also believed to have antioxidant and anti-inflammatory properties.

Overall, custard apple is a delightful tropical fruit that has captured the taste buds of many people worldwide. Its unique flavor, creamy texture, and nutritional benefits make it a favorite among fruit enthusiasts and a promising crop for cultivation in suitable regions.

References

1. Gaikwad (2016) The present experiment entitled “Influence of seed priming treatments on germination and seedling vigour of custard apple (*Annona squamosa* L.) cv. Local” was conducted during the year 2014-2015 at Agriculture Experimental Station, Navsari Agricultural University, Paria
2. Palepad KB *et al* (2017) carried out to study the effect of seed treatments on seed germination and seedling vigour of custard apple during 2015-16 at Nursery Unit, Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidypeeth, Akola
3. Jain *et al* (2018) conducted an experiment to see the effect of GA3 and growing media on seed germination, survivability and physiological parameters of Custard apple (*Annona squamosa* L.) from December 2014 to April 2015 at Fruit Research Station, Imalia Farm, Department of Horticulture, College of Agriculture, JNKVV, Jabalpur (M.P.)
4. Mane *et al* (2018) conducted a study to know the effect of different pre-sowing treatments on shoot growth of custard apple (*Annona squamosa* L.) at Instructional-cum Research Farm, Department of Horticulture, College of Agriculture, Badnapur. during the year 2015-2016
5. Rahangadle *et al* (2019) conducted an experiment to to study the influence of GA3 and date of sowing on growth and development of custard apple seedlings. Significantly, maximum fresh weight of roots (0.75g), dry weight of root (0.20g) and total dry matter (0.37g) were obtained at 120 days after germination under 500ppm GA3 treatment.
6. Pravin *et al* (2021) The present investigation was conducted at Fruit Science block, Department of Fruit Science, College of Horticulture, Anantharajupeta, Dr. Y.S.R. Horticultural University, Andhra Pradesh during the year 2020-21