Pollen cryopreservation in Bottle gourd for breeding and conservation

HGR P51

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Abstract

The current study focuses on pollen germination and cryopreservation and pollination. At the time of anthesis (4:30 to 7 p.m.) pollen were collected from field and pre storage germination assessment was carried by hanging drop technique using modified Brewbaker and Kwack media containing different concentration of sucrose. After 1 hour desiccation in zeolite beads the pollen were packed in butter paper covers enclosed in sealed aluminium pouches which were rapidly plunged into the cryobiological system containing liquid nitrogen. After cryopreservation the germination test was carried out to know the percentage of germination of cryopreserved pollen. The fresh pollen recorded germination percentage of 97.20 % and it was 96.50 % after one week of cryopreservation in 15% sucrose. The results indicate that, there is no significant decline in viability of cryopreserved pollen. Pollination of cryostored pollen has successfully set fruits in field condition.

Objectives

- Collection and extraction of pollen.
- Viability assessment and cryopreservation of pollen
- Field pollination of cryostored pollen



Male flower



Female flower

Introduction

- Bottle gourd (*Lagenaria siceraria* (Molina) Standl.) also known as Calabash, is one of the most important cucurbitaceous vegetable in India with more genetic diversity.
- As monoecious nature of bottle gourd, male flower grows on long peduncle and female flower on short peduncle however it has an ovary in the shape of the fruit.
- Anthesis and dehiscence time is moderately influenced by humidity and temperature conditions and also there is seasonal variation in photoperiod insensitive and sensitive genotype.
- So to avoid this seasonal variation in breeding programme, we have done pollen cryopreservation.

Materials and Methods



At the time of anthesis pollen were collected from field



Pollens were extracted from fresh flowers by gently tapping flowers with the help forceps

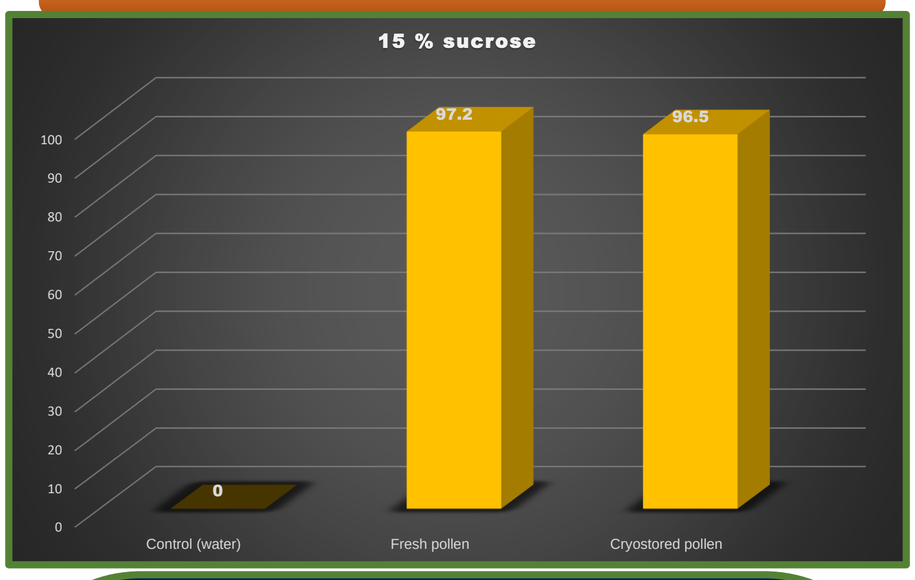


Pollens were dried in zeolite beads

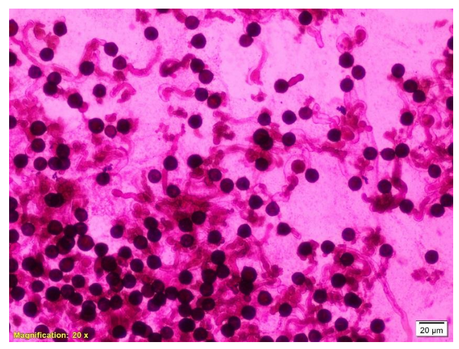


Then pollens were plunged into the cryobiological system containing liquid nitrogen

Result and Discussion

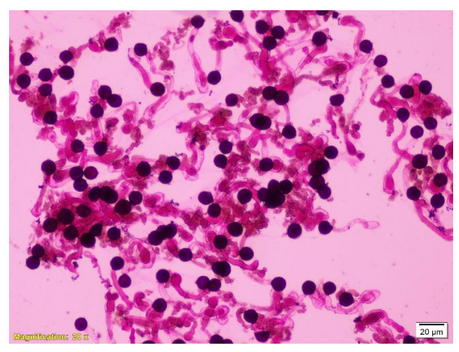


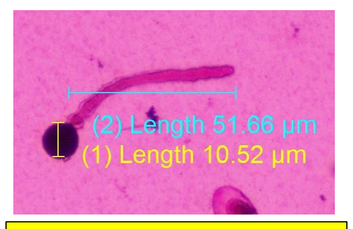
- The fresh pollen recorded germination percentage of 97.20 % and it was 96.50 % after one week of cryopreservation in 15% sucrose.
- The results indicate that, there is no significant decline in viability of cryopreserved pollen.
- The cryopreservation of bottle gourd pollen helps for production of the cross combination genotypes (Photosensitive and insensitive) with year round supplementary pollination.





Germination of fresh pollen





Germination of cryostored pollen

Conclusion

- Cryopreservation of pollen offers a simple and effective method of long-term pollen storage.
- Pollen stored in liquid nitrogen (LN) for many years without loss of its essential capabilities to pollinate, fertilize, and set normal fruit and seed when used in plant breeding, for controlled pollinations, or for the conservation of plant genetic resources.

Acknowledgment

I am very much grateful to the ICAR-IIHR, Bangalore for providing all the essential laboratory and field facilities to conduct pollen viability assessment and cryoprervation work.

References

Zaman, M. R., 2006, Pollen germination, viability and tube growth in fourteen cultivated and wild species of cucurbit grown in Bangladesh. *J. Life Earth Sci*., 1(2): 1-7.