INT. J. BIOL. BIOTECH., 6 (4): 229-231, 2009.

IN-VITRO POLLEN GERMINATION CAPACITY AND MAINTENANCE OF *CUCUMIS MELO* VAR. *MELO* L. (CUCURBITACEAE)

Shaukat Ali Khan and Anjum Perveen

Department of Botany University of Karachi, Karachi 75270, Pakistan.

ABSTRACT

Pollen germination capacity and viability period of *Cucumis melo var. melo* was examined up to 48 weeks in different concentrations of sucrose and boric acid solutions. The collected fresh pollens were stored in different conditions as refrigerator (4ºC), freezer (-20ºC, -30ºC), freeze drier (-60ºC). The fresh pollens were also treated in vacuum over silica jell and in organic solvents (acetone, benzene & chloroform). Pollens stored at freeze dryer (-60ºC) showed better germination percentage as compared to pollen stored at freezer (-20ºC, -30ºC), refrigerator (4ºC) and fresh.

Key-worsd: Pollen germination, *Cucumis melo*, Cucurbitaceae, pollen storage.

INTRODUCTION

Pollen storage is useful for breeding programmes, genetic conservation, artificial pollination and self-incompatibility. Longevity of pollen can be defined as the period of time over which the pollen retains its viability, *i.e.* germinability and fertilization ability, varies greatly with plant species and storage conditions (Hanna and Towill, 1995; Dafni and Firmage, 2000). Mostly binucleate pollens can be stored for long periods of time without loss of viability (Hanna and Towill, 1995) as compared to trinucleate pollen. Pollens stored at low temperature presented germination capacity better than high temperature (Stanley and Linskens, 1974). Pollen grains of tomato stored in open air lose half of their original germination capacity within 2 days at 25 °C and within 5 days at 6 °C (Abdul-Baki, 1992), while pollen stored at –20 °C under dry conditions retain viability for greater than three years (Hanna and Towill, 1995). Kapoor (1976) studied pollen germination in some Cucurbits. There are several reports on pollen germination and viability of different taxa with varied aims and objective like King (1965), Datta & Chaudhary, (1965), Nair and Singh (1972), Vijay (1972), Mayer *et al.*, (1988), Shivanna and Rangaswamy (1992), Taylor & Hepler (1997), Thomas (2000), and Candace & Maureen, (2003). Storage of pollen in vacuum and in organic solvents also reported by different workers (Iwanomi, 1971; Hanson & Campbell, 1972; Khan & Perveen, 2006; 2008; 2009).

MATERIALS AND METHODS

During the peak of flowering period of *Cucumis melo* var. *melo* polliniferous material was collected in large quantity from cultivated fields of Sahkro, Gharo and green houses. Fresh pollens were systematically subjected to preliminary viability tests (Alexander, 1969). Pollen culture media was prepared according to standard method of Brewbaker and Kwack (1963). The germination was scored after 3-6 hours of incubation at room temperature in humid chambers using different solutions. Pollen tubes equal to at least twice the diameter of pollen grains considered as germinated while burst pollen were counted as un-germinated. The viability of stored pollen was assessed in terms of percent germination. The pollen grains slides were also prepared for light microscopy (LM) using the standard methods of Erdtman (1952). For light microscope the pollen grains were mounted in unstained glycerin jelly and observations were made with a Nikon type- 2 microscope.

RESULT AND DISSCUSSION

Pollen viability of *Cucumis melo* var. *melo* L. has been examined up to 48 weeks in different conditions as refrigerator, freezer, freeze drier, vacuum and in organic solvents. Pollen stored at freeze drier (-60ºC) showed better germination percentage in solutions (20%, 30%) after 4-12 weeks, but after that germination percentage decreased slowly and gradually. This method seems to have more potential to maintain viability compared to other conditions. Similarly, pollen stored in freezer at -20ºC and -30ºC showed good germination but as the time passed the germination percentage gradually decreased and after 48 weeks the germination was 42.60 % and 48.60 % respectively (Table 1). The germination percentages at refrigerator (4ºC) and fresh pollen were almost same in first week (Table 1). Pollen stored at 4ºC showed only 54.10 % germination in early weeks but then germination

decreased rapidly and after 48 weeks germination was 22.30 %. In all stored conditions freeze dryer (-60ºC) showed better germination after 48 weeks i.e., 57.10% in 40% solution (Table 1). Khan and Perveen (2009) also reported that among the three verities of mango (*Mangifera indica* L. Anacardiaceae) veriety *langra* showed 54.50% germination while chaunsa pollen showed germination up-to 49.10% which is comparatively low to the germination noted in *Cucumis melo* at freeze dryer (-60ºC). Pollen were also treated in vacuum over silica jell, this condition showed optimum germination when vacuumed up-to 9 hours but after that germination is negligible and the shape of pollen become some what irregular however the germination was higher in vacuum dried condition when compared to organic solvents. Among organic solvents benzene showed better germination percentage as compared to acetone and chloroform where the pollen lost viability very quickly.

Table 1. Germination capacity of pollens of *Cucumis melo* var. *melo* L. (Cucubitaceae) stored at different temperature.

Period in Week	Different Temperature and Humidity condition							
	% of Germination at 4°C	% of solutions	% of Germination at -20°C	% of solutions	% of Germination at -30°C	% of solutions	% of Germination at -60°C	% of solutions
4	54.10	20	71.50	20	72.10	20	79.00	20
8	54.00	20	73.10	20	74.00	20	81.00	20
12	53.30	20	72.40	20	72.00	20	78.10	20
16	49.00	20	67.40	20	63.50	20	73.40	20
20	46.10	30	65.00	30	61.00	30	70.00	20
24	42.60	30	68.00	30	67.00	30	69.00	30
28	41.00	40	67.00	30	63.20	40	76.30	30
32	40.00	40	65.20	40	60.00	30	65.00	40
36	33.90	40	53.60	30	58.00	30	62.70	30
40	29.40	40	50.10	30	53.60	20	61.00	40
44	25.70	50	47.40	30	51.00	40	59.90	40
48	21.30	50	42.60	40	48.60	30	57.10	40

Acknowledgement

We are thank-full to Pakistan Science Foundation, Islamabad, for providing financial support.

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(*Accepted for publication October 2009*)