

Effect of Post Harvest Fruit Storage on Seed Quality in Ash Gourd (*Benincasa hispida* (Thunb.) Cogn.)

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ABSTRACT Experiments were conducted during 2001-03 to find out the effect of post harvest storage of mature fruits of ash gourd (cvs. CO 2 and KAU Local) on seed quality. Stored fruits of CO 2 and KAU Local showed significant fruit weight loss of 52.9 and 49.9 per cent, respectively after one year. Similarly, fresh seed weight reduced to the tune of 23.3 and 11.5 per cent, and dry seed weight reduced to 24.6 and 25.4 per cent in CO 2, and KAU Local, respectively after one year of storage. The reduction of 100 seed weight was faster during 7-8 months onwards in KAU Local. The germination per cent significantly increased upto eight months of storage afterwards, a gradual decrease was observed in seed quality characteristics.

Production of high quality seeds in cucurbits depends on harvesting the fruits at the proper stage of maturity as well as proper extraction and storage procedures [1]. In fleshy fruits, the seeds continue to develop and mature in the flesh until they get extracted from fruits [2]. Physiological maturation can also continue while seeds are in the dry state although at a slower rate. In dry seeds, the process is called after-ripening and the duration required to achieve maximum vigour varies with storage. Hence, post harvest ripening in the form of fruit storage must be standardized in order to get uniform germination and seedling growth. Since ash gourd is adapted to tropical condition, it behaves independently unlike other cucurbitaceous vegetables grown in western countries, which have large patronage by majority of scientific workers. It is a general practice that gourd fruits are harvested at vegetable maturity and stored for seed extraction in the farmer's holding. But leaving the fruits in the vine for full maturity is more effective according to Nerson [3]. Besides the initial germination, longevity of such seeds harvested at the time of vegetable maturity is also poor than those mature on the mother plant itself. In practice, seed growers may not take risk in retaining fruits in the field. In this context, storage of fruits is highly essential for quality seed production point of view. Pre-extraction storage of harvested fruits improves germinability in many

cucurbits [4 & 5]. Hence, influence of extended storage of mature (70 DAA) ash gourd fruits under ambient storage condition was studied using CO 2 and KAU Local varieties.

MATERIALS AND METHODS

Well-matured ash gourd fruits (70 Days After Anthesis) of CO 2 and KAU Local harvested from the summer season crop raised during 2001 were stored for twelve months in the ambient conditions (average temperature of 27°C and 70 % of RH) at Department of Seed Science and Technology, Tamil Nadu Agriculture University, Coimbatore. The fruits were kept in ventilated wooden racks in a scattered manner. Every month, fruits were weighed individually and loss of weight was recorded at the end of storage period. The seeds extracted from respective treatments were cleaned manually, placed in paper towels to remove external moisture and fresh weight was noted and expressed as gram per fruit. Dry weight of the seed was also recorded after subjecting to oven drying at 60°C for 36 h. The moisture content of the seed was estimated by low constant temperature (drying at 105° C for 16 h) oven method [6].

After drying the seed to 10 per cent moisture content, the weight of eight replicates of 100 seeds

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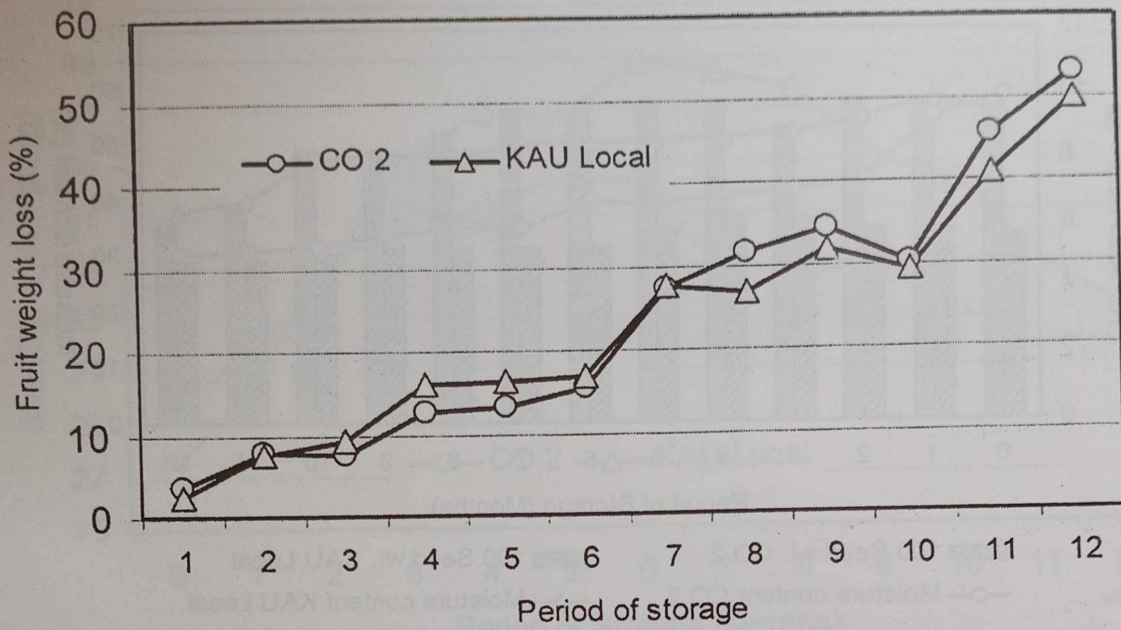


Fig 1. Fruit weight loss in ash gourd cvs. CO 2 & Kerala Local during Storage

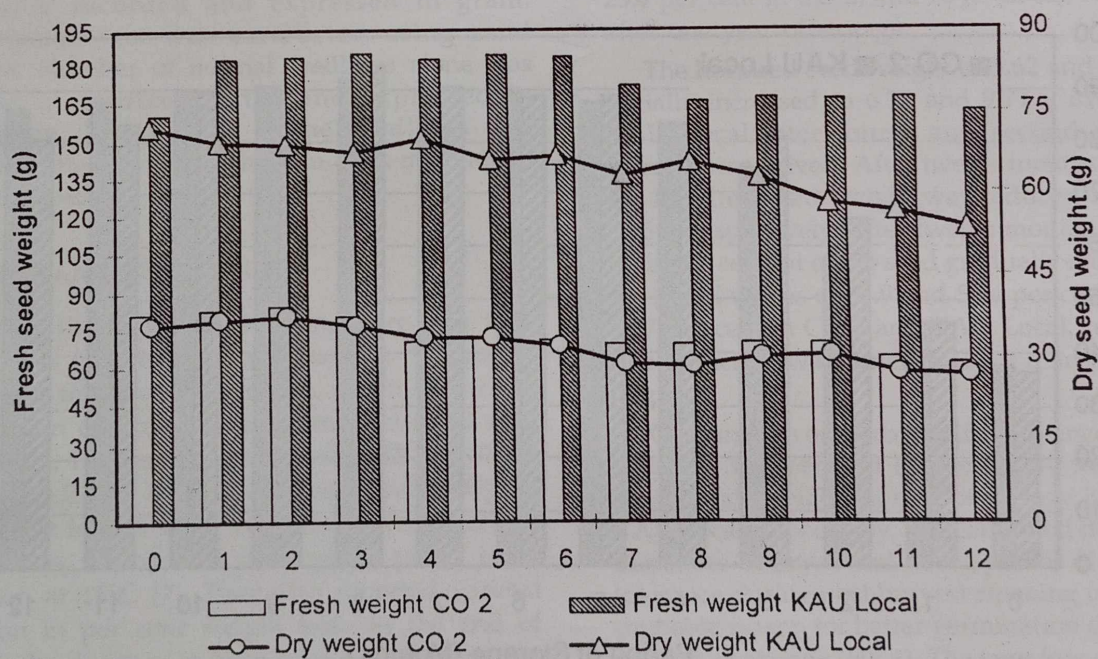


Fig 2. The effect of fruit storage on fresh and dry weight of seed in ash gourd cvs. CO 2 & KAU Local

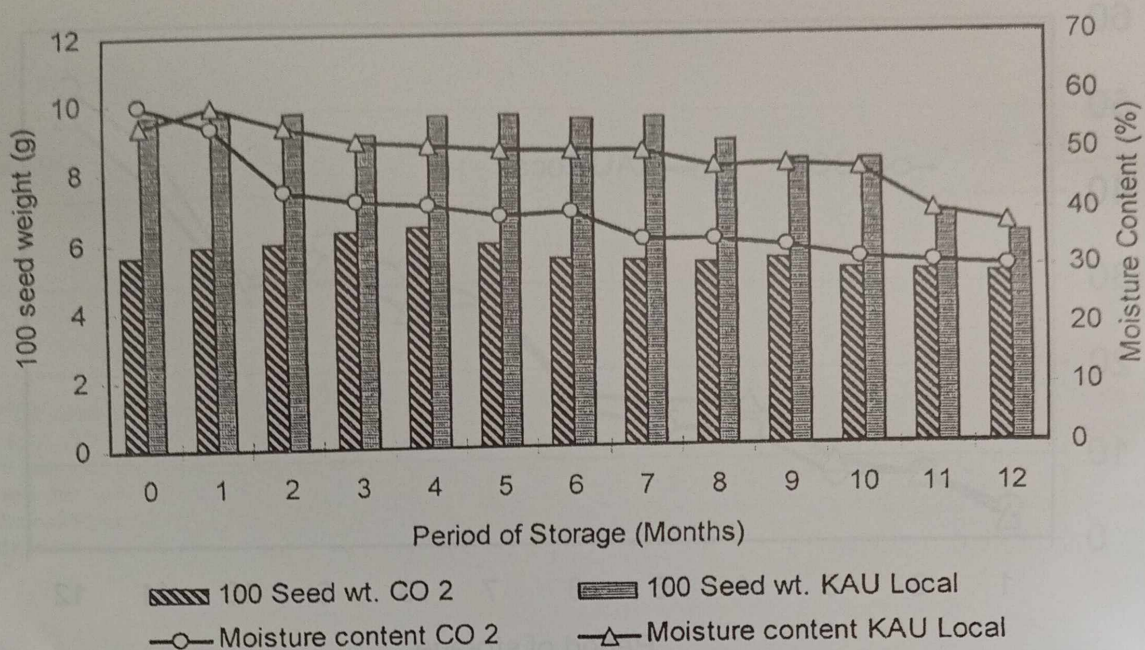


Fig 3. The effect of fruit storage on 100 seed weight and moisture content in ash gourd cvs. CO 2 & Kerala Local

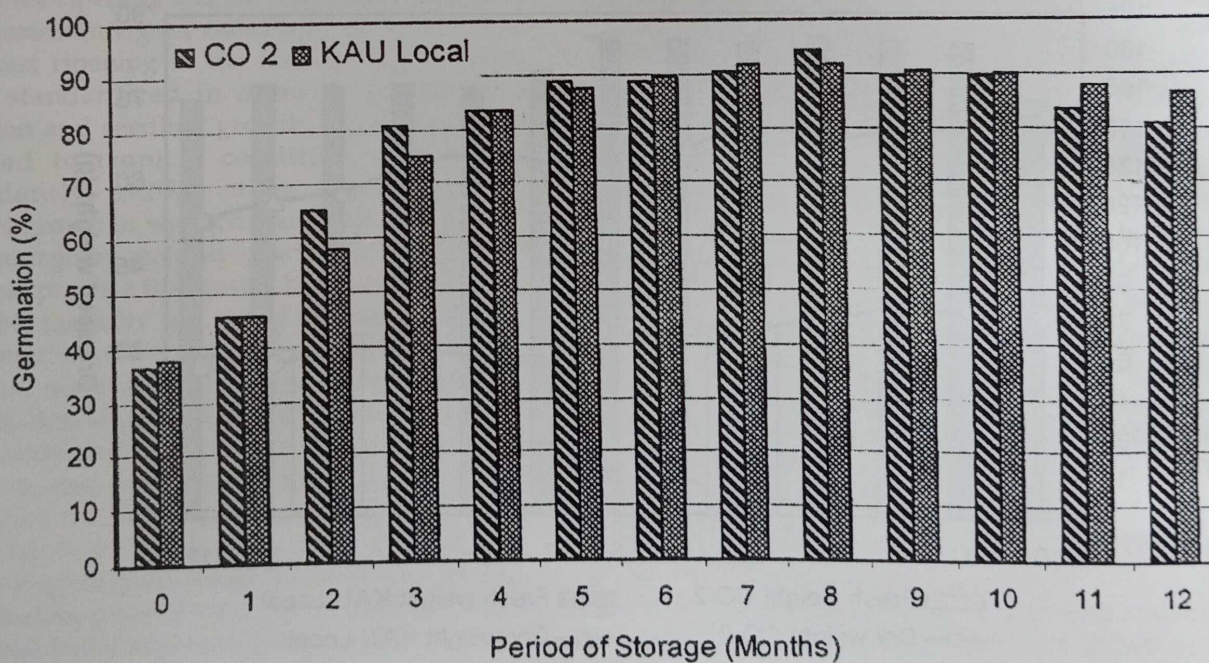


Fig 4. Effect of fruit storage on germination in ash gourd cvs. CO 2 and KAU Local

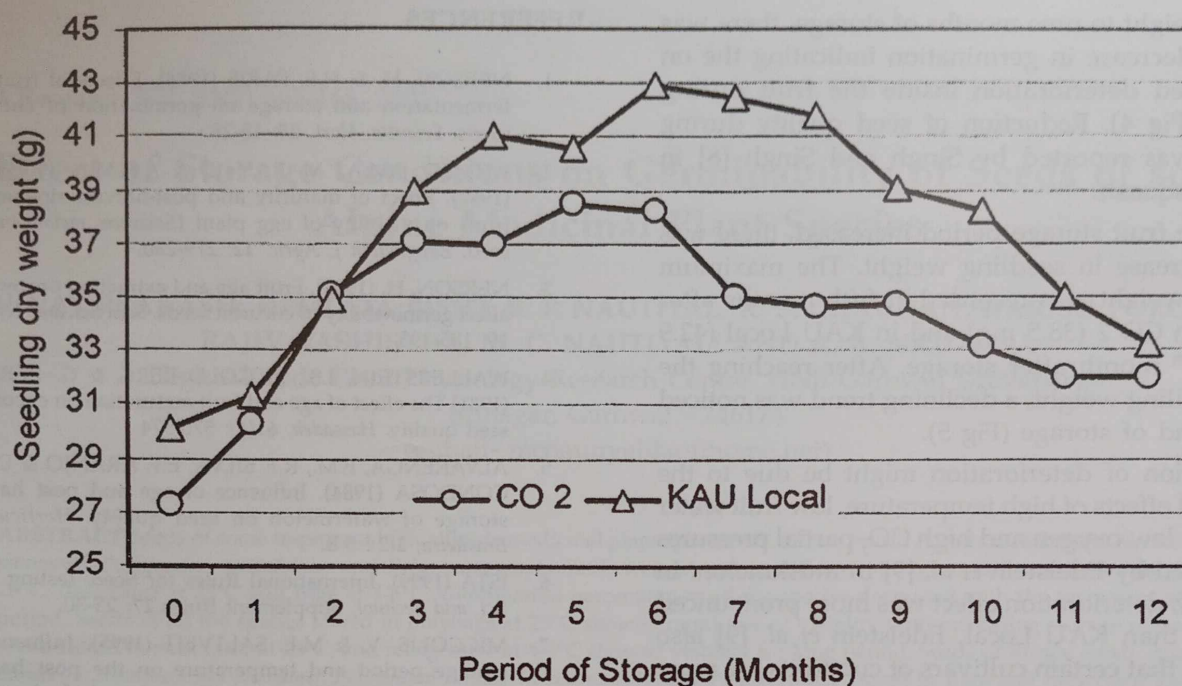


Fig 5. Effect of fruit storage on dry weight of seedling in ash gourd cvs. CO 2 and KAU Local

each were recorded and expressed in gram. Germination test was conducted using sand medium. Number of normal seedlings alone was counted at fourteenth day and expressed in percentage. Dry weight of the seedlings was estimated after drying them in an oven maintained at 85°C for 48 h.

RESULTS AND DISCUSSION

During the course of storage, there was fruit weight loss in both the varieties upto 12 months period due to water evaporation, which resulted in dehydration of fruits leaving pithy pulp and seed mass intact. The fruit weight loss was 53 and 49 per cent in CO 2 and KAU Local, respectively (Fig 1). The weight loss of 4 per cent after three weeks of storage was recorded in muskmelon under room condition at 15°C [7]. They also reported varietal variation in per cent weight loss. At the end of storage, the decrease in fresh seed weight was from 81 to 62.3 and 160.3 to 162.3, in CO 2 and KAU Local, respectively and dry weight was 35.3 to 26.6 and 79.8 to 53.7 g fruit⁻¹ (Fig 2). In terms of per cent, fresh seed weight reduced to the tune of 23.3, 11.5 per cent, and dry seed weight reduced to 24.6 and

25.4 per cent in CO 2, and KAU Local, respectively after one year of storage.

The hundred seed weight of 5.62 and 9.62 g had initially increased to 6.32 and 9.71 g in CO 2 and KAU Local after fourth and second months of storage, respectively. After twelve months of storage, the hundred seed weight was reduced to 5.00 and 6.15 g, respectively. After twelve months of storage, moisture content of the seed gradually reduced from the initial values of 57.9 and 55.4 per cent to 31 and 37.7 per cent in CO 2 and KAU Local, respectively. The reduction was faster in CO 2 than KAU Local. (Fig 3).

Germination of seeds significantly increased from 36.5 and 37.8 per cent (0 months) to 94.5 and 91.5 per cent after eight months of storage in CO 2 and KAU Local respectively. The continued development of mature embryos and development of desiccation tolerance during post harvest ripening might be the probable reason for better germination during these periods of storage (Fig 4). The very low germination from the fresh fruit might be due to the dormancy associated with fresh seeds when they were tested during initial period of storage. These results are corroborated with the reports by Ahmed *et al* [2] and Nerson [3] in brinjal and cucurbits, respectively.

After eight to nine months of storage, there was a slight decrease in germination indicating the onset of seed deterioration inside the fruit during storage (Fig 4). Reduction of seed quality during storage was reported by Singh and Singh [8] in summer squash.

As the fruit storage period increased, there was slight increase in seedling weight. The maximum seedling weight was recorded at fifth months after storage in CO 2 (38.5 mg) and in KAU Local (42.9 mg) at 6th month after storage. After reaching the peak seedling weight, a declining trend was noticed till the end of storage (Fig 5).

Initiation of deterioration might be due to the combined effects of high temperature, low fruit water potential, low oxygen and high CO₂ partial pressures as reported by Edelstein *et al.* [9] in muskmelon. In this study, deterioration effect was more pronounced in CO 2 than KAU Local. Edelstein *et al.* [9] also observed that certain cultivars of cucurbits are more sensitive to low oxygen environment, which causes deterioration of seeds than others.

Hence, Fruit storage of ash gourd for the period of maximum five months under ambient condition is recommended for post harvest maturation and improved germination. Keeping fruits under storage beyond five months may not give benevolent effect on seed quality for the cultivars in Tamil Nadu for Seed Production. However studies conducted on this crop in North Indian conditions suggested fruit storage of ash gourd for only one month for best seed quality [10].

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