

Hot pepper ix: Modified atmosphere packaging and chilling injury tolerance of twelve ornamental pepper genotypes

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Introduction:

A new trend in many countries including consumer markets in the Caribbean is the cultivation of peppers for edible and ornamental purposes. The ornamental plant market is worth nearly \$5 billion in the United States. Commercial success depends on consumer appeal conferred by plant beauty, quality, vigour, colour, shape and size of leaves and fruits. Ornamental pepper fruits are susceptible to physiological disorders such as chilling injury (CI) (Bridgemohan et. al, 2016). This problem limits the use of low storage temperature to manage postharvest quality, and seriously affects the ability of handlers to store or transport fruits over long distances, because temperatures that are low enough to delay senescence may also be damaging to the fruit.

Objective:

Evaluation of twelve (12) ornamental pepper genotypes was investigated to determine their relative sensitivity to chilling injury (CI), marketable quality and decay.

Materials and Methods:

Five fruits from each genotype were seal-packaged in 0.035 mm thick low density polyethylene bags (LDPE), and stored at 7C and 90-95% relative humidity and subsequently transferred for an additional day at 28C. A similar allocation of fruits from each genotype was stored in air as control at 28C.

Results and Discussion:

Although fruits were supplemented with modified atmosphere packaging (MAP), the advent of chilling injury symptom development, marketable quality and decay incidence varied among the 12 genotypes. Genotypes 3 and 4 accounted for the best shelf life with fruits securing marketable values of 67% and 62% respectively after 15 days at 7C which was almost two-folds greater compared to their counterparts stored at 28C. While the same two genotypes were chilling tolerant after continuous storage of 15 days at 7C, obvious symptoms of chilling injury such as pitting, stem and calyx discoloration and seed darkening were manifested even after 1-day exposure to 28C. At the same time, the majority of genotypes particularly 1, 2, 5, 9 and in particular 8 and 11 succumbed to severe chilling injury due to the high incidence of decay dominated with bacterial soft rot. Secondary infections induced by CI aggravated with multiple infections further compromised marketable quality and usability of genotypes 8 and 11 which were eventually identified with the highest sensitivity to chilling injury.

Conclusion:

Despite having a modified atmosphere package to store fruits genotypic characteristics appeared to be the major limiting factor in the determination of chilling injury susceptibility and marketable quality of ornamental peppers.

References:

Bridgemohan, P, Mohamed, M. E., Mohammed, M and Felder, D. 2016. Hot Peppers: IV. HPLC Determination of the Relative Pungency and Fruit Quality Attributes of Eight (8) Caribbean Hot Pepper Landraces. International Journal of Research and Scientific Innovation, Vol. 3(8): 17-29.

Table 1. Fresh weight losses, marketable and decay incidence of 12 genotypes of ornamental pepper crosses after 15 days of storage at 70C and 28C.

Genotypes	Storage after 15 days					
	% Fresh Wt. losses		% Marketable Fruit		% Fruit Decay	
	7 °C	28°C	7 °C	28°C	7 °C	28°C
SD40F4						
1	3.3	8.5	22	0.5	78	95
2	5.6	10.2	24	0.5	76	95
3	4.3	7.6	67	31	33	69
4	3.1	7.8	62	28	38	72
5	3.5	6.9	22	10	78	90
6	4.9	8.9	52	46	48	54
7	4.1	7.0	44	49	56	51
8	4.7	8.7	14	0.0	86	0.0
9	5.5	11.1	27	12	73	88
10	4.2	7.4	42	51	58	49
11	4.3	7.6	18	6.0	82	94
12	3.6	6.6	42	54	58	46
LSD (0.05)	1.3	2.9	15.8	15.8	14.0	20.5

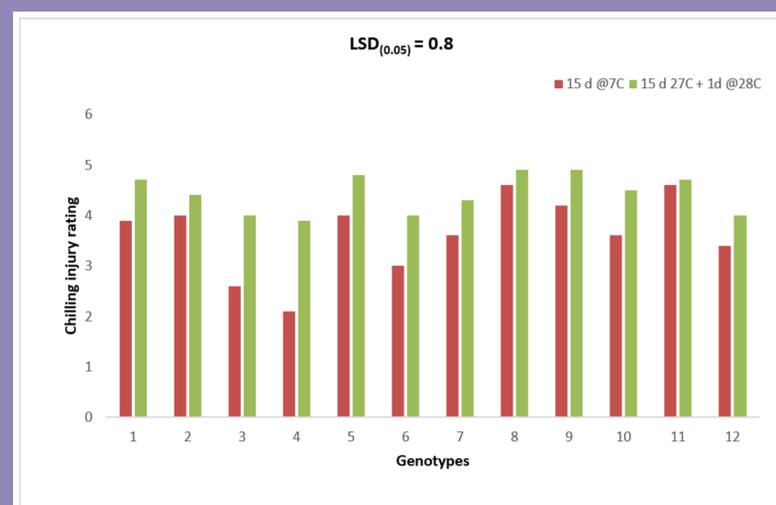


Figure 1. Incidence of chilling injury of 12 genotypes of ornamental pepper crosses after 15 days at 7C and upon subsequent transfer for an additional day at 28C.

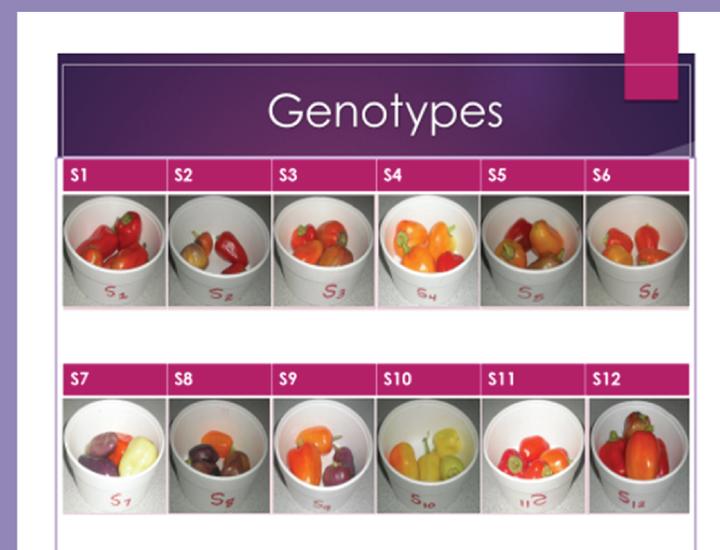


Plate 1. Ornamental pepper genotypes.