

Krissana Boonsiri 2007: Chilling Injury of Three Pepper Cultivars Stored at Low Temperature. Doctor of Philosophy (Postharvest Technology), Major Field: Postharvest Technology, Interdisciplinary Graduate Program. Thesis Advisor: Professor Saichol Ketsa, Ph.D. 132 pages.

Fruits of sweet pepper, chili spur pepper, and hot pepper were stored at 5, 10°C (85-90% R.H) and room temperature. The development of chilling injury symptom was monitored. The symptom was found only in fruit stored at 5°C. The visible chilling injury symptoms varied depending on variety and maturity stage. Sweet pepper showed water soaking and seed browning, while surface pitting occurred in chili spur pepper and seed browning exhibited only in hot pepper. Pepper at breaker and red stage did not show any chilling injury symptom. Green hot pepper at 15 days after flowering (DAF) was the most sensitive to low temperature than 20, 25 and 30 DAF. Hot pepper fruit at 15 and 25 DAF were stored at 5°C. Seeds of fruits at 15 DAF turned brown and positively correlated with visible cell damage and the rate of electrolyte leakage. The initial levels of free phenolics, levels of thiobarbituric acid-reactive substances (TBARS), and activities of polyphenol oxidase (PPO), phenylalanine ammonia lyase (PAL), superoxide dismutase (SOD), and lipoxygenase (LOX) in seeds at 15 DAF were higher than that of 25 DAF. The results suggested that loss of membrane integrity in young seeds was a cause of browning at low temperature. Low activities of catalase (CAT) and peroxidase (POD) and low levels of unsaturated fatty acids might be major factors contributing the development of chilling damage in seeds at 15 DAF. Pretreatment of hot pepper with hot water treatment, hot air treatment, 5 and 10 $\mu\text{l/l}$ of 1-MCP and 10^{-4} and 10^{-5} M of methyl jasmonate could not reduce seed browning. Levels of *CaCat 1* mRNA in seeds at 25 DAF were higher than that at 15 DAF. *CaCat 1* gene expression in seeds of 25 DAF was the same trend as enzyme activity that decreased after 6 days storage. Expression level of Aquaporin gene, a gene involving in transporting H_2O_2 , was also increased in seeds at 25 DAF.

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