**Inhibitory effect of antioxidant compounds on pink-rib discoloration in lettuce mid-ribs**

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Romaine and iceberg lettuce (*Lactuca sativa* L.) are an economically important crop with a production value of $2.84 billion annually. Mid-rib discoloration is a stress disorder caused by enzymatic reactions leading to loss of quality and marketability. Phenylalanine ammonia lyase (PAL) and polyphenol oxidase (PPO) are the main enzymes involved in pink-rib and are activated upon wounding or stress. Previous reports have suggested antioxidant compounds as an option to inhibit or reverse discoloration. In this study, we induced wounding in store bought romaine and iceberg heads and submerged samples in water, cysteine (500 ppm), and an unnamed treatment (1000 ppm), as well as an additional control without wounding (n=4). Following 30 s of submersion, mid-ribs were pat dried and stored in breathable, high-density polyethylene bags at 5 °C/95% relative humidity for 5 d. Samples were evaluated for discoloration subjectively via visual inspection and rated on a 5-pt scale. A digital imaging method was also developed to provide an objective measure of pinking severity. In this method, pixel RGB values from digital images of the mid-ribs were measured to determine the percentage of pixels classified as pink at each cut site. Samples were then frozen in liquid nitrogen and processed for enzyme activity and metabolite analysis using spectrophotometry, high performance liquid chromatography (HPLC), and liquid chromatography mass spectrometry (LC-MS). In romaine lettuce, all treatments had minor to moderate pink-rib after 3 days. Pink-rib discoloration advanced to moderately severe in cysteine and the wounded control samples by 5 days. In iceberg lettuce, the other treatment showed no pink-rib discoloration after 5 days, while cysteine and the wounded control were between moderate to moderately severe by 3 days. This study revealed the applicability of specific antioxidant treatments and the metabolite changes that occur in stressed lettuce susceptible to pink-rib discoloration as well as samples treated to reduce discoloration.

400 word limit

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Shrunken-2 (sh2) type sweetcorn is known for its slow sugar-to-starch conversion and long shelf life. Although discovered in the University of Florida’s sweetcorn breeding program in 1953 it become the industry standard for fresh market sweetcorn until the mid-1990’s. The industry currently ships sweetcorn with the shank still attached, which complicates packing due to non-uniform ear length. In this study, we simulated commercial handling of sweetcorn (sh2) type with untrimmed shanks and trimmed shanks to 2-cm. Ears were then hydrocooled immediately or following 3.5 hr at 30°C, then stored at 5°C/95% relative humidity for 0, 5, and 10 d. Husk color, husk drying, silk appearance, and kernel appearance declined in overall quality uniformly, irrespective of treatment. Sweetcorn kernels developed splitting, denting, and presence of microbial growth; denting occurred the greatest with 14-15 kernels per ear at 10 days. After 5 and 10 days, trimmed ears retained higher moisture content moisture loss increased with longer storage time, with little variation between immediate and delayed cooling. As storage period increased, total sugar concentration (TSC) increased slightly, with no difference due to time or trim type. However, untrimmed ears displayed greater fluctuation in TSC throughout storage ranging from 56.5 to 83.5 µg/ml, while trimmed ears displayed 65 to 71.9 µg/ml range. This study displays a slight benefit of trimming shanks to maintain water content and TSC stability with shelf-life, specifically breakdown and denting as the limiting factor. Overall quality was not compromised with trimmed tissues and its use shows promise in sweetcorn packing.