

Yield, fruit damage, yield loss and juice quality characteristics of machine and hand harvested 'Brown Snout' specialty cider apple stored at ambient conditions in northwest Washington

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Summary

In this 2-year study, 'Brown Snout' specialty cider apple (*Malus x domestica*) that had been hand harvested or machine harvested with an over-the-row shake-and-catch small fruit harvester was ambient stored (56 °F mean temperature) for 0, 2 and 4 weeks to evaluate yield, fruit damage, yield loss and juice quality characteristics. The average yield (pounds per acre) of fruit picked and retained by the mechanical harvester was 74% that of the hand harvest yield and 81% that of the hand harvest yield when fruit that fell out of the harvester was included in the machine harvest yield. Percent fruit bruised and cut were greater for machine harvest (97.5% and 25.5%, respectively) than for hand harvest (47% and 0.5%, respectively), on average for 2014 and 2015. Yield loss to rot was greater for machine harvest than for hand harvest, and increased for both methods over time; percent rot doubled from 2 weeks to 4 weeks storage for machine harvest (22% to 41%), and while negligible, tripled from 2 weeks to 4 weeks storage for hand harvest (0.7% to 2.1%). Juice quality characteristics did not differ due to harvest method, but did differ due to year and storage time. Soluble solids concentration [SSC (percent)] and specific gravity (SG) did not change due to storage in 2014, but in 2015 SSC and SG were greater on average for 2 and 4 weeks storage duration (15.00% and 1.062, respectively) than at harvest (13.31% and 1.056, respectively). Titratable acidity [TA (malic acid g.L⁻¹)] decreased in 2014 from 2.98 g.L⁻¹ at harvest to 2.70 g.L⁻¹ on average for 2 and 4 weeks storage duration, but did not differ due to storage in 2015. Tannin [tannic acid equivalent (percent)] was unchanged in 2014 from harvest to 4 weeks storage, but increased in 2015 from 0.16% at harvest to 0.19% by 4 weeks storage. These results indicate that harvest efficiency could be improved with some engineering modifications of the over-the-row mechanical harvester and training modifications for the trees. A comparison of the aromatic and phenolic contents of mechanically harvested and hand harvested 'Brown Snout' would be a valuable next step in evaluating shake-and-catch mechanical harvest technology for cider apple production.