

# Effects of naphthaleneacetic acid, naphthalene acetamide, benzyladenine and carbaryl on thinning, fruit quality and macronutrients in leaves and fruits of 'Soltani' apple.

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## Abstract

Too many fruits per tree can result in production of small fruit size and poor quality, reduced pricing, breakage of limbs, exhaustion of tree reserves, reduced cold hardiness and reduction in return bloom. Thinning is one of the most important techniques for improving fruit size and quality and increasing return bloom leads to reduction of alternate bearing in apple trees. Severity, method and timing of flower or fruitlet thinning can influence crop load. It is possible that thinning practice affects leaf and fruit mineral composition. Mineral elements such as calcium, magnesium, potassium and nitrogen in apple fruits at the harvest time can influence fruit quality after storage. Use of chemical thinners is one of the practical ways to fruit thinning. Therefore, this investigation has done to study the effect of chemical thinning on fruit set, fruit quantity and quality and concentration of macro nutrients in leaf and fruit at harvest time. This experiment was designed as a randomized complete block with nine treatments and three replications on 13-year old 'Soltani' apple trees, in 2007 and 2008. Treatments included naphthaleneacetic acid (5 and 10 mg L<sup>-1</sup>), naphthalene acetamide (25 and 50 mg L<sup>-1</sup>), benzyladenine (50 and 100 mg L<sup>-1</sup>) and sevin (500 and 1000 mg L<sup>-1</sup>) that were sprayed on shoots when fruits diameter were 8-10 mm (15 days after full bloom). The results indicated that application of chemical thinners reduced the percentage of initial and final fruit set compared with the control. However, naphthaleneacetic acid at 10 mg L<sup>-1</sup> was most effective than other treatments. All treatments significantly increased fruit weight and diameter compared with the control, except naphthalene acetamide at 50 mg L<sup>-1</sup>. The lowest yield efficiency was induced by the concentration of 50 mg L<sup>-1</sup> naphthalene acetamide. Naphthaleneacetic acid, naphthalene acetamide and sevin at 1000 mg L<sup>-1</sup> significantly increased the aborted seeds compared with the control. Fruit length, length to diameter ratio of the fruit, number of safe seed, total seed of fruit, pH, fruit firmness and total soluble solid were not affected by chemical thinning. All chemical thinners significantly increased concentration of leaf nitrogen compared with the control, except naphthalene acetamide at 50 mg L<sup>-1</sup> and benzyladenine at 100 mg L<sup>-1</sup>. Naphthaleneacetic acid at 5 mg L<sup>-1</sup>, naphthalene acetamide at 25 mg L<sup>-1</sup>, benzyladenine at 100 mg L<sup>-1</sup> and sevin at 500 mg L<sup>-1</sup> significantly increased concentration of leaf phosphorus. Naphthaleneacetic acid and benzyladenine significantly increased the concentration of potassium in leaf compared with control. The concentrations of calcium and magnesium in leaf were not affected by thinning. Naphthalene acetamide at 50 mg L<sup>-1</sup>, benzyladenine at 100 mg L<sup>-1</sup> and sevin at 500 mg L<sup>-1</sup> increased the concentration of phosphorus in fruits. The concentration of calcium in fruits significantly increased by naphthaleneacetic acid at 5 mg L<sup>-1</sup> and naphthalene acetamide at 50 mg L<sup>-1</sup> compared with the control. All treatments had no effect on concentration of fruit nitrogen, potassium and magnesium as compared to control.

**Key Words:** Apple, Fruit thinning, Fruit quality, Macronutrient