

## **Do Organically Grown Strawberries Have Higher Levels of Phytochemicals and Can Consumers Tell the Difference?**

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A matted row strawberry planting was established in 2000 on a half acre site at the OARDC in Wooster, OH with the purpose of evaluating different composts and cultivars to determine which combination would be the best for growing organic strawberries under Ohio conditions. No pesticides were applied to this site since 1996. In 2000, several cover crops were planted, for pre-season weed control. A pea and oat mixture was planted in April and plowed under in July. In August 2000 a rye (between rows) and oat (within rows) crop was planted. In 2001, 6 strawberry cultivars ('Earliglow', 'Honeoye', 'Idea', 'Jewel', 'Northeast' and 'Seneca' were planted in the spring into the killed oats and the annual rye was mowed. Treatments included three different types of composts (yard waste, dairy barn and vermicompost) that were incorporated at planting and top dressed in the fall and spring of each year (2001-2004). An untreated check, a synthetic fertilizer standard, and a conventionally sprayed grower standard treatments were also established. Treatments were arranged in a randomized complete block design. Perennial rye was planted between rows in the fall of 2001 to reduce weeds.

Plant tissue nutrient analysis showed that all nutrients were in the sufficiency range for all treatments and cultivars during the three fruiting years of the project. There were no differences in yield between treatments. 'Jewel' and 'Honeoye' produced the highest yields. The check treatment consistently had the higher percentage of clean berries and the lowest levels of gray mold and slug damage. 'Idea' had leaf scorch problems in 2004. Weeds were less of a problem each year (2002: 1,958 labor h/A; 2003: 1,030 h/A; 2004: 527 h/A.). Among treatments, vermicompost had the most weeds; the check, the least. Among varieties, Seneca had the most weeds; Idea, the least. Economic analysis showed that because of hand weeding costs, organic strawberries required a 25-40% premium retail price to achieve the same level of profitability as conventional strawberries.

Each fruiting year taste tests were conducted during the season to determine if consumers could detect differences between and within treatments and cultivars (triangle test). Judges could not tell the difference in appearance, smell, and taste between treatments within a cultivar (organic compost treatments vs. conventional or synthetic fertilizer). However, panelists could tell the difference in taste between cultivars within a treatment from different breeding programs ('Jewel' vs. 'Idea'), but had difficulty distinguishing 'Jewel' vs. 'Seneca' and 'Jewel' vs. 'Honeoye' which are all from the NY breeding program.

In 2004, antioxidant phytonutrient analysis (vitamin C, anthocyanin and other phenolics) was conducted on strawberries for all treatments and cultivars. No differences were observed in vitamin C. Also, there were no differences in anthocyanin content between treatments, but as expected redder cultivars such as 'Honeoye' had more anthocyanins than the lighter colored berries ('Idea'). There were differences in phenolic compounds between treatments and cultivars. 'Earliglow' had 28% more phenolic

compounds than 'Idea' which had the least phenolic compounds of the 6 cultivars. The conventionally sprayed and fertilized treatment had the least amount of phenolic compounds compared to the other treatments (12% less than the dairy barn compost treatment).