Crop Production

How Does Petunia Perform in Cranberry Pomace Compost Media?

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Massachusetts growers have successfully produced hardy mums, poinsettias, flowering hanging baskets and mixed containers of flowering annuals using composted cranberry pomace during the last several years with the help of Paul Lopes. These trials have shown the promise of using cranberry pomace as a component in growing media and have familiarized growers with its use. Projects at UMass studying plant growth response to pomace mixes under controlled conditions have also shown positive results (Cox, 2008; Cox and Lopes, 2007). This article looks at the response of petunia to cranberry pomace growing media. It's part of a larger project supported by a grant from The New England Greenhouse Conference.

How the plants were grown

Two types of cranberry pomace were tested. One type consisted of pomace composted for about 3 years ("old") resulting in an appearance and consistency something like coffee grounds. The initial pH and EC of this material was 5.5 and 0.57 mmho/cm, respectively. The second type of pomace was about 6 months old ("new") and was not completely composted as seeds and fruit skins could be seen. The initial pH and EC of this was 5.8 and 0.88 mmho/cm, respectively.

Plugs seedlings of 'Ultra Red' petunia were transplanted to 4-inch pots of Fafard 3B (control) and the pomace growth media on 1 January 2008. Plants were fertilized at every watering with 180 ppm N from Technigro 17-5-24 alternating with 15-0-15.

Pomace growth media were formulated with old or new pomace at levels of 25, 50, 75, and 100% by mixing with sphagnum peat moss on a volume basis. Coarse perlite was added to one-half of the pots substituting for 10% peat moss to determine what benefits to plant growth might result from improved drainage. Dolomitic limestone at 5 lb./yd^3 was added to the pomace media. There were 8 single-plant replicates per treatment and the control.

On 1 March plant height and plant diameter were measured, the number of branches ≥ 2 inches in length and the number of open flowers were counted, and the tops were harvested for dry weight determination. Growth medium was sampled from five pots in each treatment for EC (electrical conductivity) and pH analysis using the 1:2 method of growth medium analysis.

Results

Plant growth. Petunia plants growing in old and new cranberry pomace compost were virtually indistinguishable from one another and the control (Fafard 3B) (Figure 1). Height, plant diameter, branch number, and the number of open flowers of plants growing in cranberry pomace compost were generally not different from the control (Table 1). The exceptions were the smaller plant diameter and fewer branches when plants were grown in mix containing 50% new compost. Dry weights of plants grown in 50, 75, and 100% new compost were significantly less than the control, however this was not true of plants growing at all levels of old compost and 25% new compost.

Comparing old and new compost over all compost levels (bottom of Table 1), old compost produced larger diameter plants, greater branch number, more open flowers, and greater dry weight. However, due to the

Figure 1. L to R. Petunias growing in Fafard 3B, 100% new compost, and 100% old compost.

somewhat irregular growth habit of petunias these differences were not easy to observe. Compost level, considering both types of compost together, had no effect on plant growth.

Healthy and extensive root systems seemed to be produced in all treatments (Figure 2). However, actual measurements of root growth were not made.

Adding 10% coarse perlite as a substitute for 10% peat moss had no effects on plant growth (data not shown).

Table 1. Growth of petunia 'Ultra Red' in cranberry pomace growth media.

Treatment	Height (cm)	Plant diameter (cm)	Branch number	Open flowers	Shoot dry wt. (gm)
Control (Fafard 3B)	14.7[z]	36.8	8.0	5.4	8.3
New compost 100%	14.1	31.8	5.6	4.4	5.4
75% + peat	14.7	31.2	5.5	4.0	3.4
50% + peat	12.6	28.4	4.3	4.5	4.7
25% + peat	14.1	33.0	6.5	6.0	6.6
Old compost 100%	14.8	36.3	6.9	7.8	8.7
75% + peat	14.4	36.3	7.6	7.5	8.6
50% + peat	14.6	33.8	6.6	6.4	9.0
25% + peat	14.4	35.2	6.9	8.5	9.0
New compost	13.9[y]	31.1	5.5	4.7	5.0
Old compost	14.5	35.4	7.0	7.5	8.8
Significance	**	**	**	**	**

[z]Underlined means are statistically significant from Fafard 3B (control) at P=0.01. (1 inch=2.54 cm).
[y]New and old compost are significantly different at P=0.01 (**).

Figure 2. L to R. Root masses from plants grown in Fafard 3B, 100% new compost, and 100% old compost.

Growth medium EC and pH. Before planting, EC (soluble salts) increased as the level of cranberry pomace increased in the growth medium (Table 2). However, only in the case of 100% new compost was the EC high enough to possibly inhibit the growth of young seedling transplants. At harvest, in most cases, the EC of the growth media was much lower than before planting.

No symptoms of nutrient deficiency were apparent even though the ECs at harvest were at rather low levels. Overall, old compost had higher EC at harvest than new compost. The pH of pomace mixes before planting was 5.5 or less in all cases. Pomace media had much lower starting pHs than the control.

Measurements of pH made at the end of the experiment showed only small changes from the starting pH. Overall, new compost had slightly higher pH at harvest than old compost.

Table 2. pH and EC of cranberry pomace growth media before planting and after harvest.

Treatment	EC (mmho/cm)		pH	
	Before planting[z]	After harvest[y]	Before planting[z]	After harvest[y]
Control (Fafard 3B)	1.09	0.71	5.8	5.4
New compost 100%	2.38	0.76	5.5	5.4
75% + peat	1.65	0.70	5.3	5.5
50% + peat	1.05	0.75	5.0	5.2
25% + peat	0.64	0.65	5.3	5.3
Old compost 100%	1.72	1.12	5.4	5.2
75% + peat	1.12	0.81	5.2	5.1
50% + peat	0.84	0.77	5.4	5.3
25% + peat	0.80	0.70	5.2	5.3
New compost		0.72[x]		5.3
Old compost		0.88		5.2
Significance		**		*

[z]A single sample taken from a batch of growth medium used for planting.
[y]Mean of 5 replicate pots at harvest.
[x] New and old compost are significantly different at P=0.01 (**).

Conclusions

A superficial look at the plants grown in this study would suggest that either old or new cranberry pomace compost can be used to growth petunias. As much as 100% compost of either type can be used to successfully grow petunias. However, the data I collected provided evidence that, while satisfactory results can be achieved with either age compost, the old, more decomposed pomace was superior to the new compost. Adding perlite to facilitate drainage had no effect on plant growth and thus does not appear to be a necessary amendment. The pH of all compost media was acidic to start (more so than the Fafard 3B control) and did not change greatly by the time plants were harvested. Acid pH is desirable for petunias to prevent iron deficiency, but more limestone and a more basic fertilizer might be necessary for crops sensitive to too much iron and manganese.

References

Cox, D.A. 2008. Salvia grows well in cranberry pomace. *Floral Notes.* 20(5):3.

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