Compost as an alternative to methyl bromide as a means for nutrient management for strawberry production

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Strawberry production constitutes an important component of the annual income of small fruit growers in the southeastern United States. The majority of these growers utilize an annual cropping system, commonly referred to as strawberry plasticulture. This system depends on the use of methyl bromide (MB) for preplant soil fumigation. Methyl bromide controls a wide array of diseases, insects and weeds that enable strawberry growers to have a very productive crop, they would not be able to realize without the chemical. However, MB has been linked to stratospheric ozone depletion. Consequently, the manufacturing and importation of MB is scheduled to be banned in the United States in the year 2001. Numerous chemical alternatives are being sought and evaluated. However, due to recent incidents of food contamination by pesticides and other organisms that cause health problems, there is considerable room and interest to evaluate non-fumigant based systems for domestic production. Recent observations from an on-farm experience, indicate that one of the most promising non-chemical systems is known as the Controlled Microbial Composting (CMC) process.

The CMC process was developed in Austria and is the leading composting technology used in Europe. The primary concept of the system is to increase soil fertility through the application of aerobically produced compost, and a controlled build-up of humus. In addition a major goal of the CMC system is to manage the compost and cropping system to ensure there are no offensive emissions nor environmental pollution problems (i.e. groundwater contamination).

The CMC system has been used very successfully by a strawberry farmer in Virginia. This grower produces 10 acres of strawberries without MB, with yields comparable to systems that use MB. He has not encountered the diseases that are often major problems in conventional strawberry production. In addition, after using the system for 2 years he found that he needed to use only 10% of the usual rate of nitrogen, thus dramatically reducing the amount of N that can be lost to the environment.

We have initiated an on-farm study in North Carolina (NC) using this same system. The NC grower is highly committed to testing the CMC system on his farm and has agreed to let us use part of his land for on farm research and demonstration purposes. The experiment was initiated in the fall of 1997. Mature compost was purchased from the Virginia and applied on a test site in North Carolina. The same compost will be applied for the next 2 years. During this period, we will document crop growth and development as well as examine soil and plant tissue samples on a regular basis to assess active bacterial and fungal biomass over a 3 year period. In addition, we will take soil and tissue

nutrient analysis, weed biomass and insect counts on a regular basis. The information gathered from this study will enable us to correlate desirable crop yield, growth and development with the presence or absence of certain soil microorganisms, weeds and insects.

Yields from the plots the first year (1998) are statistically equivalent for the compost and MB plots (table 1). Total yields as a percent of methyl bromide treatment were 93.4% for the compost plots and 79.6% for the control. The compost plot had the highest % of marketable fruit. All treatments had similar disease incidence and cull berries this first year. Plant growth data, nutrient analysis and pest incidence are still being analyzed.

Table 1. Yield components and % disease incidence of strawberries harvested in 1998.

Treatment	Total yield (lbs/acre)	Berry weight	% marketable	% cull (by wt)	% bot. (by wt)
Control	29088	15.8	90	2.5	0.7
MB	36532	15.8	90	2.6	0.6
Compost	34109	16.01	92	1.9	0.5
MB (TC 98-99)[z]	38260	15.2	91	2.5	0.5
LSD	5044	.35	1.6	NS	NS

[z] Telone chlorpicrin will be substituted in 1998.