Poster A146

# Microbial Content of Compost Tea after Variations of Ingredients or Procedures

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Compost tea describes a procedure where compost is mixed with water. The mixture may be left to stand with minimal disturbance, also called "compost extract" or "steepage", or actively supplied with oxygen by an aquarium pump to stimulate population growth of aerobic microbes.

This project examined actively aerated compost tea. Over a 3-year period, 25 trials were conducted where five different brewers were operating at the same time. One brewer had the same recipe from trial to trial, to verify consistency over time. Four similar brewers were used to test one variable of ingredients or procedure. Each trial was performed only once. Identification was done by direct microscopy and counts estimated from plate dilution at Soil FoodWeb Inc., Alberta.

**The "standard" recipe**

Ingredients:
Composted yard waste 485 grams
(Glengrow from landfill, City of Kelowna BC)
Vermicompost 285 grams
(Nurturing Nature Organics, Lake Country BC)
Humic acid 30 ml Multi-dynamic Humic Extract
(Tecologic Products Ltd, Calgary AB);
Seaweed 30 ml Turbo SE 0-4-4 *Ascophyllum n.*
(Logic Alliance Inc., Kentville NS)
Fish fertiliser 15 ml Nutrifish SE 2-3-1
(North Atlantic fish, Pioneer Organics, NS)

Procedure:
Each 5 US gallon brewer was filled with 15 litres of drinking tap water (pH 7.0, E.C. 0.24).
Water was aerated 1 hour before adding ingredients.
Compost products were removed after 5 hours.
The tea was actively aerated another 16 hours.
Equipment was cleaned with hydrogen peroxide.

Microbial content of finished tea was used to assess consistency of the same person using the same brewer and the same recipe. One brew was copied over 9 experiments for the "K.I.S." brewer (see table 1) and 7 experiments for the "Bobolator" brewer (data not shown).

Results for each brewer show fairly constant numbers from trial to trial except high variation in protozoa numbers (flagellates and amoeba).

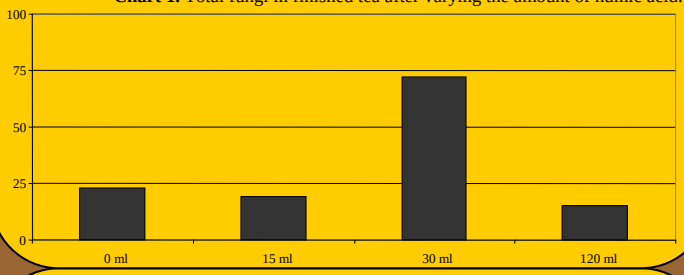
**Table 1.** Microbial content of finished compost tea prepared with the commercial brewer "K.I.S." using the same procedure and recipe over 9 trials.

| Trial | Total bacteria | Total fungi | Flagellate | Amoeba | Ciliates |
|---|---|---|---|---|---|
| 08-160 | 7552 | 20 | 13863 | 575 | 0 |
| 08-161 | 12032 | 25 | 4606 | 8318 | 20 |
| 08-163 | 7168 | 34 | 5753 | 831 | 4 |
| 08-166 | 6912 | 44 | --- | --- | --- |
| 08-170 | 6784 | 39 | 2772 | 831 | 0 |
| 08-171 | 6272 | 25 | 31644 | 57536 | 4 |
| 08-174 | 11520 | 28 | 13863 | 31644 | 4 |
| 08-179 | 5760 | 27 | 57536 | 4263 | 4 |
| 08-182 | 614 | 3 | 46060 | 13863 | 27 |

Humic acid is added to compost tea as a "food source" to stimulate growth of beneficial fungi present in the start-up compost. In this trial, varying amounts were compared to the "standard" recommendation of 30 ml per 15 litres of water.

Results indicate humic acid stimulates fungi activity. There was no impact on bacteria numbers or protozoa numbers, except higher amoeba in tea with 120 ml.

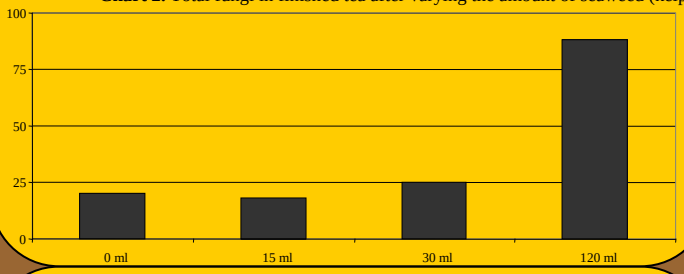
**Chart 1.** Total fungi in finished tea after varying the amount of humic acid.




Seaweed (cold water kelp) is added as a "food source" to stimulate growth of both bacteria and fungi, and to add nutrients for plant foliage and roots. Seaweed species from cold-waters (*Ascophyllus nodosum*) are preferred for commercial applications.

Results indicate the number of total fungi was not affected by seaweed, except at the 4X standard rate. Number of flagellates was higher in all treatments, regardless of rate.

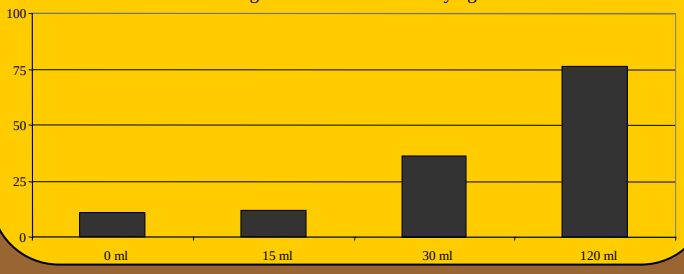
**Chart 2.** Total fungi in finished tea after varying the amount of seaweed (kelp)




Fish fertiliser is used as a "food source" to stimulate growth of bacteria and provide nutrients. The general recommendation is to use fish hydrolysate at 0.1 to 1% by volume

Results indicate a linear increase in total fungi with increased amounts of fish fertiliser. There was no treatment impact on bacteria, flagellates or amoeba. No fungi was recovered from tea brewed with fish fertiliser alone, without compost (data not shown).

**Chart 3.** Total fungi in finished tea after varying the amount of fish fertiliser.




**CONCLUSION**

Compost tea has potential to help suppress plant diseases. There is scientific evidence that actively aerated compost tea can prevent a number of plant diseases such as damping off and *Botrytis* mould. Best results are obtained when start-up compost is high quality. The active brewing aims to extract beneficial micro-organisms found in the start-up compost; ingredients such as humic acid and kelp aim to stimulate population growth.

In this project, there was a high impact on final microbial content from the start-up compost and the duration of brewing time. There was a moderate impact from the use of humic acid and kelp. There was a low impact from the source of water and the clean-up of brewing equipment (data not shown).

All experiments were controlled but not replicated, preventing statistical analysis of most data. The results should be viewed as trends rather than absolute, as similar brews done under different conditions would likely deliver different results. Future work will require a method to stabilize microbial activity without affecting microbial composition.

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