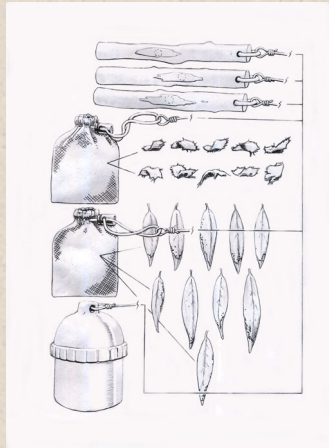


## Introduction

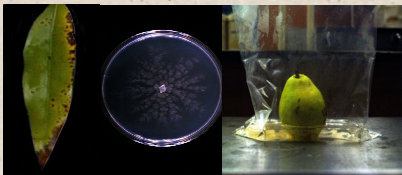
Trimmings from potentially infected landscape plants are brought to local composting facilities on a daily basis. In order to prevent the spread of sudden oak death, we must be sure that subsequent movement of the completed compost will not spread the disease. We present data suggesting that the composting process effectively sanitizes green-waste, and recommend composting as a Responsible disposal method available to those generating this waste.

## Methods



\* Coast live oak: *Quercus agrifolia*  
\*\* Bay laurel: *Umbellularia californica*

After treatment, infected substrate was Plated onto selective media, or baited to Pears, and then plated onto media



# Composting as a Sanitation Measure for Green Waste Infected with *Phytophthora ramorum*

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## Results

Our results showed composting to be a viable method for sanitization of waste infected with *Phytophthora ramorum*

### Turned Windrow and Oven Results by Site

Site	n	Pre	% Pre	SE	Post	% Post	SE	Delta mean	SEdiff	99% CI for 0
B	8	66/180	37%	3.85%	0/180	0%	0.00%	-37%	3.85%	0 +/- 13%
M	8	61/180	34%	4.49%	0/180	0%	0.00%	-34%	4.49%	0 +/- 16%
C	8	63/180	35%	3.08%	50/180	28%	1.38%	-7%	3.38%	0 +/- 11%
O	8	52/168	31%	4.03%	0/168	0%	0.00%	-31%	4.03%	0 +/- 14%

### Forced Air Static Pile Results

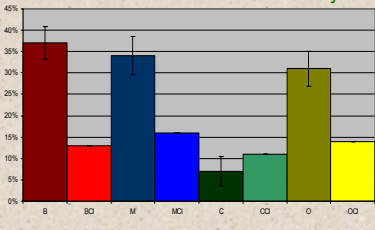
Pile	n	Pre	%Pre	SE	Post	%Post	SE	delta mean	SEdiff	99% CI for 0
1	8	125/184	68%	4.45%	0/184	0%	0.00%	-68%	4.45%	0 +/- 16%
2	4	63/92	68%	5.95%	0/184	0%	0.00%	-68%	5.95%	0 +/- 35%
C	8	123/184	67%	2.40%	92/184	50%	7.79%	-17%	8.15%	0 +/- 27%

### Inoculation Success and Survival by Substrate

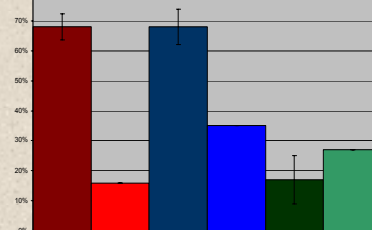
	Pre treatment scores				Post treatment scores				Control scores							
	N	% Pre	SD	Range	N	% Post	Range	Pear	N	% Control	SD	Range	Pear	% Pear	Range	p
Leaves	36	55%	25.98	10-100	36	0	0-0	0	16	46.88%	21.13	0-80	10	28%	0-100	
Stems	34	87%	11.09	33-100	34	0	0-0	0	16	87.50%	10.83	50-100	2	6%	0-50	
Chips	36	31%	33.56	0-90	36	0	0-0	0	16	35.63%	33.72	0-100	0	0%	0-0	

### Forced Air Static Pile Composting Results

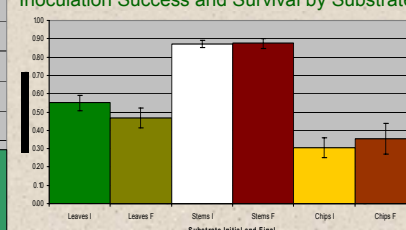
#### Turned Windrow and Oven Results by Site



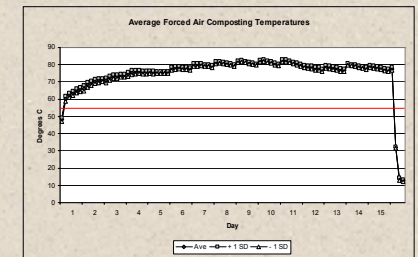
#### Inoculation Success and Survival by Substrate



#### Inoculation Success and Survival by Substrate



## Average Composting Temperatures



Infected material was subjected to 55 Deg. C for two weeks

## Discussion

The difference between our confidence levels for zero (BCI, MCI, etc.) and our treatment effect (B, M, O, etc.) clearly shows a treatment effect, regardless of location or composting technique. The results are similar for the oven study, suggesting that time and temperature alone (without the aid of microbial competition, antagonism, or antibiotics formed in the compost) is enough to eliminate *P. ramorum* from highly infected tissue. *P. ramorum* was isolated both through direct plating (% control) and through pear baiting (Pear, %Pear). *P. ramorum* survived well on leaves under most conditions, but was only able to persist on woody substrates under cool, moist, conditions (Survival by Substrate).

Treatment at 131 deg F for two weeks (temp graph) is an effective means to eliminate *P. ramorum*. This direct process type of experiment is useful to prove and/or optimize the composting process, but structured as a direct process evaluation (as here), it does not necessarily translate into a definitive test. Spot test analysis is a better tool (Christensen et al, 2002). To this end, we have conducted a case study showing composting holds great promise. Out of ten yards of highly infected material, not a single sample contained *P. ramorum*, in spite of the fact that we used five different sampling methods, and took 680 samples.

## Conclusion

These studies suggest that proper composting presents a minimal risk of Spreading disease by use or transport of cured compost

**If green-waste looks Infected, don't dump it, compost it!**

\_CI: These numbers (and bars on graph) represent the 99% probability range that a given mean is actually equal to zero Delta mean: These numbers (and bars on graph) represent the actual difference between treatment values and zero