

CLAIMS

1. An organic herbicide product comprising:
 - low lignin content pine oil about 48%-80% (w/w);
 - low to medium rosin tall oil about 15%-40% (w/w); and
 - 5 either KOH about 3%-10% (w/w), or KOH and NaOH in a combined amount of about 3%-10% (w/w);
 - wherein the pH of the product is about 8 to about 12.
2. The organic herbicide product according to claim 1, comprising:
 - low lignin content pine oil 48%-75% (w/w);
 - 10 low to medium rosin tall oil 19.4%-23% (w/w);
 - KOH about 4%-8% (w/w);
 - wherein the pH of the product is about 10 to about 11.
3. The organic herbicide product according to claim 1 or 2, wherein the low lignin content pine oil comprises (% w/w):

15	3-carene	1.3% – 2.0%;
	Limonene	6.0% - 7.20%;
	Eucalyptol	0.08% - 0.90%;
	g terpinene	1.00% - 1.55%;
	limonene isomer	10.90% - 11.10%;
20	fenchol	1.00% – 1.70%;
	b terpinenol	4.40% - 5.50%;
	g terpinenol	3.00% - 3.10%;
	endo borneol	1.50% – 2.30%;
	terpinen-4-ol	1.80% - 2.10%;
25	alpha-terpinenol	48.0% - 54.9%; and
	2-carene	9.00% - 9.35%.
4. The organic herbicide product according to any one of claims 1-3, wherein the low lignin content pine oil is hand-tapped pine oil or synthetic pine oil.
5. The organic herbicide product according to any one of claims 1-4, wherein the low

30 lignin content pine oil has trace levels of lignin.

6. The organic herbicide product according to any one of claims 1-5, wherein the product is substantially free of NaOH.
7. The organic herbicide product according to any one of claims 1-6, wherein the low lignin content pine oil is 53-68% (w/v) of the organic herbicide product.
- 5 8. The organic herbicide product according to any one of claims 1-6, wherein the low lignin content pine oil is 61-68% (w/v) of the organic herbicide product.
9. A method of reducing unwanted vegetation in a soil environment comprising:
 - spraying the soil environment with an effective amount of an organic herbicide product comprising:
 - 10 low lignin content pine oil about 48%-80% (w/w);
 - low to medium rosin tall oil about 15%-40% (w/w);
 - either KOH about 3%-10% (w/w), or KOH and NaOH in a combined amount of about 3%-10% (w/w);
 - wherein the pH of the product is about 8 to about 12.
- 15 10. The method according to claim 9, comprising:
 - spraying the soil environment with an effective amount of an organic herbicide product comprising:
 - low lignin content pine oil 48%-75% (w/w);
 - low to medium rosin tall oil 19.4%-23% (w/w);
 - 20 KOH about 4%-8% (w/w);
 - wherein the pH of the product is about 10 to about 11.
11. The method according to claim 9 or 10, wherein the low lignin content pine oil comprises (% w/w):

	3-carene	1.3% – 2.0%;
25	Limonene	6.0% - 7.20%;
	Eucalyptol	0.08% - 0.90%;
	g terpinene	1.00% - 1.55%;
	limonene isomer	10.90% - 11.10%;
	fenchol	1.00% – 1.70%;
30	b terpinenol	4.40% - 5.50%;
	g terpinenol	3.00% - 3.10%;

endo borneol	1.50% – 2.30%;
terpinen-4-ol	1.80% - 2.10%;
alpha-terpinenol	48.0% - 54.9%; and
2-carene	9.00% - 9.35%.

- 5 12. The method according to any one of claims 9-11, wherein the low lignin content pine oil is hand-tapped pine oil or synthetic pine oil.
13. The method according to any one of claims 9-12, wherein the low lignin content pine oil has trace levels of lignin.
14. The method according to any one of claims 9-13, wherein the organic herbicide
10 product is substantially free of NaOH.
15. The method according to any one of claims 9-14, wherein the low lignin content pine oil is at 53-68% (w/v) of the organic herbicide product.
16. The method according to any one of claims 9-14, wherein the low lignin content pine oil is at 61-68% (w/v) of the organic herbicide product.
- 15 17. The method according to any one of claims 9-16, wherein the unwanted vegetation is annual ryegrass (*Lolium rigidum*), red-root amaranth (*Amaranthus retroflexus*), fat hen (*Chenopodium album*), or blackberry nightshade (*Solanum nigrum*).
18. A method for reducing seed viability comprising:
 - spraying a soil environment with an effective amount of an organic herbicide
20 product comprising:
 - low lignin content pine oil about 48%-80% (w/w);
 - low to medium rosin tall oil about 15%-40% (w/w);
 - either KOH about 3%-10% (w/w), or KOH and NaOH in a combined amount of
25 about 3%-10% (w/w);
 - wherein the pH of the product is about 8 to about 12.
19. The method according to claim 18, comprising:
 - spraying a soil environment with an effective amount of an organic herbicide
product comprising:
 - low lignin content pine oil 48%-75% (w/w);
 - 30 low to medium rosin tall oil 19.4%-23% (w/w); and
 - KOH about 4%-8% (w/w);

wherein the pH of the product is about 10 to about 11.

20. The method according to claim 18 or 19, wherein the organic herbicide product damages the shell casing of the seed, thereby exposing the interior of the seed to the elements.
- 5 21. The method according to any one of claims 18-20, wherein the seed is present in the soil environment and/or is present on unwanted vegetation growing within the soil environment.
22. The method according to any one of claims 18-21, wherein the low lignin content pine oil comprises (% w/w):

10	3-carene	1.3% – 2.0%
	Limonene	6.0% - 7.20
	Eucalyptol	0.08% - 0.90%
	g terpinene	1.00% - 1.55%
	limonene isomer	10.90% - 11.10%
15	fenchol	1.00% – 1.70%
	b terpinenol	4.40% - 5.50%
	g terpinenol	3.00% - 3.10%
	endo borneol	1.50% – 2.30%
	terpinen-4-ol	1.80% - 2.10%
20	alpha-terpinenol	48.0% - 54.9%; and
	2-carene	9.00% - 9.35%.
23. The method according to any one of claims 18-22, wherein the low lignin content pine oil is hand-tapped pine oil or synthetic pine oil.
24. The method according to any one claims 18-23, wherein the low lignin content pine oil has trace levels of lignin.
- 25 25. The method according to any one claims 18-24, wherein the organic herbicide product is substantially free of NaOH.
26. The method according to any one claims 18-25, wherein the low lignin content pine oil is at 53-68% (w/v) of the organic herbicide product.
- 30 27. The method according to any one claims 18-25, wherein the low lignin content pine oil is at 61-68% (w/v) of the organic herbicide product.

28. The method according to any one of claims 18-27, for reducing the seed viability for seeds of annual ryegrass (*Lolium rigidum*), red-root amaranth (*Amaranthus retroflexus*), fat hen (*Chenopodium album*), or blackberry nightshade (*Solanum nigrum*).
- 5 29. A process for preparing an organic herbicide product, the process comprising mixing at ambient temperature for a time sufficient to cause saponification:
- low lignin content pine oil about 48%-80% (w/w);
- low to medium rosin tall oil about 15%-40% (w/w);
- KOH about 3%-10% (w/w);
- 10 wherein the pH of the product is about 8 to about 12.
30. A process for preparing an organic herbicide product, the process comprising mixing at ambient temperature for a time sufficient to cause saponification:
- low lignin content pine oil 48%-75% (w/w);
- low to medium rosin tall oil 19.4%-23% (w/w);
- 15 KOH about 4%-8% (w/w);
- wherein the pH of the product is about 10 to about 11.
31. A process for preparing an organic herbicide product, the process comprising mixing at ambient temperature for a time sufficient to cause saponification:
- low lignin content pine oil about 48%-80% (w/w);
- 20 low to medium rosin tall oil about 15%-40% (w/w);
- KOH and NaOH in a combined amount of about 3%-10% (w/w);
- wherein the pH of the product is about 8 to about 12.
32. The process according to any one of claims 29-31, wherein the mixing is conducted at a temperature of from about 10°C to about 35°C.
- 25 33. The process according to any one of claims 29-32, wherein the mixing is conducted for about 1 to about 5 hours.
34. The process according to any one of claims 29-33, wherein the low lignin content pine oil comprises (% w/w):
- | | |
|-------------------|----------------|
| 3-carene | 1.3% – 2.0%; |
| 30 Limonene | 6.0% - 7.20%; |
| Eucalyptol | 0.08% - 0.90%; |
| g terpinene | 1.00% - 1.55%; |

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|---|------------------|--------------------|
| | limonene isomer | 10.90% - 11.10%; |
| | fenchol | 1.00% – 1.70%; |
| | b terpinenol | 4.40% - 5.50%; |
| | g terpinenol | 3.00% - 3.10%; |
| 5 | endo borneol | 1.50% – 2.30%; |
| | terpinen-4-ol | 1.80% - 2.10%; |
| | alpha-terpinenol | 48.0% - 54.9%; and |
| | 2-carene | 9.00% - 9.35%. |
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- 10 35. The process according to any one of claims 29-34, wherein the low lignin content pine oil is hand-tapped pine oil or synthetic pine oil.
36. The process according to any one of claims 29-35, wherein the low lignin content pine oil has trace levels of lignin.
37. The process according to any one of claims 29-36, wherein the product is substantially free of NaOH.
- 15 38. The process according to any one of claims 29-37, wherein the low lignin content pine oil is 53-68% (w/v) of the organic herbicide product.
39. The process according to any one of claims 29-37, wherein the low lignin content pine oil is 61-68% (w/v) of the organic herbicide product.
- 20 40. An organic herbicide product prepared by the process according to any one of claims 29-39.