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2,746,853

TOBACCO DESUCKERING PROCESS

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No Drawing. Application July 31, 1952,
Serial No. 301,984

3 Claims. (Cl. 71-2.3)

This invention relates to improved agricultural compositions for desuckering tobacco plants. More particularly, it relates to emulsifiable desuckering compositions providing controlled emulsion stability characteristics.

Tobacco is a billion dollar crop in the United States. Much of the labor required to grow this crop is spent in manually breaking out the sucker bonds to increase the leaf yield and quality.

It has now been found that aqueous emulsions of petroleum mineral white oils with specific types of emulsifying agents can be used to desucker the tobacco plants much more economically. Furthermore, this improved sucker control method has no adverse effect on tobacco quality. Buyers and processors cannot distinguish between tobacco from plants treated with the composition of the present invention and tobacco from untreated plants.

The petroleum, mineral, white oils utilized for this purpose are mainly paraffinic and/or naphthenic, aromatic-free oils similar to those prepared by the well-known exhaustive sulfuric acid treatment of petroleum distillate to remove substantially all aromatics. Their preparation, i. e., by treating with fuming or concentrated sulfuric acid, is well known in the art. These acid treated oils have specific gravities in the range of about 0.800-0.885, a viscosity range SUS at 100° F. of 80-370, a boiling point predominantly in the range of about 550-1000° F., and are substantially free of aromatics, i. e., contain only a trace. Typical inspection is as follows:

Viscosity SUS at 100° F. -----	150
Specific gravity -----	0.864
A. S. T. M. Dist., °F. (Equivalent value at atmospheric pressure):	
I. B. P. -----	564
F. B. P. -----	975
Aniline point, °F. -----	230
Flash point, °F. -----	352
Unulfonated residue test -----	99.9
Sulfur -----	0.007
Color, Saybolt -----	+30
Percent Aromatics -----	Trace

The requirements for the emulsifying agents employed are rather specific in nature, i. e., not all emulsifying agents work in the compositions of this invention to secure the requisite emulsion stability characteristics control. The emulsifying agents employed are synthetic oil-soluble, non-ionic and/or anionic emulsifiers, and especially preferred are ethylene oxide condensation products. Typical emulsifiers by trade name and chemical description are as follows: Antarox A401, alkyl aryl polyoxyethylene glycol ether; Atlas G2854, polyoxyethylene sorbitol tetraoleate; Agent 140H, alkyl aryl polyoxyethylene glycol ether; Span 85, Sorbitan trioleate; Triton X45, alkylated aryl polyether alcohol; Nonisol 210, polyethylene glycol oleate; and petroleum sulfonate. The alkyl aryl polyoxyethylene glycol ethers are especially effective and desirable.

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The concentrations of the ingredients as well as the nature of the emulsifying agents have also been found to be quite critical, as laboratory tests and observations during the field trials indicate that emulsions should show about 10-85% and preferably 40-70% water separation on standing for one hour. Greater or lesser stability results in inferior results. This is measured by shaking 100 cc. of the aqueous emulsion for ½ minute in a 100 cc. graduate and allowing it to stand. The concentrations of ingredients to give these desirable properties have been found to be:

90-99.8 vol. percent petroleum mineral white oil
0.2-10 vol. percent oil-soluble non-ionic or anionic emulsifier

Before using, this concentrate is emulsified with enough water to give a concentrate to water ratio in the range of ½ to ¼. For example, aqueous emulsions containing 50% oil and 0.2-1.0% emulsifier have been found to be especially effective.

The suckers may be killed by applying the composition of this invention emulsified with water just below the exposed surface of the freshly "topped" tobacco plant. The killing action of the oil seems to take place after it runs down the stem and reaches the active sucker tissue. The emulsion may be applied by swab, paint brush, pressure oil can, dropper, or other convenient means. Special applicators have been developed to "top" and apply emulsion simultaneously, e. g., the "Clip-Oil" described in Information Series Bulletin No. 3, October 1950, Department of Agricultural Engineering, North Carolina Agricultural Experiment Station. Field experiments have shown that an application of about 3 cubic centimeters (0.1 ounce) of emulsion to each plant will control up to about 98% of the suckers. This means that an acre of tobacco may be treated with 5 gallons of emulsion containing 2.5 gallons of the composition of this invention. Smaller applications per plant will give poorer sucker control, while larger amounts will not appreciably improve the control.

The following examples illustrate this invention and indicate test results obtained with the compositions of this invention emulsified with water.

EXAMPLE I

Eight petroleum mineral white oils having viscosities in the range of 88-368 SSU at 100° F. were tested in sucker control compositions on tobacco plants near Lumberton, Greensboro, and Asheville, North Carolina. Each oil was tested as an aqueous emulsion containing 50 volume per cent of oil and 1 volume per cent of: (1) alkyl aryl polyoxyethylene glycol ether emulsifier; or (2) polyethylene glycol ester emulsifier; or, (3) a petroleum sulfonate modified with a minor amount of a non-ionic emulsifier; the balance being water. These emulsions were applied to the tobacco plants at the rate of about 2 cubic centimeters per plant yielding the following average results in percentage sucker control: Lumberton, 73%; Greensboro, 93%; Asheville, 92%. Only minor to negligible nodal scar or stem burn occurred in these tests. It should be mentioned that the tobacco near Lumberton was treated about a week beyond the optimum period for sucker control.

EXAMPLE II

Laboratory tests were made of the stability of the emulsions field tested as described under Example I. These stability tests showed that the degree of sucker control was improved 5 or 6 per cent when moderately stable emulsions, i. e., those showing approximately 20-75%

water separation in the one-hour test, were used. The following tabulation illustrates the results of these tests:

Average Percent Water Separation, One-Hour Test	Average Percent Sucker Control		
	Lumberton	Greensboro	Asheville
11.5.....		92.8	88.8
52.....		97.8	95.2
57.....	71.0		
85.....	66.2		

This extra margin of control is especially important when the general level of control is high.

The utilization of emulsions of the compositions of this invention represents extremely large labor savings and lower growing costs. The estimated labor and costs of sucker control with emulsions of the compositions of this invention compared to standard practice are as follows:

Costs of desuckering with emulsifiable white oil compared to standard manual practices

Method of Control	Composition of this Invention	Manual
Total Hours per Acre.....	4	25-50
Labor Cost at 50¢ per Hour.....	\$2	\$12-25
Cost of Oil at 5 Gals. ¹ per Acre.....	\$2.50	-----
Total Cost per acre.....	\$4.50	\$12-25

¹ Of emulsion.

The savings are apparent.

It is to be understood that this invention is not limited

to the specific examples which have been offered merely as illustrations, and that modifications may be made without departing from the spirit of this invention.

What is claimed is:

5 1. The process of desuckering tobacco plants which comprises applying to said plants an aqueous emulsion of a petroleum mineral white oil, said emulsion exhibiting about 10 to 85 volume percent water separation on standing for one hour, said petroleum mineral white oil having
10 a specific gravity in the range of about 0.800 to 0.885, a boiling range of about 550° to 1000° F., a viscosity of SUS at 100° F. of 80 to 370, and, as an emulsifying agent, an oil soluble compound selected from the group
15 consisting of non-ionic and anionic emulsifier compound, the proportion of mineral oil to emulsifier being from 90 to 99.8 volume percent oil and 0.2 to 10 volume percent emulsifier.

20 2. The process of claim 1 wherein said oil and emulsifier are admixed with water in the range of from 1/2 to 2/1.

3. The process of claim 2 wherein said emulsifier is an ethylene oxide condensation product.

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