Areskap - Aresket - Aresklene

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Monsanto Chemical Company Phosphate Division St. Louis, Missouri

New York - Chicago - Boston - Birmingham - Charlotte - Cincinnati - Detroit - San Francisco - Seattle - Los Angeles - Montreal

ARESKAP - ARESKET - ARESKLENE

These trade names are applied to surface active agents manufactured and distributed by Monsanto Chemical Company having the following chemical composition:

Areskap - Monobutyl phenylphenol sodium monosulfonate
Aresket - Monobutyl biphenyl sodium monosulfonate
Aresklene - Dibutyl phenylphenol sodium disulfonate

The active concentrations of the several grades are shown as follows:

		% Active
Areskap 50	(water solution)	50
Areskap 100	(dry powder)	100
Aresket 240	(water solution)	40
Aresket 300	(dry powder)	100
Aresklene 375	(water paste)	75
Aresklene 400	(dry powder)	100

PHYSICAL AND CHEMICAL PROPERTIES

Dry Powders

	ARESKAP 100	ARESKET 300	ARESKLENE 400
Color	Tan	Tan	Tan
Odor	Sl. aromatic	Sl. aromatic	Sl. aromatic
Melting Range*	Decomposition 160°C	Decomposition 160°C	Decomposition 160°C
Ash	Approx. 25.7%	Approx. 28.5%	Approx. 22.5%
Sulfates	Trace	Trace	Trace
Chlorides	Trace	Trace	Trace
Volatility	Less than 1% up to 160°C decomposition point.		
Saponification Value	Less than 10 mgm. KOH per gram of powder.		
Acidity Value	Less than 5 mgm. KOH per gram of powder.		
Bulk Density gm./cc.	0.490	0.485	0.603
pH (1% Solutions in Distilled Water @ 30°C)	7 - 8	7 - 8	7 - 8

*Since these products are sodium salts of organic acids, they decompose rather than melt. The liquid decomposition products give the appearance of a melt at temperatures above 150°C to 160°C.

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SOLUTIONS

Since the dry powders are quite hygroscopic, it is frequently found that they are better adapted to commercial application as solutions.

The properties of these solutions are comparable with the respective dry powders shown above.

	Specific Gravity
Areskap 50	1.155 - 1.165 @ 20°C
Aresket 240	1.145 - 1.155 @ 20°C
Aresklene 375	Approx. 1.2 @ 20°C

SOLUBILITIES

ARESKAP, ARESKET and ARESKLENE are used in such varied fields that it is impossible to completely compile their solubilities. The appended table gives the solubility of 10 grams of powder in 90 grams of the most common solvents.

Solvent	ARESKAP	ARESKET	ARESKLENE
Water	Soluble	Soluble	Soluble
Ethyl Alcohol	Soluble	Soluble	Soluble
Acetone	Soluble	Insoluble	Soluble
Pine Oil	Soluble	Insoluble	Soluble
Methyl Ethyl Ketone	Soluble	Insoluble	Soluble
Butyl Cellosolve	Soluble	Soluble	Soluble
Ethylene Glycol	Soluble	Soluble	Soluble
Dichlor-Ethyl Ether	Insoluble	Insoluble	Insoluble
Ethyl Ether	Soluble	Insoluble	Soluble
Pentasol	Soluble	Insoluble	Soluble
Diethylene Glycol	Soluble	Soluble	Soluble
Petroleum Ether	Insoluble	Insoluble	Insoluble
Gasoline	Insoluble #	Insoluble	Insoluble*
Kerosene	Insoluble #	Insoluble	Insoluble
Glycerine	Soluble	Soluble	Soluble**
Chloroform	Soluble	Insoluble	Soluble
Carbon Tetrachloride	Soluble	Insoluble	Insoluble
Cellosolve Acetate	Soluble	Soluble	Soluble
Ethyl Acetate	Soluble	Insoluble	Soluble
Butyl Acetate	Soluble	Insoluble	Soluble
Oleic Acid	Soluble		
Tung Oil	Insoluble	Insoluble	Insoluble
Turpentine	Insoluble	Insoluble	Insoluble
Solvent Naphtha (Mineral Spirits) (Varnoline)	Insoluble	Insoluble	Insoluble
Linseed Oil	Insoluble	Insoluble	Insoluble
Ethylene Dichloride	Soluble	Insoluble	Soluble (hot) (Jells)
Ortho Dichlorbenzene	Soluble(hot)	Soluble(hot) (jells)	Soluble

* Some solubility on warming.
** Tendency to jell.
\# Slightly soluble if first dissolved in benzene or toluene.

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SURFACE TENSION EFFECTS

There are several methods for determining the surface tension effects of wetting agents. We have included the more common ones: DuNuoy Tensiometer and Draves Method.

DU NUOY TENSIOMETER

The following determinations represent the average of five readings:

	DuNuoy Determinations - Dynes/cm.		
Solution	ARESKAP 100	ARESKET 300	ARESKLENE 400
1.0%	33.7	35.7	32.5
0.25%	33.9	36.0	29.5
0.0625%	40.1	45.3	35.0

The smaller the number indicates greater wetting and spreading power of the solutions.

DRAVES METHOD

The Draves method as employed is outlined in detail in the 1938 Yearbook of the American Association of Textile Chemists and Colorists. Briefly, this methods the time required for a skein of cotton yarn in a solution under standardized conditions closely approximating commercial wetting-out practice.

Wetting Time in Seconds - Distilled Water @ 25 degrees C.

% Concentration	ARESKAP 100	ARESKET 300	ARESKLENE 400
0.5	10.5	11.6	2.6
0.25	38.7	23.1	6.6
0.125	>180.0	78.4	18.2
0.0625	-	>180.0	90.4

Wetting Time in Seconds - 2% Sulfuric Solutions @ 25 degrees C.

0.5	Inst.	9"	Inst.
0.25	11"	19"	5"
0.125	128"	99"	16"
0.0625	+180"	+180"	158"

Wetting Time in Seconds - 2% Sodium Hydroxide @ 25 degrees C.

0.5	+180"	15"	102"
0.25	-	33"	+180"
0.125	-	94"	-
0.0625	-	+180"	-

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Wetting Time in Seconds - 5% Sodium Hydroxide @ 25 degrees C.

% Conc.	ARESKAP 100	ARESKET 300	ARESKLENE 400
0.5	105	19	29
0.25	+180	51	120
0.125	-	143	+180
0.0625	-	+180	-

STABILITY TO METALLIC IONS

Many industrial applications involve the use of soluble metallic salts, and it is important that a wetting agent be stable to them, i.e., retain wetting action without forming insoluble salts or forming complexes with surface tension reducing properties. In certain other operations, it is desirable that an insoluble salt be formed.

TABLE

Number of milligrams of metallic salt required to cause insoluble salt formation with 100 mgm. of dry wetting agents (100 mgm. maximum amount of salt added).

Metal Salt	ARESKAP 100	ARESKET 300	ARESKLENE 400
Aluminum Sulfate	8	6	6
Barium Chloride	20	9	15
Copper Sulfate	88	100	100
Calcium Chloride	100	14	23
Ferric Sulfate	17	7	27
Lead Nitrate	33	21	35
Magnesium Sulfate	100	100	100
Nickelous Nitrate	100	100	60
Zinc Sulfate	100	100	100
Average	62.9	50.8	51.8

APPLICATIONS

EMBALMING

0.5% Areskap 50 added to concentrated embalming fluids makes it possible for these solutions to permeate the body completely. By reducing the surface tension of the embalming liquids, they readily flow into even the smallest capillaries. So effective is the dispersion of color through the use of "Areskap 50," that a healthier glow than enjoyed in life is attained.

Embalming fluids are generally formulated with alcohol, glycerine and formaldehyde as the chief constituents. The following typifies such a product to which is added Areskap 50, as follows:

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Water	38 parts
Glycerine	38 "
Methanol	38 "
Borax	3 "
Phenol	5 "
4% Formaldehyde	200 "
Areskap 50	3 "

INSECTICIDES

The following formulations have been found of proved merit:

Rotenone - Sulfur dust

Cube rotenone	15%
Sulfur	15%
Talc	69%
Aresket 300	1%

The wetting agent dissolves in the dew and spreads the insecticide.

European cornborer (Circular No. 114, Connecticut Agricultural Experiment Station, New Haven, Conn., June, 1936)

		Per 100 gals.
No. 1	Areskap 100	6 oz.
	Ground Derris Root	4 lbs.
No. 2	Areskap 100	6 oz.
	Phenothiazine	4 lbs.
No. 3	Areskap 100	6 oz.
	Liquid Tannin	3 lbs.
	Free Nicotine (50%)	1 lb.

Control of Gypsy Moth

Lead Arsenate	30.0 lbs.
Fish Oil	6.0 "
Motor Oil	1.2 "
Aresket 240	1.2 "
Water	45.0 gals.

Use five gallons per acre of trees.

Control of stinking smut on wheat

Areskap	0.25%
Formaldehyde 40%	0.31%

Treating bulbs

Aresket 300 is used in a cresol dip for gladiolus bulbs before planting to combat mites.

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Summer oil sprays

An oil emulsion prepared at the New Jersey Experiment Station, New Brunswick, New Jersey, said to be as good as can be prepared with any other emulsifier, consists of the following:

Summer oil	66%
Water	33.5%
Aresklene 400	0.5%

The dry Aresklene is dissolved in water. While this is circulated with a pump, the oil is added slowly with constant agitation with pumping. After all the oil has been added, the pumping is continued for about 10 to 15 minutes, then passed through a colloid mill.

The customary oil emulsions, as manufactured by Government formula, consist of 2 gallons of oil, one gallon of water and one pound of 40% potash fish oil soap, the latter as an emulsifier. This gives an emulsifiable oil, containing 66% active unsulfonated oil. Recently the Standard Oil Company of Indiana have begun to market an oil containing practically no water, 96% unsulfonated oil and 5% of oil-soluble emulsifying agent. These oils are diluted at the point of application to yield a concentration of approximately 2% oil in a water emulsion. This latter being applied as a spray to trees.

For dormant or winter sprays, an oil having a viscosity of 150-200 Saybolt Seconds is employed; whereas, for summer sprays, an oil having a viscosity of 75-100 Saybolt Seconds is employed. The winter oil sells for 25¢ per gallon and the summer oil for 50¢ per gallon.

Home-made Oil Emulsions for Summer Spraying in Apple Orchards

Joseph M. Ginsburgh, New Jersey Agricultural Experiment Station, New Brunswick, New Jersey, states that based on experiments conducted for several years with various petroleum oil distillates, and with different emulsifying agents, a formula has been developed by which the farmer can readily prepare a stable home-made oil emulsion for summer spraying in apple orchards, resulting in a large financial saving. A semi-refined paraffin distillate of the following specifications proved equally as safe as the highly refined oil heretofore used and is, of course, considerably cheaper:

Boiling Range--Initial	570-590°F
Final	750-750°F
A.P.I. Gr.	31 or higher
Viscosity--Saybolt U./100	65-75
V.I.	90-100 or higher
U.S.R.	82-84%

Of the many emulsifiers tested, sodium lauryl sulfate was found very effective. It produces a stable emulsion, compatible practically with all kinds of water available on the farm for spraying purposes. The stock emulsion consists of 70% oil, 29% water, and about 0.5 to 1.0% emulsifier.

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The following procedure was found satisfactory with the ordinary power sprayer. The emulsifier is first added to 10-20 gallons of water and transferred to the spray tank, containing the rest of the water. With the agitators and pump running at a pressure of 50 lbs. or higher, the oil is slowly run in. After all the oil has been added, mixing is continued for about 30 minutes or until the emulsion becomes thick, creamy and homogeneous, showing no free oil on the surface. The finished emulsion is pumped into clean drums for storing. If foaming becomes excessive, reaching top of tank, about 1 to 4 pints of defoamer (3 lbs. of wool grease in one gallon of kerosene) may be added.

For spraying, the home-made emulsion is diluted with water to the desired oil concentration in the same way as the commercial oil emulsion.

Pea Aphids

Rapid strides have been made during the past in solving the problem of the control of pea aphids. Canners and growers have a choice of several controls, embodying the use of derris and cube in spray and dust form, nicotine in vaporized and dust applications, and quite possibly combinations of these methods. It is a question now of a choice of method rather than a search for suitable insecticide.

One point stands out as being vitally important in both dust and spray applications and that is the necessity, economy and advantage of using a satisfactory wetting and spreading agent.

An excellent material for this purpose is Dry Aresket 300 and the solution form of this product, Aresket 240.

In dust applications containing derris, cube or nicotine, from 3 to 5 pounds of Dry Aresket 300 is used. This provides satisfactory sticking properties to the dust application and at the same time by breaking down the surface tension of the moisture, promotes wider and more even spread of the insecticide.

In spray applications a pint of Aresket 240 to 100 gallons of spray is generally used. This addition to the spray greatly increases the effectiveness of the insecticide and makes the treatment more economical.

Aresket is variously mentioned throughout the literature as Diphenyl Butyl Sodium Sulfonate, Sulfonated Phenylphenol, Sulfonated Alkylated Diphenyl, and others. It can be used in any kind of water and there is no record of its ever causing injury to plants.

According to the JOURNAL OF ECONOMIC ENTOMOLOGY 28, P. 224, J. M. Ginsburg of the New Jersey Agricultural Experiment Station, New Brunswick, New Jersey, outlines the use of wetting agents for oil insecticides:

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Against aphis pomi

To yield equivalent mortality of 80% required the following dilutions:

Gardinol W.A.	1:210
Aresket or Areskap	1:350

Rat Poison

In treating sunflower seeds with poison for rats, it was found that Aresket 240 added to the soaking solution increases the speed of soaking (reduces to 25 minutes) and insures a perfect kill.

Wm. Buettner of O. J. Buettner & Sons, Inc., Brooklyn, New York, in Service Letter #253, distributed by the National Pest Control Association, Inc., to their membership, stated:

> ". . . if a wetting agent such as Aresket or Santomerse D is used, there can be brought into a workable solution the arsenic in a micron size."

for use in rat control.

Red Mite

According to Ralph E. Heal, New Jersey Agricultural Experiment Station (JOURNAL ECONOMIC ENTOMOLOGY 29:550), summer control of European red mites on apples with derris and neutral wetting agents (foliage previously sprayed with sulfur and lead arsenate, which precluded use of oil or soap.)

Derris root (4% Rotenone)	1¼ - 2 lbs.
Areskap 100	10 oz.

per 100 gallons

On the basis of Areskap 100 as 100% effective, the other wetters had the following values:

Aresklene	100.5%
Aresket	91.2%

Apple washing to remove Spray Residues

To reduce spray residues within food law tolerances, use 2% Areskap 50 in 1½% Muriatic Acid solution, heated to 100°F.

Ant Control

The University of Idaho, Department of Entomology, recommends a stock solution to be diluted as follows:

Carbon Bisulfide	1½ gallons
Crude Naphthalene	56 ounces
Aresklene 400	1½ ounces
Water	2 quarts

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Preparation of stock material: Dissolve the crude naphthalene in the carbon bisulfide. All lumps must be broken up and the material completely dissolved. The mixing can be done with electrically driven equipment or a small cream churn.

Place the water and Aresklene together and agitate in the mixing apparatus until it has the appearance of very foamy soapsuds. Slowly add the carbon bisulfide - crude naphthalene solution to the water - Aresklene, agitating vigorously while adding. Continue the agitation for several minutes after all the materials are combined. This completes preparation of the stock material.

Use of the material: The stock emulsion, prepared as described above, is diluted 1 part to 80 parts of water (1/2 pt. emulsion to 5 gals. of water). The ant colony is prepared for treatment by building a dike of dirt about 2 inches high around the outside. The area enclosed by the dike can then be filled once or twice with the diluted emulsion until enough is added to soak thoroughly through the colony. The amount of diluted material will vary between 5 and 10 gallons, depending upon the size of the colony. All stages of the ants are killed. The best time to treat is at dusk when the ants have all returned to the colony.

Wire Pickling

Using 0.75% Areskap 100 in a 15% HCl bath (not 15% of 18°Be Muriatic) based on the diluted weight of bath. Contact time of 9 seconds in a 20-ft. tank with very good results. Without Areskap it does not work.

Areskap 50 in Muriatic Acid pickling bath for wire has the following advantages:

1. Reduces the loss of Muriatic Acid through dragout.
2. Reduces the formation of dross in their galvanizing pot. Under their present process any iron salts which adhere to the work are carried into the galvanizing pot and combine with zinc to form dross. Better drainage of the work should aid in eliminating this.
3. Secure better pickling thru quicker penetration of the acid to the center of the coils.

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The information in this bulletin is based on our experience, represents our best judgment in the matter, and is intended to be helpful; but we cannot assume responsibility for any loss or accident that may result from its use.

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