

# WETTING AGENTS VS. CROP OIL CONCENTRATES

Wetting agents are usually grouped into a class of compounds termed surfactants (surface active agents). They are capable of emulsifying, dispersing, wetting, and spreading, but their primary purpose is to reduce the surface tension of a spray solution. This allows more contact between the spray droplet and the plant surface. The principal functioning agents of these products may vary greatly in makeup and percent active ingredient.

Crop oil concentrates are another type of adjuvant. They normally contain 75-80 percent nonphytotoxic oil and 15-20% surfactant/ emulsifier. They, like the wetting agents, vary greatly, first in grade and refinement of oil, and second in type and quality of surfactant/emulsifier. Crop oil concentrates usually enhance penetration more than surfactants alone. This is believed to be the result of the action of the oil in relation to the waxy cuticle and to the buildup of surfactant molecules in the cracks and openings of leaf surfaces. The purpose of the surfactant/emulsifier in this mixture is to emulsify the oil in the solution, lower the surface tension of the overall spray solution, and aid in cuticle penetration.

Crop oil concentrates and surfactants increase pesticide contact by:

1. Helping spray droplets stick to the plant, resulting in less run-off.
2. Causing a more uniform spreading of spray solution and uniform wetting of the plant.
3. Assuring that droplets do not remain suspended on hairs, scales, or other surface projections.

## ADJUVANT SELECTION

Once the type of adjuvant needed has been determined, differences between products of the same type must be resolved. Products represented as being "the same thing" may possess major differences in activity. Malathion and parathion have often been considered "the same thing" by some, although significant differences exist in their individual activity. That same difference in range of activity may also be found between to adjuvant products of the same type. Valid and reliable data, derived from testing the adjuvant product, should accompany company claims. This information is often available from Extension, university, or manufacturer sources.

## RATE SELECTION

Once a suitable adjuvant has been selected, it is equally important to determine and use the correct rate of adjuvant. Unlike pesticides, adjuvant rates are determined both on a volume/volume basis and a per acre basis. Most wetting agents (based on a minimum 70% active ingredient) are recommended at one-quarter to one-half percent volume/volume concentration and most crop oil concentrates are recommended at one percent volume/volume concentration. The following table will serve as a useful guideline in selecting the correct adjuvant rate.

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Finally, several key factors should be considered in the selection of the proper adjuvant:

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## COVERAGE DIFFERENCES

ADJUVANT CONCENTRATION PERCENTAGE  
By Volume (% Concentrate v/v)

Adjuvant Rate	Gallons of Spray									
	1	5	10	15	20	25	30	40	50	100
.25 pt. (4 fl. oz.)	3.12	.62	.31	.21	.16	.13	.10	.08	.06	.03
.50 pt. (8 fl. oz.)	6.25	1.25	.62	.42	.31	.25	.21	.16	.13	.06
.75 pt. (12 fl. oz.)	9.37	1.87	.94	.63	.47	.38	.31	.23	.19	.09
1.00 pt. (16 fl. oz.)	12.5	2.50	1.25	.83	.63	.50	.42	.31	.25	.13
1.50 pt. (24 fl. oz.)	18.7	3.75	1.87	1.25	.94	.75	.63	.47	.38	.19
2.00 pt. (32 fl. oz.)	25.0	5.00	2.50	1.67	1.25	1.00	.83	.63	.50	.25
2.50 pt. (40 fl. oz.)	31.2	6.25	3.12	2.08	1.56	1.25	1.04	.78	.63	.50
3.00 pt. (48 fl. oz.)	37.5	7.50	3.75	2.50	1.88	1.50	1.25	.94	.85	.38
4.00 pt. (64 fl. oz.)	50.0	10.0	5.00	3.33	2.50	2.00	1.67	1.25	1.00	.50
1.00 gal. (128 fl. oz.)	100.00	20.0	10.00	6.67	5.00	4.00	3.33	2.50	2.00	1.00



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1. Use only nonionic surfactants manufactured and marketed for agricultural use.
2. Buy or calculate the cost based on the percentage of active ingredient. A 50 percent active ingredient per gallon is equal to only one-half of a 100 percent material.
3. Do not consider isopropyl alcohol or water as active ingredients. If the label does not specifically state the percentage of active surfactant, ask the dealer for this information.
4. Do not buy or use household detergents for use with pesticides.
5. There are no miracle surfactants. Claims that a surfactant can be used at concentrations much lower than conventional surfactants should be questioned. Ignore claims such as "keeps spray equipment clean," "causes better root penetration and nutrient uptake, water penetration," etc. If it sounds too good to be true, be suspicious.
6. Buy from a reliable dealer, considering the manufacturer; read the label; and base the price on the active surfactant cost.
7. Make sure the adjuvant has been tested and proven effective — that it has been formulated from raw materials for specific use, and is recommended where a need is established. ■

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