Percentages for adjuvants and active ingredients

Often, the amount of an adjuvant to use in a pesticide mixture is given in terms of percentage of the final solution. For example, the adjuvant directions may say to use it at a 0.5% concentration. To determine the amount needed, first convert the percentage of concentrate in the final solution to a decimal. Then you'll calculate the amount of the adjuvant concentrate to mix with water. To convert percentages to decimals, divide the percentage number by 100 to get the decimal. This is the same as moving the decimal point two places to the left and adding zeroes as needed.

To convert 0.5% to a decimal, divide 0.5 by 100.

$$\frac{0.5}{100} = 0.005$$

1. 2% is equal to what decimal?   0.02
2. 1.5% is equal to what decimal?   0.015
3. 15% is equal to what decimal?   0.15

You may need to be able to convert percentages to decimals when you have to figure out the amount of adjuvant to add to a pesticide mixture, or the amount of pesticide to add to water.

How many gallons of adjuvant should you add to 400 gallons of a pesticide mixture if the adjuvant is used at a 0.5% concentration by volume?

First, convert 0.5% to a decimal by dividing 0.5 by 100.

$$\frac{0.5}{100} = 0.005$$

Next, multiply the decimal by the number of total gallons wanted, to get the amount of adjuvant needed.

$$0.005 \ \ X \ \ 400 \ gallons \ = \ 2 \ gallons$$

How many gallons of pesticide and water mixture will you need to prepare 400 gallons of spray mixture that includes the adjuvant?

400 gallons total – 2 gallons adjuvant = 398 gallons of pesticide and water solution.

Many pesticides applied as spot treatments are mixed with water at a specific "percent solution." To create this solution, convert the percentage of concentrate in the final solution to a decimal. Multiply the total number of solution you want by the decimal to find out the amount of pesticide concentrate to mix with water.

Suppose you want to make 100 gallons of a 10% solution of a pesticide in water. First, convert the percentage to a decimal.

$$\frac{10}{100} = 0.10$$

To determine the amount of pesticide you'd need, multiply 0.10 by the total volume you need.

$$0.10 \ \text{X} \ 100 \ \text{gallons} \ = \ 10 \ \text{gallons}$$

You want a total of 100 gallons of the 10% mixture. You now know that 10 gallons will be the pesticide. From the total volume of the mixture, subtract 10 gallons of pesticide to get the amount of water needed.

$$100 \ \text{gallons of water and pesticide} \ - \ 10 \ \text{gallons of pesticide} = 90 \ \text{gallons of water}$$

You would add 10 gallons of pesticide concentrate to 90 gallons of water. If you added 10 gallons of pesticide to 100 gallons of water, the solution would be too dilute.

Practice:

1. *How many gallons of pesticide product and how many gallons of water should you add to make 500 gallons of a pesticide mixture if the pesticide is used at 0.5 % concentration by volume?*

2. *How many gallons of pesticide product and how many gallons of water should you add to make 600 gallons of a pesticide mixture if the pesticide is used at 0.2% concentration by volume?*

3. *How many gallons of pesticide product and how many gallons of water should you add to make 300 gallons of a pesticide mixture if the pesticide is used at 0.5% concentration by volume?*

Answers:

1. 0.005 X 500 = 2.5 gallons of product

    500 gallons – 2.5 gallons = 497.5 gallons of water

2. 0.002 X 600 = 3 gallons of product

    600 gallons – 3 gallons of product = 597 gallons of water

3. 0.005 X 300 = 1.5 gallons of product

    300 gallons – 1.5 gallons = 198.5 gallons of water