PESTICIDE VAPOR PRESSURE
TOPIC FACT SHEET

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What is vapor pressure?

Vapor pressure is a pesticide's tendency to "evaporate". In other words, to change from a solid or liquid into a vapor.[1] In general, pesticides with low vapor pressures are less likely to turn into a vapor and get into the air. Those with high vapor pressures are more likely to get into the air. You'll typically see vapor pressure measured in torr or millimeters of mercury (mmHg) at 25 °C (77 °F). These units describe pressure like "pounds" and "grams" describe weight.

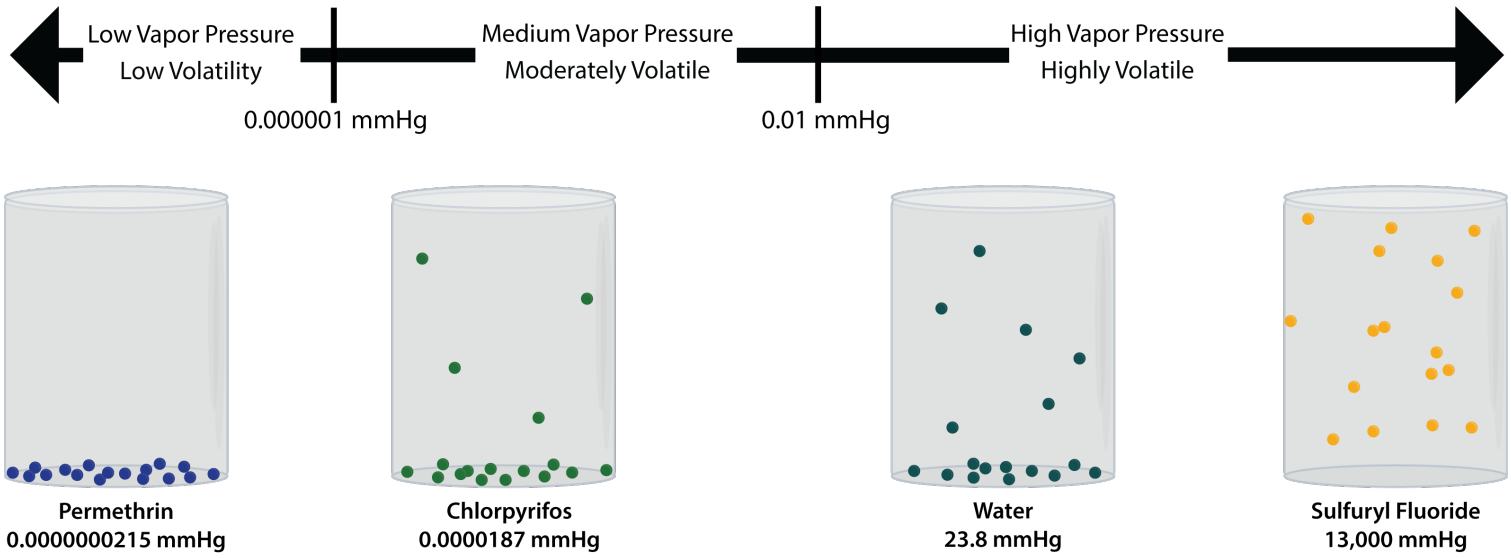

Image: Example of pesticide vapor pressures.[2,3,4,5] Photo credit: National Pesticide Information Center

How is a pesticide's vapor pressure determined?

If you were to place a pesticide in a container and close it, some of it would stay at the bottom. Some of it may also evaporate into the air inside the container. The pressure from these trapped vapors pushing outward can be measured. This can be done with pressure gauges or other devices. These measuring devices are able to detect very low pressures.[6]

Why is a pesticide's vapor pressure important?

A pesticide's vapor pressure can tell us quite a bit about how it will act inside and outside. For example, it can help us predict:

- Where the pesticide will go after it is applied
- How long the pesticide might stay in water, on plants, and in soil[1]
- How much pesticide will get into the air[7]
- Whether people or animals are at risk of breathing in the pesticide. Pesticides that quickly and easily turn into vapors can increase this risk.[7]

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While some pesticides will stay grounded after they are applied, others may be more likely to move up into the air. It is important to know which type of pesticide you might be dealing with before it's used. Pesticides with higher vapor pressures tend to move into the air faster and easier. This can increase the chance of breathing them in. Vapors may more easily reach the skin and eyes. Wind may also carry vapors away to other areas.

If you know the vapor pressure of a pesticide, you can better predict how it will act both indoors and outdoors. You can also take steps to lower the risk to people, animals, and the environment. For example, a farmer might use plastic row covers to prevent a highly volatile pesticide from escaping from soil. This helps prevent harm to nearby people, plants, and animals. When using volatile pesticides indoors, professionals might wear respirators and other protective equipment. Always check the pesticide label. It will list the minimum precautions and protective equipment that are necessary.

To keep your risk low in your own home, you may consider:

- Covering vents (or other sensitive items) when spraying nearby.
- Turning off air circulation to rooms being sprayed.
- Using volatile pesticides only in well-ventilated areas.
- Avoiding the use of volatile pesticides near exposed food items.
- Ventilating the area after application by opening windows and doors and/or using fans.
- Keeping people and pets out until the area has been well-ventilated.
- Avoiding treated areas until sprays have dried thoroughly.

What can influence a pesticide's vapor pressure in the environment?

Many things can affect whether or not a pesticide will get into the air. In fact, pesticides can have different vapor pressures under different conditions. Temperature plays a very large role here.[7] In general, pesticides will have lower vapor pressures at lower temperatures. As temperature goes up, so does the pesticide's vapor pressure.

Other environmental factors, like climate, soil type, and moisture level can also affect a pesticide's volatility. Pesticides can also stick to soil, be broken apart by water and light, and dissolve in water. These things can affect how likely it is to become a vapor. The way a pesticide is applied can also play a role.[7] For example, a pesticide with small droplets, like an aerosol, may get into the air more easily than a spray with larger droplets.

Additionally, the **other ingredients** in a pesticide product can speed up or slow down the active ingredient's transition to the vapor phase.[8] A quick example of how some of these factors work together can be found in the following images.

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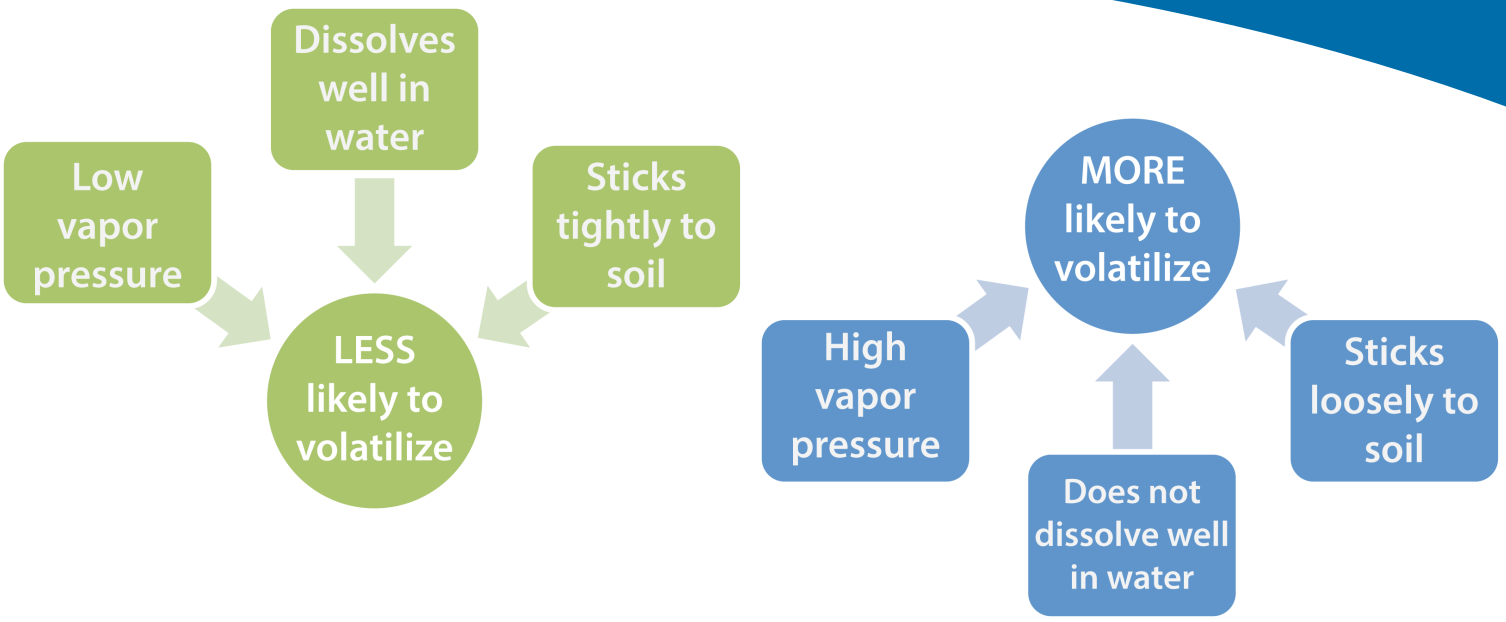

What happens to a pesticide once it becomes a vapor?

In the air, pesticides can break down, be breathed in, and move away from the treated area into new areas.[7] When pesticides move off-target as vapors, that is known as vapor drift.[9] Pesticide vapors can be broken apart by light, water, and microbes. They can also stick to dust particles in the air and be carried away by air currents. Later, wind or rain may deposit those airborne pesticides onto soil, water, plants, or animals in other areas.[7]

Becoming a vapor isn't the only way that a pesticide can move away from the place it is applied. Dust particles or spray droplets can also move through the air during or shortly after pesticide use. This is known as particle **drift**.[9,10] Pesticide labels have information about how to reduce the risk of drift. For some products, that might mean using very specific spray nozzles, limiting the release height, or not applying under certain weather conditions. Additional methods can include adding a thickener to the spray tank, reducing the spray pressure, or using spray shields.[11] If you suspect pesticide drift, contact the pesticide **authority** in your state.

Where can I get more information?

For more detailed information about pesticide vapor pressures, please visit the list of **referenced resources** below or call the National Pesticide Information Center, Monday - Friday, between 8:00am - 12:00pm Pacific Time (11:00am - 3:00pm Eastern Time) at 1-800-858-7378 or visit us on the web at http://npic.orst.edu. NPIC provides objective, science-based answers to questions about pesticides.

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