# Chemical Field test kit

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## Introduction

Mycologists have long used chemical field tests to help them categorizes and identify different species. Chemical tests can be very useful in separating two very similar species that look the same but have different reactions. The different tests react with chemical compounds in the mushrooms generating a color reaction or color change. Test sites are typically the cap, gill or pores, stripe or stem and cross sections of the cap and stripe. For some species the partial veil is also tested. Chemical tests are frequently used for the identification of boletes and russulas. Note that most species have no documented tests but this does not mean they don’t react to the chemicals it is worth experimenting and seeing if there is a reaction. For other species the recorded results are not always accurate or complete. The tests should be carried out on fresh mushrooms shortly after picking. The chemicals react with enzymes or compounds in the mushrooms as the mushroom ages the enzymes are deactivated and volatile compounds are lost, also the chemicals will no longer be able to penetrate the mushroom and test results will not be as strong or can become inconsistent.

## Usage

### Ammonia (NH3)

This is household ammonia. Ammonia is the first of the three most commonly used chemical tests. It is frequently used in the identification of bolete and cortinarius species. Place a drop of ammonia on the mushroom surface to be tested. Positive test results are a blue-green or gray color change although it can sometimes be brown, orange or other colors. Some reactions on bolete caps are a flash of color which then settles to a second color.

### Ferrous sulfate 10%

Second of the commonly used chemical tests, also known as the green vitriol test. These are the iron salts reported in many books. For best results you may need to break the surface of the cap slightly before applying a drop of ferrous sulfate. An essential test for russulas identification also used a lot in bolete identification. Color change typically orange to green.

### Potassium hydroxide 10%

The third of the most commonly used chemical tests, also known as potash or soda solution. This is a strong alkali solution and is caustic, make sure you wash it off your skin quickly. Used in the identification of boletes, field mushrooms and polypores. Boletes the test is often applied to the cap, for other species it may be the pores or a cross section of the flesh. Color changes vary from yellows and pinks to red and magenta or greens and olive or black. A negative reaction can also be an important result.

### Sulfuric acid 1N

Sulfuric acid is dangerous, wear gloves! A drop of sulfuric acid is applied to the gills or pores and sometimes the flesh of a mushroom can result in a color change. Color changes vary from yellow and pinks through orange and then rust and reds.

### Sulphovanillin

A solution of sulfuric acid and vanillin, needless to say the sulfuric acid is dangerous, wear gloves! A few crystals of vanillin are placed in a plastic watch glass and a drop of sulfuric acid is added. The solution is stable for a couple of days. Mainly used in russula identification and the reaction turns black within a few minutes.

### Hydrochloric acid 32%

Hydrochloric acid is dangerous, wear gloves! Mostly used with boletes. Place a drop of Hydrochloric acid on the mushrooms flesh or skin. Color change differs depending on where it is placed but is runs from yellow and pinks to occasional orange, red and black.

### Meixner test

Hydrochloric acid is dangerous, wear gloves! This is a test for alpha-amanitin, a toxic compound, in Amanita mushrooms. Mushroom extract is placed on low quality newsprint or telephone book paper and a drop of Hydrochloric acid is added. Positive color reactions are grayed bluish-green.

### Lugol's Iodine

An iodine solution that can be used as a test of the flesh or mushrooms, especially Ascomyctes, and for a spore reaction. Can be combined with potassium hydroxide in some tests. For spores a positive reaction is a red or red-brown reaction. For mushroom flesh a black reaction is a positive reaction.

## Other resources

<http://www.mushroomexpert.com/macrochemicals.html>

Handbook of Mushroom Poisoning Diagnosis and Treatment, Chapter 7 Mushroom Field tests (out of print)

<http://www.gbif-mycology.de/HostedSites/Baral/IodineReaction.htm>