

# Isolation of Naturally Occurring Pesticides

**Developers:**

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**Discipline:**

Biology, Environmental Science, Ecology

**Grade Levels:**

Grades 7 through 12

**Goal:**

To show that insecticides occur in nature.

**Materials:**

Mortar and pestle (for plants)

Sand

Acetone

Corn Oil (Mazola®)

4-oz. jars

Drosophila melanogaster

Instant Drosophila food

Cotton

Squirt bottle containing water

1 package of cheesecloth

125-ml Erlenmeyer flasks

7-cm funnel

Gloves

Electric coffee or spice grinder (for spices)

*Spices:* peppercorns 5 g., fennel seeds 5 g, cumin seeds 5 g.

*Plants:* Chrysanthemum flowers 10 g, Marigold leaves 5 g, Marigold flowers 5 g.

**Procedure:**

1. Make up stock solution of corn oil/acetone: add 0.5 ml corn oil to 100 ml acetone
2. Weigh out 5 grams of each sample - fennel, cumin, pepper, marigold leaves, flowers and a 10-gram sample of chrysanthemum flowers.
3. Processing of Samples

**a. Plants**

Put plant sample in mortar, sprinkle some sand over the sample and grind until thoroughly crushed, about 2 minutes.

Add 10 ml of acetone and grind thoroughly, being careful not to splash liquid. If the mixture is too thick, add 5 more ml of acetone. Strain the acetone/extract mixture by pouring through cheesecloth in a funnel on top of a 125-ml Erlenmeyer flask. After most of the liquid has drained into the flask, extract the remaining liquid by forming a bag around the plant material and squeezing (make sure that you wear gloves). The liquid in the flask is your extract.

**b. Spices**

Grind spice sample in grinder until pulverized. Transfer ground sample to a jar using a spatula. Add 10 ml of acetone and stir mixture well (about thirty seconds). Strain the acetone/extract mixture by pouring through cheesecloth in a funnel, on top of a 125-ml Erlenmeyer flask. After most of the liquid has drained into the flask, extract the remaining liquid by forming a bag around the plant material and squeezing (make sure that you wear gloves). The liquid in the flask is your extract.

4. Mix 1 ml of the extract with 0.5 ml of corn/acetone stock solution. Pour into a 4-oz jar.
5. Quickly twirl jar in a hood to evaporate the acetone. The oil/extract mixture should coat the sides of the jar.
6. Add dry instant food so that it just covers the bottom of the jar. Carefully add water until the food has been hydrated.
7. Add 20 *Drosophila melanogaster* adults to the jar and stopper with cotton. They should be awake (see Teacher Note). Record results after 5, 10, 15, 60 minutes and 24 hours.
8. Control: 0.5 ml corn oil and 1 ml acetone. Coat sides of jar and add food.

**Extensions:**

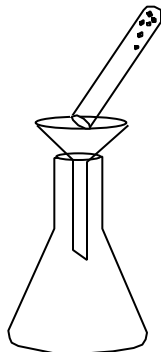
1. Try different plants and different plant parts.
2. Try different spices.
3. Capture different species of wild *Drosophila* and test them.
4. Use different types of insects.
5. Try chromatography of extracts.
6. Instead of corn oil use Kimwipes®. A Kimwipe® is saturated with 1 ml of extract. The Kimwipe® is then spread out in the hood and dried for 10 minutes. The Kimwipe® is then placed in the bottom of the jar and saturated with 1.5% sugar (sucrose) solution. Be careful not to get any water on the sides of the jar. Add 20 adult *Drosophila melanogaster* to the jar and put in cotton stopper. Record results as above.

**Safety Considerations:**

Teacher should advise students to avoid breathing acetone vapors or getting acetone on their skin.

**Teacher Note:**

Anesthetize flies ahead of time and place 20 in a fly vial for each extract. Transfer of live flies is best achieved by placing a funnel on the jar with the extract. The fly vial is then tapped to cause flies to drop to the bottom, and the cotton is removed. The vial is quickly inverted onto the funnel. Gently tap the jar to cause the flies to drop into it. (see figure).



# Drosophila Insecticide Data Sheet

Test Substance: \_\_\_\_\_ Scientist Names: \_\_\_\_\_

Initial number of flies: \_\_\_\_\_

Study start time	Time in hours	Dead Flies	%Dead Flies
_____	_____	_____	_____
Observation times	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Visual Symptoms or Comments

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Drosophila Insecticide Data Sheet  
Test Material: \_\_\_\_\_

