Quick-test kit for detecting pesticide residues

PESTICIDE residues in food are hazardous to our health. Determining whether there are pesticide residues in fruits, grains, vegetables, soil and water is important in making our food safe and healthy. To address this concern, quick-test kits have been developed that can detect residues of pesticides, herbicides and fungicides.

These kits can be used in the field, in markets or in the home.

Effectiveness

The cost of one test kit is 1,000 times cheaper than the conventional testing technique, based on chemical analysis. The kit can detect levels of residue as low as 0.5 ug in a one-gram sample. This is the normal maximum permissible level of pesticide in fresh food. Instructions on how to prepare the samples and detect the residues are given in the kit.

The kit is handy and easy to use because it does not employ sophisticated equipment. It contains:
- A set of glass slides;
- A medicine dropper;
- Glass test tubes;
- An alcohol lamp;
- Color chart;
- Treated filter papers;
- Capillary tubes;
- Test solutions; and,
- Instructions on how to conduct the test and interpret results.

Results of analysis are obtained quickly: five minutes for insecticides and 30 minutes for fungicides and herbicides. In contrast, the conventional method of testing may take three days to yield a result, and each analysis uses a large amount of organic solvents.

Fig. 1. Quick-test kits detect residues of pesticides, herbicides and fungicides. The kits may be used in the field, market place or at home.
The technology

Testing water for OP residues

To detect residues of organophosphorus (OP) pesticide in water, the following steps are recommended:
1. Fill the test tube with 40 ml of the water to be tested.
2. Add 2 mL methylene chloride;
3. Shake well and let the mixture stand for two minutes;
4. Siphon the off lower layer of the mixture with the medicine dropper;
5. Use the alcohol lamp to heat the water sample, so the original 1mL of extract is concentrated to 0.1 mL. An electric fan can also be used to evaporate some of the water.
6. Treat the paper strips by adding a drop of Solution 1, and allow them to dry.
7. Place five drops of the concentrated extract on treated extract paper strips, using the capillary tube. The drops should be as small as possible.
8. Place the filter paper between glass slides. Heat for one minute. Cool for three minutes and add a drop of Solution 2.
9. Match the resulting color with the color chart.

Testing fruits and vegetables for OP residues

Testing fruits and vegetables for organophosphates involves the following procedure:
- Cut the sample into small pieces;
- Place about 5 g in a test tube, add 5 mL of acetone and shake.
- Pour the acetone extract into another vial.
- Repeat steps 5 to 9 as in testing for residues in water.

Other test kits have been developed to detect residues of:
- Organophosphate plus carbamate pesticides;
- Carbamate pesticides only;
- Pyrethroid pesticides;
- Herbicides (phenyl urea); and,
- Fungicides.

Each kit is accompanied by a set of instructions.

Fig 2. Quick tests are needed to monitor pesticide residues in vegetables to be sold in markets. Vegetables containing more than the permitted maximum levels can then be taken off the market before they are sold.