

Introduction

Pesticides are toxic substances to be used in the agricultural products under recommended limit and residues need to be lower the safety limit. In fact, those residues at the excess standard is still detected in many kinds of food. Now a day several methods for pesticide residues analysis are available, but the invested cost is very high. They need a long analysis time with the complicated instruments, such as GC, HPLC and GCMS. Therefore the simple test kit for screening pesticides (Organophosphorous and/ or carbamate and/ or other toxic cholinesterase inhibitors) has developed with fast and reliable result.

Although this developed kit can not detected all kinds of toxic residues, but it is now only the best one method to be chosen for screening toxic residues in agricultural products, soil and water and to be a suitability tool for food safety control in Consumer Protection Programme, especially this technique is highly sensitive for toxic bio-degrade products under field conditions.

Target groups of Testing

- ❖ Organophosphate group
- ❖ Carbamate group, Organochlorine
- ❖ Synthetic Pyrethroid Cholinesterase inhibitors

Target Sample

Vegetables, Fruits, Cereal grains, Medicinal plants, Dry salted fish, Soil, Mud and water from/ near contaminated area, Consumed water.

Details of GT-Kit

Compose of 2 parts

- ◆ Modified Equipment : modified warm water bath 1, Thermometer 1, Test tube 18, Pasteur pipette 5, Rack 1, Sample bottle 5, Plastic pipette 12, Aquatic air pump& evaporated kit 1 and hand book 1
- ◆ GT-Reagents Kit:
 - 10 tests/kit - 30 tests/kit - 300 tests/kit

Procedure of Analysis : Sample Extraction

Before the analysis, the sampling procedure, the weight of the analytical sample and the sample preparation should be followed the Codex's Recommendation. (The details describe in the GT hand book)



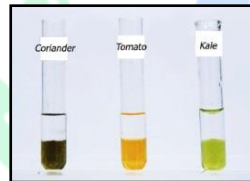
Chop or blend sample.



Weigh 5 g. of the homogenous sample in to the sample bottle.



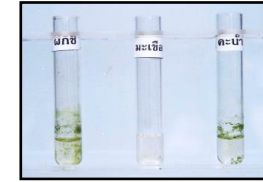
Add 5 ml. of solvent-1 in to the sample bottle , cap the bottle tidy and shake vigorously 1 min., leave for 10-15mins.



Pipette 1 ml. of the extract in to a test tube and add 1 ml. of Solvent-2 in to the same tube.

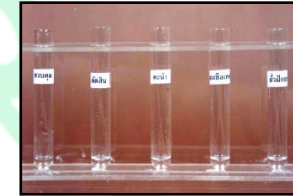


Take to evaporate in the modified warm water bath(about 32-36 degree celcius) by connecting the evaporated kit with the air pump and the pasteur pipette and then insert the end of the pasteur pipette in to the sample test tube, adjust the air releasing from the air pump in to the extract, then leave for evaporation until the solvent-1(lower layer) disappeared.



For this step, the leaving solution is now called " **Sample Extract** "

Detection Step:



Take 3, 4,.....test tubes label for:

- Tube 1: cut point or unsafe*
- Tube 2: control or not detected
- Tube 3: sample extract (name)

(3 tube for 1 sample, if need more sample, add more tube for another sample)

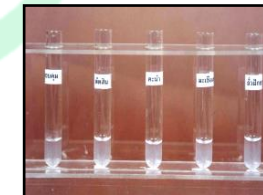
Then add each 0.25 ml. of solvent-2(1 part of plastic pipette) in to tube 1 and tube 2 and add 0.25 ml.(1 part of plastic pipette) of each sample extract in to tube 3, 4....Then put them all in to the modified warm water bath 32 – 36 °C



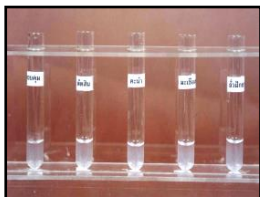
Pipet each 0.5 ml of GT-1 (2 parts of plastic pipette) in to every tubes and wait for 5 – 10 minutes



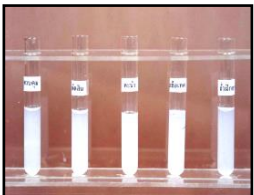
During the waiting time, mix GT-2 + GT-2.1 and GT-3 + GT-3.1



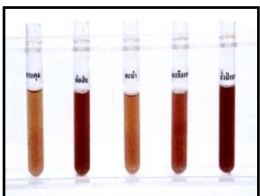
Then add 0.375 ml. (1½ part of plastic pipette) of the mixture GT-2 in to tube 1(cut point/ unsafe tube) and each 0.25 ml.(1 part of plastic pipette) in to tube 2 , 3, ("control/ not detected" and "sample") and leave for 30 minutes.



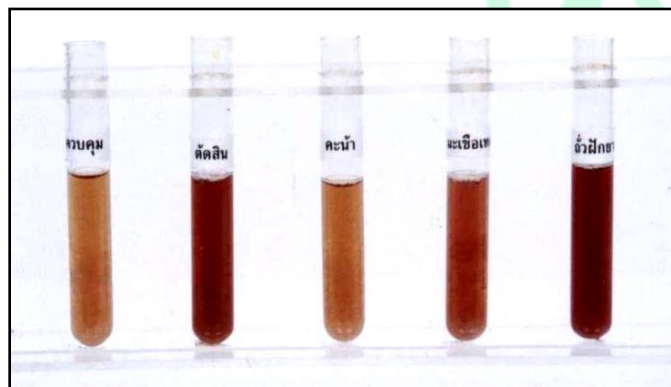
When the time ended, add each 1 ml.(4 parts of plastic pipette) of the mixture GT-3 in to every tubes and swirl.



Then add each 0.5 ml.(2 parts of plastic pipette) of GT-4 in to every tubes and swirl.



The last step, add each 0.5 ml.(2 parts of plastic pipette) of GT-5 in to every tubes, swirl and evaluate the results.



Control Cut point/unsafe Not detected Detected, safe Detected, unsafe

Result Evaluation : compare color in the tubes

Color in the tube	the result
Sample tube \leq tube 2 (control/not detected)	Not detected
Sample tube $>$ tube 2 but $<$ tube 1 (cut point /unsafe)	There are some toxic residues expected safe* for consumption
Sample tube $>$ tube 2 and \geq tube 1 (cut point /unsafe)	There are some toxic residues expected unsafe** for consumption

Note: * safe for consumption = there are some toxic residues inhibited the cholinesterase enzyme at less than 50 %, these toxic residue amounts can be washed out by the consumer

** unsafe for consumption = there are some toxic residues inhibited the cholinesterase enzyme at 50 % or more than, , these toxic residue amounts can not be washed out by the consumer, they are only decreased by washing.

Caution

- The targets in using the solvent-1 are to dissolve the toxic residues from the sample and to destroy the interfering enzyme deposited in the sample. Therefore the solvent-1 is toxic for human health, avoid breathing and leave it evaporated in the ventilated place or hood.
- When the chemical reagents contact your skin, wash out with the clean water.
- Should wear glove during analysis.
- Place testing kit out of children reach.
- During the analysis, be aware the contamination among GT-reagents.

Storage of GT-Reagents

- Keep a set of GT-reagents kit in a refrigerator/ cool place, except GT-1 & GT-2 in the freezer, the shelf life about 1 year, but in the case of limited space, keep only GT-1 & GT-2 in freezer and keep the other reagents in the air condition room)
- The mixture of GT-2 + 2.1 and GT-3 + 3.1 (after used) need to be kept in the refrigerator and the GT-2 mixture can be used within 10 days, the GT-3 mixture can be used within 3-4 days

GT-Pesticide Residual Test Kit

Analysis of Toxic Residues in food and related samples (Organophosphate and/or Carbamate Pesticides and/or Other Toxic Cholinesterase Inhibitors)



The 3 rd award on "Inventor's Day 1997" from The National Research Board of Thailand Patent No. 8446



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