

## Self surveillance for quality of food

Meat is a main source of protein essential for life. At present, production of animals especially economic animals in our country is expanded since Thailand is a major exporter of foods, especially for shrimp and chicken. At the same time, antibiotic and antimicrobial drugs are widely administered for prevention and treatment in those animals, therefore, the problem of drug residues in meat and other tissues consequently occurs. Division of Food, Department of Medical Sciences has developed easy and rapid test for determination of drug residues in meat and viscera in order to control their qualities for the safety of consumers. This kit can be used without special or expensive equipment and the efficiency of testing is reliable.

## Health impact

Prolonged consumption of meat and viscera with drug residues can cause drug resistance and allergenicity to sensitive consumers.

## Target Sample

- ✦ Chicken, Pork, Beef, Shrimp, Fish, etc.
- ✦ Viscera of Chicken, Pig, Cattle, etc.

## Number of tests / set

50 tests / set

## Testing kit tools

- ✦ 50 prepared tubes
- ✦ 10 droppers
- ✦ Extraction solution A, B and C (Select one or more types of solution depending on the group of drug residues to be determined)
- ✦ Accessory tool: water bath / incubator (temperature control at  $64 \pm 2$  °C)

## Collection and preparation of meat sample

1. Sampling 5 grams of minced meat or viscera into one or more about 50 ml. centrifuge tubes.
2. Add 5 ml. of extraction solution A or B or C into each centrifuge tube. The criteria for choosing the types of extraction solution depend on the group of drug residues to be determined as follows:
  - Solution A for tetracycline group.
  - Solution B for macrolide aminoglycoside and sulfonamide group.
  - Solution C for penicillin group.
3. Vigorously shake the tube by hand or shaker for 10 minutes. Then, place the tubes in water bath and slowly heat it until reaching 60 °C. After that maintain there for 5 minutes, and later cool down.
4. Centrifuge at 3,000 – 4,000 rpm for 15 minutes. Take the supernatant for adjust pH except shrimp meat supernatant.
5. Adjust pH of the supernatant samples (chicken, pork, beef, and fish) for further test.

### 5.1. For determination of Tetracycline grouped:

Adjust pH of the supernatant samples to 6.5 as follows:

- Chicken, Fish: adjust 3.75 ml. of the supernatant samples (initial pH ~ 6.1) with 1 drop (33 µl) of 1 N NaOH
- Pork, Beef: adjust 2.0 ml. of the supernatant samples (initial pH ~ 5.8) with 1 drop (33 µl) of 1 N NaOH. If initial pH ~ 5.5, adjust 1.5 ml. of the supernatant samples with 1 drop (33 µl) of 1 N NaOH.

### 5.2. For determination of Penicillin group:

Adjust pH of the supernatant samples to 6.5 as follows:

- Chicken, Fish: adjust 5.0 ml. of the supernatant samples (initial pH ~ 6.1) with 1 drop (33 µl) of 1 N NaOH.
- Pork, Beef: adjust 2.0 ml. of the supernatant samples (initial pH ~ 5.8) with 1 drop (33 µl) of 1 N NaOH.

### 5.3. For determination of Macrolide, Aminoglycoside and Sulfonamide group:

Adjust pH of the supernatant samples to 7.0 as follows:

- Chicken, Fish: adjust 3.75 ml. of the supernatant samples (initial pH ~ 6.5) with 1 drop (33 µl) of 1 N NaOH.
- Pork, Beef: adjust 1.5 ml. of the supernatant samples (initial pH ~ 6.1) with 1 drop (33 µl) of 1 N NaOH.

6. Perform each of inhibitor - free supernatant samples as steps which described above for testing as negative control sample.

## Testing procedure

1. Add 4 drops of supernatant obtained from using different extraction solution into each prepared tube. In case of testing for sulfonamide group, prepared tube with trimethoprim shall be used.



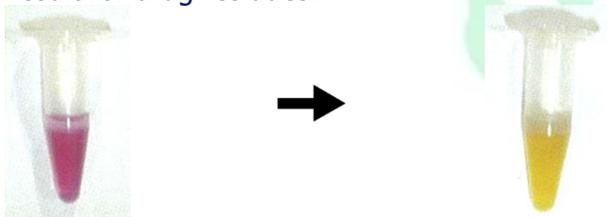
2. Add 4 drops of negative control into another prepared tube.

3. Incubate all the tubes  $\geq 2.45$  hrs. (Chicken, Pork and Beef) except Shrimp and Fish requires  $\geq 2.30$  hrs. in water bath or incubator when the temperature reach  $64 \pm 2$  °C. Keeping medium in the tube under water level (If using water bath for incubation) until the color of medium in negative control tube changes completely from purple to yellow. Observe the color change of medium in sample tubes. Therefore, reading time of the result depends on the color change of medium in a negative control tube.

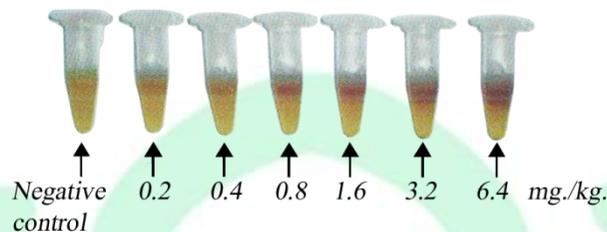


### Reading and interpretation

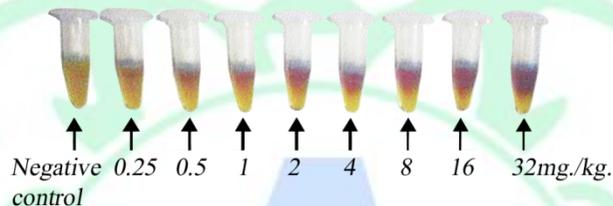
1. If the color of medium changes completely from purple to yellow, it indicates negative result for drug residues.



2. If it shows purple color in medium, it indicates positive result for drug residues, of which their quantities relate to various levels of purple color as follows:



#### OXYTETRACYCLINE



#### SULFADIMETHOXINE

#### Effectiveness of test kit

This test kit has 93.0% accuracy, 78.9% sensitivity, and 96.7% specificity. It can be tested for at least 12 kinds of drug residues: Amoxicilin, Bacitracin, Chlortetracycline, Erythromycin, Gentamycin, Neomycin, Oxytetracycline, Penicillin, Streptomycin, Sulfadimethoxine, Tetracycline and Tylosin.

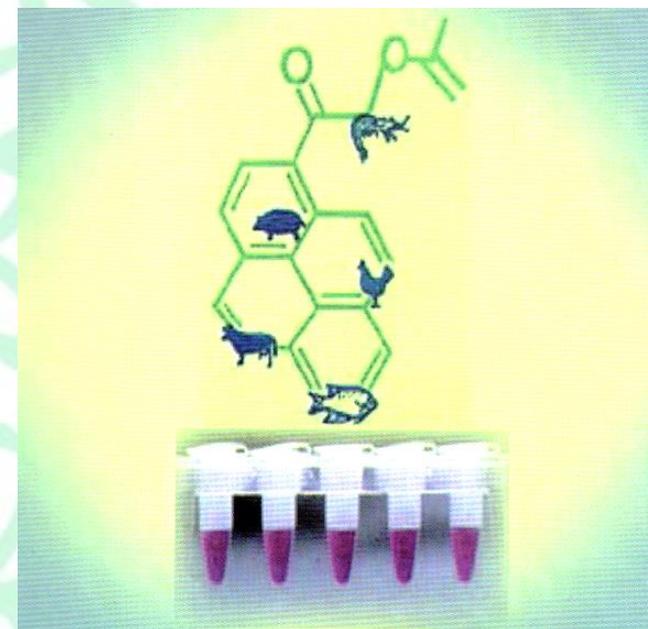
#### Storage / Expiration

Store prepared tubes and also keep extraction solution at 4-8 °C after opened for 6 months.

#### Procedure after test

Soak the tested medium in disinfectant by adding it into the tube and leave it there for 30 minutes or immerse the tube in boiling water for 15 minutes, and later discard it.

# Manual of test kit for Determination of Drug residues in Meat



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