

# Estimation of pesticide residues in the blood of people, Kalasin Province, Thailand

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Suwanaruang T. Estimation of pesticide residues in the blood of people, Kalasin Province, Thailand. *AGBIR*. 2022; 38(3):285-287

The level of pesticide poisoning in the blood A screening method with a cholinesterase test paper was used. Which is normally used by the public health surveillance and risk screening of people? This reflects exposure to carbamate and organophosphate pesticides. If exposed to a lot of chemicals the amount of cholinesterase is reduced. The objective of this research was to survey and interview public health volunteers by examining pesticide residues in the blood of the sample population, Nua District, Kalasin Province in a population of 173 people, level 1 there were no residues found, 50 people (28.90%), level 2 the 23 people were at risk (13.29%) and level 3 found that 100 people had residues (57.80%). The residual insects in the blood would have an effect to consumer groups as well, including agricultural chemicals. In addition to contaminating plants, vegetables, and fruits it also accumulates in the environment. This research made recommendations

to the public and public health volunteers educated about the prevention consumption of food that should be washed thoroughly with water. What kind of consumption do you choose? Chemical injections should be completely protected. Turn to use biological agents instead. The sound group that was detected will lead these individuals to change their behavior to take herbal medicine, including eating organic food, use of chemical pesticides. There is also a need for agriculture because there are many weeds body care. They will wear closed clothing such as long pants and long sleeves; wear protective equipment, masks, gloves, hats, face shields or goggles. Refrain from eating food, drinking water while mixing chemicals or spraying and after finishing chemicals. It will clean the body with clean water etc., which uses chemicals. Preventing and eliminating pests is still a necessary method. But reduce the concentration including reducing the amount of pesticide use to conserve the environment to be in good condition in the future.

**Key Words:** *Pesticide; Exposure; Blood; Population*

## INTRODUCTION

The human population has doubled, whereas arable land for agriculture and consumption for the population has only increased by 10 percent. There is also enormous pressure from influential people to produce cheap crops on the land that is beginning to deteriorate day by day. This is because the nutrients in the soil are consumed and the idea of adding external substances such as fertilizers and pesticides is encouraged. That yields faster and becomes a short-term solution to large-scale commercial intensive farming systems [1]. Synthetic pesticides have been widely used in industrial agriculture around the world since the 50th century. Since that time many chemicals have been found to be highly invasive into the environment. It is the result of repeated use of chemicals and in some cases, chemical residues in the environment. Some chemicals take a very long time to decompose. This can be seen from the discovery of chemicals that were banned decades ago. It regularly includes DDT and its second derivative in the environment [2].

Due to the effects of chemical residues in the environment that are harmful to wildlife. This has led to an exponential increase in research on the effects of pesticides over the past thirty years wide and diverse meanwhile of understanding the effects of pesticides on human health and the mechanism of action of such chemicals is rapidly expanding [3]. Studies have shown a statistical relationship between pesticide exposure and an increased risk of developmental disabilities, including neurological and immune disorders and some cancers. However, it is particularly challenging to prove specifically that exposure to pesticides causes disease or abnormal conditions in humans. Because there is no human group that has never been exposed to chemicals completely, again the vast majority of diseases are due to a variety of causes that complicate public health assessments. In addition the vast majority of people are exposed to complex chemicals and constantly changing their ingredients. Which is not just pesticides but received from the daily life from many ways of touching as well those pesticides cause more toxins to accumulate [4].

Some measures to reduce the use of pesticides have failed to protect human health at all, because there are many types of pesticides that have adverse effects on health and the ecosystem in general [5].

Complete elimination of synthetic pesticides by eliminating the use of pesticides in industrial agriculture and solving the problem through eco-farming, it is critical to reducing these health risks. Crops must be protected by multi-level cultivation methods to increase landscape diversity in order to provide habitat for pollinators and natural pest control organisms. These organisms are multiplied by aggressive management of vegetation. Diversity of plants and species crop rotation, soil testing. These will increase soil fertility as well as increase resistance to pests. Natural biological regulators, for example, beneficial bacteria, viruses, insects, and nematodes have been successfully used to improve the protection of food crops [6].

Refrain from using synthetic chemical pesticides in agriculture. Emphasis on the prohibition of pesticides with carcinogenic properties, which have mutagenic or reproductive toxic properties (CMRs category I and II) and endocrine disruptors (EDCs), including chemicals with neurotoxic properties. Provide appropriate enforcement of the Sustainable Use Directive. (by allowing members of the state to include concrete government measures and goals towards a concrete reduction in the use of chemical pesticides in agriculture) [7]. Improve the EU pesticide risk assessment process (to ensure that there are direct and indirect security controls both in terms of medium and long-term health and environmental impacts caused by exposure to chemical compounds). Transform public research using ecological agriculture into concrete action by farmers (Switch from the current use of synthetic chemicals to biological tools to control insect pests and promote the integrity of farmland and ecosystems) [8].

## Objective

The objective of this research was to survey and interview public health volunteers by examining pesticide residues in the blood of the sample population, Nua District, Kalasin Province, Thailand.

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**Received:** 18-May-2022, Manuscript No. AGBIR-22-64139; **Editor assigned:** 21-May-2022, Pre QC No. AGBIR-22-64139 (PQ); **Reviewed:** 04-Jun-2022, QC No. AGBIR-22-64139; **Revised:** 11-Jun-2022, Manuscript No. AGBIR-22-64139 (R); **Published:** 18-Jun-2022, DOI: 10.35248/0970-1907.22.38.273-275



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MATERIALS AND METHODS

The principle of pesticide residues in the blood

Reactive paper is a special test paper used for the determination of cholinesterase enzyme content. Which is an enzyme that is responsible for the destruction of substances acetylcholine when the body is exposed to organophosphorus or some carbamate substances? These substances will combine and inhibit the activity of the enzyme cholinesterase. This makes this enzyme unable to destroy the substance acetylcholine. So there is a greater amount causing the transmission of feelings to communicate without stopping the muscles will continually spasm, become paralyzed, and eventually die, if not treated properly and in a timely manner. Therefore, the Reactive Paper is used to detect toxicity from organophosphorus and carbamate pesticides in order to monitor and monitor the hazards of these substances in the working population. These substances are associated with both industrial and agricultural sectors [9,10].

Methods for detecting pesticides in the blood: [10]

1. Clean the tip of the finger that will draw blood with a cotton swab moistened with alcohol.
2. Take blood and collect blood samples with a blood collection device and a small glass tube.
3. Set up the glass tube until the lymph and red blood layers are separated.
4. Put the pesticide allergy test paper used for detecting pesticide allergy onto the slide with tweezers.
5. Drop 1 drop of yellow liquid obtained from item 3 on the test paper.
6. Put another slide over it.
7. Leave it for 7 minutes.
8. Read the result by comparing the color change with the standard color calibration sheet.

RESULTS

Reading test results

- Level 1. The color of the test paper is green-yellow to yellow, indicating that it is safe.
- Level 2. The color of the test paper is green, indicating a tendency for pesticide poisoning.
- Level 3. The color of the test paper is green-blue, indicating a high propensity for pesticide poisoning.

Storage

The bottle should be tightly closed and stored in a dry place at a temperature of 4-8°C (refrigerator) and away from light.

Research results

Progress on the movement to abolish or ban three pesticides, namely paraquat, chlorpyrifos and glyphosate, after a long hiatus, with the latest trend to adjust. There was a blood sampling activity to determine the level of toxicity from pesticide residues in the body of the people who attended the event, with cooperation from Nua District, Kalasin Province, in a population of 173 people. In the population of 173 people from the research level 1, there were no residues found, 50 people (28.90%), level 2 the 23 people were at risk (13.29%) and level 3 Found that 100 people had residues (57.80%). A screening method with a cholinesterase test paper was used, which is normally used by the public health surveillance and risk screening of farmers. This reflects exposure to carbamate and organophosphate pesticides if exposed to a lot of chemicals. The amount of cholinesterase enzyme is reduced. It is divided into 3 levels in Table 1.

TABLE 1  
The amount of cholinesterase enzyme is reduced 3 Levels

Levels	173 people
Level 1 Yellow or Yellowish green is equal to the normal level.	103 ± 30.7

Level 2 Green is equal to the level of risk or the activity of the enzyme cholinesterase	50 people (28.90%)
Level 3 Dark green equals not safe or cholinesterase activity	100 people (57.80%)

DISCUSSION

Educated about the prevention of Consumption of food that should be washed thoroughly with water. What kind of consumption do you choose? Chemical injections should be completely protected. Turn to use biological agents instead. The sound group that was detected will lead these individuals to change their behavior [7].

To take herbal medicine, including eating organic food, there is also a need for agriculture. Due to the large number of weeds, if weeds are eliminated by cutting and cutting, it will take a long time. The weeds don't die. When it gets water, it will grow again. Unlike using chemicals, spraying weed killers takes about an hour, and the weeds die and never grow again. The body care they will wear closed clothing such as long pants, long sleeves, wear protective equipment, masks, gloves, hats, face shields or goggles. Refrain from eating food, drinking water while mixchemicals or spraying and after finishing chemicals. It will clean the body with clean water, etc., which uses chemicals. To prevent and eliminate pests is still a necessary method, but reduce the concentration including reducing the amount of pesticide use to conserve the environment in the best possible condition [11].

Organochlorine group (Organochlorine), which is a group of chemicals that contain chlorine as an element. The most commonly used insecticides in this group include DDT, Dieldrin, Aldrin, Toxaphene, Chlordane, and Lindane, etc.

Organophosphate group (Organophosphate), which is a group that contains phosphorus as an element such as Malathion (Malathion) and Fenitrothion (Fenitrothion), etc. Carbamate, which contains carbaryl as an important component such as Carbaryl, Carbofuran and Methomyl, etc. Pyrethroids are chemical groups that are synthesized in relation to the structure of pyrethrins which are natural substances extracted from pyrethrum plants such as deltamethrin, permethrin, resmethrin and bioresmethrin (Bioresmethrin), [12].

Skin The pesticide enters the body directly through the skin, e.g. before spraying, and is exposed by mixing without gloves. When spraying, contact with spray and clothing that has been soaked with pesticides. After spraying, pesticides can be exposed by harvesting contaminated produce without gloves, for example. Inhalation Farmers spraying pesticides or people near the spraying area can be exposed to pesticides through inhalation.

Oral, Accidental occurrences such as using a chemically contaminated hand to pick up food or drink contaminated with a pesticide, or intentionally eating or drinking. The health effects of pesticide exposure are divided into two parts: Acute toxicity: Symptoms manifest immediately after exposure to pesticides such as nausea, vomiting, headaches, muscle aches and pains.

Muscle spasms, spasms, diarrhea, shortness of breath, blurred vision, burning eyes [8]. Chronic toxicity (Chronic Toxicity) is caused by prolonged exposure to chemical pesticides and accumulated toxins that cause diseases or health problems such as cancer, diabetes, paralysis, paralysis, various skin diseases, sterility, disabilities of newborns hearing loss, sexual dysfunction, etc. Pesticide toxicity is Classified by type of important chemicals as follows: organophosphate substances have the effect of inhibiting the functioning of the central nervous system and peripheral nervous system by binding to the enzyme cholinesterase Which is responsible for signaling the nerves to stop working [6].The binding effect of enzymes causes the number of enzymes to decrease and affects various muscles, glands and smooth muscles, which Controlling organs to work more than usual Because the amount of cholinesterase enzyme is not enough to stop working, symptoms include retinal detachment, difficulty breathing, dizziness, vomiting, trembling hands, staggering gait, convulsions, unconsciousness, muscle weakness, muscle cramps. Meat, glands, salivary glands excrete a lot of saliva; sweat glands sweat a lot [1].

CONCLUSION

Carbamate substances in this group act similarly to organophosphates but fewer toxicity symptoms are the same as organophosphate exposure except for seizures less unconscious organochlorine. This group of substances is absorbed by the skin when you get a lot this will cause the central nervous system to be hampered,

causing muscle weakness, dizziness, and headache. Pyrethroids it is a highly bio-sensitive substance and used as a dilution, this group of substances.

#### ACKNOWLEDGEMENTS

Many thanks, Public health volunteers from Nua District, Kalasin Province Especially Mrs. Jurairat Phupaluy. Thank you a lot my family, my friends, my students and my University for many supports.

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