

## **Factors Associated with Pesticides Used and Cholinesterase Enzymes Level in Blood of Farmers in Pattani Watershed, South Thailand**

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**Abstract.** Factors associated with pesticides used and cholinesterase enzymes level in blood of farmers in Pattani watershed. for study the relationship between the factors associated with pesticides and Cholinesterase Enzymes level in brood of formers farmers in Pattani watershed. The study found that the pesticides of pesticides were the right method for the using the pesticides. The Cholinesterase Enzymes levels in blood of formers were the medium rich to the lower rich 16.4 %, 82.8 %. The value of cholinesterase Enzymes level in blood of farmers in Pattani Watershed was the safety period 78.0. The relationship of every factor and Cholinesterase Enzymes in blood of farmers ware found the p-value 0.05 of gaunter age's study, touching of pesticides adaption of information and the point of the practice of using of Pesticides.

### **Introduction**

Today agriculture has applied advances in agricultural science and technology to increase production efficiency, such as the use of agricultural chemicals. Pesticides and synthetic plant hormones with an important objective to achieve higher productivity and the products that are beautiful are the needs of consumers farmers therefore use chemicals widely. Without regard to the danger that will occur to themselves and the environment. In addition, Thailand has enforced laws to control the use of strict chemicals. Therefore, the distribution of agricultural chemicals freely farmers therefore choose to buy products easily. There are a variety of benefits according to the advertising of the distributor company. Although many agricultural chemicals, the ministry of industry announced the cancellation of the use, but still can buy in the market. The amount and value of chemical imports in Thailand has always been increasing. Statistics for the bureau of plant and agricultural materials control from 2009 to 2012 were imported 109,969, 137,739, 117,816, 164,539 and 134,480 tons, worth 16,837, 17,957, 22,070 and 19,357 million according to order[1]. At present, Thailand still has no control over the amount of imported pesticides and the import of pesticides was increasing every year in the last 10 years. In the past, imports increased by three times, that is, in 1999, the amount of

imports was about 6,000 million baht. In the year 2011, import numbers rose to more than 22,070. baht or amount of 164 million kilograms [2] by introducing insecticides and herbicides in to groups that are highly imported, both quantity and value of agricultural chemicals this used in the process from before planting during plant growth. Before harvesting and used for keeping agricultural products thus causing contamination in the environment easily especially substances that decompose like. In addition, there may be problems with the use and waste disposal. Using these chemicals may also be resistant to insects that need to be eliminated, and requires more volume or use more toxic substances causing endless problems. Pesticides are still a major problem affecting the environment and health of farmers, which are health problems from the use of pesticides, will happen to farmers who have been exposed to acute poisoning, such as nausea, vomiting, headache, muscle pain, diarrhea, breathing difficulties, blurred vision, etc. But the more dangerous darkness was cumulative toxicity from continuous chemical exposure whether it was being used or being near a farming area that uses a lot of chemicals will result in many chronic diseases such as cancer, diabetes, Parkinson's, paralysis, paraplegia, various skin diseases, sterility, dysfunction and disability of newborns. Which was caused by genetic changes of cells (Mutagen). Passing many pesticide chemicals are designed to interfere with cell genetics and in 2003 to 2012 there were people who were poisoned by the average pesticide residue was 1,734 cases per year, the highest in 2003, 2,342 people. The patients tend to rise continuously from 2007 to 2011 in the year. In 2012, there were 1,509 reported cases of poisoning. The incidence rate of 2.35 per hundred thousand people, no death report [3]. Health problems caused by the use of pesticides was a big and very serious problem of Thai society especially the impact on farmers, as information in the year 1997 of the bureau of occupational and environmental diseases that the Ministry of Public Health has found that farmers whose blood test results are not safe and at risk of poisoning due to the use of pesticides in the amount of 16.35 percent or 89,926 people from the number of farmers who test 563,353 people and has a significant increase significantly in the year 2550 results randomly detected. there are 39.00 percent of farmers that have such health risks and from blood tests throughout the country in 2011 and 2012, found that farmers have pesticides in the blood in out the dangers and threats, bulbul. There are more than 30.00 percent and have patient information from pesticide chemicals. From hospitals throughout the country, it was found that in 2011, there were 7,395 patients with chemicals which were acute illness from pesticides [4] And the bureau of occupational and environmental diseases, Ministry of Public Health stated that the illness caused by the use of organophosphate and carbamate insecticides in the ranks is the 3rd most common cause of illness or injury from occupation. 2013 does not appear page numbers). Which is consistent with the results of the study of [5]. Detecting residual chemicals in the blood of farmers at the level of insecurity, up to 40.00 percent, was at the risk level of 55.00 and poisoning the nervous system, skin, fatigue, headache, 38.00 percent 2 deaths during spraying. Pesticide poisoning was a major cause of illness and death in many countries in the world. It was estimated that 95.00 percent of serious pesticide poisoning occurs in many developing countries. Which was in the Asia Pacific region simple farming that often uses pesticides to save time and labor economic and social problems, poverty related protection equipment and treatment tools are factors contributing to higher morbidity and mortality rates. [6]. Pattani watershed was one of the important water resources in the ecosystem. And the social structure system that engages the watershed community with watersheds originating from the San Kalakiri mountains in Betong district, Yala province and flowing northward through Than To district Bannang Sata district Mueang district, Yala province, Nong Chik district, Yaring district, Pattani Dam into the gulf of Thailand in Mueang district Pattani province the Saiburi River there are upstream from various peaks. In the San Kalakiri mountains flowing through chanae district, Si Sakhon district, Rueso district, Narathiwat province. Then flows into Raman district, Yala province and into the gulf of Thailand at Sai Buri district and Yaring district in the gulf of Pattani with

approximately 200 kilometers in the use of resources. Especially the cultivation of crops in the Pattani watershed, resulting in residual effects found in the central area of Pattani watershed in found the residue exposed to chemicals in the body in 2013, 60.86 percent from the random sampling, 130 people found 84 people [7]. Study of the linking factors of pesticide use and the level of choline esters in blood of farmers in Pattani watershed. It was very important to know how the situation of toxic residues of agricultural chemicals in the area was and what factors are linked from the use of chemicals in the Pattani watershed.

### **Methods**

This research study used the interview form, and blood transplantation of farmers to determine the level of choline esters in the lymphatic system with a special test set to study the relationship between pesticide use behavior and choline esters enzyme levels in Farmers' blood in Pattani watershed by social sampling. In various villages of 18 villages which are farmers who grow vegetables planting shogun oranges and planting rice or farming exposed to organophosphate and carbamate pesticides. The sample group, 400 people, found the enzyme choline esters, by blood screening, enzyme screening, choline esters in farmer's serum which has been translated into 4 levels; level 1 was normal or means there was no chemical residue in the blood, safe translation level 2 was safe or means there was residual chemicals in the blood. There are chemical residues in the blood, unsafe results, level 4 was unsafe or means there was residual chemicals in the blood, the translation was not safe. Data collection Blood collection, enzyme detection, choline esters and interviews for the purpose of research studies To find pesticide residues in blood and interviewing the behavior of pesticide use of agro-chemicals Lean Estes By using the Choline Esters test paper set Of the Government Pharmaceutical Organization In the study of factors related to the enzyme choline esters In farmers in the Pattani watershed area Translating the results of enzyme choline ester detection, namely The normal choline esters enzyme refers to the results of blood tests with the choline esters test paper of the government pharmaceutical organization to detect the enzyme choline esters and find the enzymes. Choline esters are normal and safe, choline esters are not normal, meaning blood test results with choline esters test paper, of the pharmaceutical organization in order to detect the enzyme choline esters and find the enzyme choline esters as risky and unsafe. The report blood results to the sample group practice this until the information was complete according to, the number of sample size calculations, the researcher collected the interview form. And then use the data from the interview form to rate and save data to the data log and computer. Analyze the statistical data by using a computer program. Data analysis applying pesticide use behavior of farmers come to make a frequency distribution calculated as percentage, average and standard deviation and present the results in the form of a lecture table. It was analysis of the relationship between the link factors in pesticide use and the level of choline esters in blood of farmers in Pattani watershed using statistical analysis of correlation with chi-square statistic.

### **Results and Discussion**

This research study of the relationship the factors of pesticide used and the level of choline esters in the blood of farmers in Pattani watershed were studied and discussed the following results. General information gender showed that most of the samples were male, 68.8 percent and 31.2 percent were female. The majority of samples were 41-50 years old, 27.0 percent, followed by 31-40 years, 24.0 percent, 21-30 percent. 16.5 percent year old, 51-60 years old, 16.2 percent more than 60 years old, 15.2 percent and the smallest sample group under the age of 20 years, 1.0 percent respectively. Due to agricultural duties in the Pattani lowland area mostly male that serves in the area on a regular basis and

was older in working age, ie aged 41-50 years, which was in accordance with the principles in the three southern border provinces. The men was responsible for operating in those areas, and it was an adjustment to support the unrest situation which males can save lives and property more than females which was consistent with the research on the relationship between conservation and utilization of biodiversity of people in Pattani watershed[7]. who said that in the Pattani lowland area there was a diverse diversity and local leaders were male can protect the society as a whole. Regarding the status, most of the sample groups were married with 79.5 percent, followed by single status, 13.5 percent, separated by 4.8 percent and the lowest sample group had 2.2 percent of divorce status and the highest level of education. Most of the sample group had primary education at 28.5 percent, followed by high school education / vocational certificate, 21 percent, bachelor degree or higher 21.5 percent, secondary education Early 16.0 percent diploma / diploma 11.2 percent and the smallest sample group did not study 1.0 percent, respectively. Such as situation can explain that most farmers were in a marriage condition. Because the local culture facilitates marriage with more than one wife which corresponds to the research [8].Public participation and environmental conservation in the Pattani watershed area, which found that marital status had a large number and primary education, especially the head of the family, because it was a civil society that has only education in the area. After finishing primary school, he turned to religious studies and to come to the leader in the next area. The average family income per month found that most of the sample group had monthly income of 5,000-10,000 baht / month, 38.0 percent, followed by monthly income. 10,001-15,000 baht / month, 25.2 percent less than 5,000 baht / month, 21.8 percent and the lowest sample group with monthly income more than 15,000 baht / month, 15.0 percent respectively and the type of agricultural occupation found that the sample group Most of them are farmers who grow vegetables, beans, cucumbers, cucumbers, 55.8%, followed by rice growers (Farmer) 30.2 percent, other groups 12.5 percent, and the lowest sample group is farmers who grow 1.5 percent Shogun orange, respectively. It was explanations the income that most farmers earn less than 5000 to 10000 baht per month, because agriculture in the area has risk factors, for the departure to harvest causing uneven income. Therefore, in accordance with [7] who was research on the relationship between conservation and utilization of biodiversity of people in the Pattani watershed area, which found that the risk factors for agricultural occupation are increasing accordingly and in line with most farmers grow vegetables, beans, cucumbers, which was short-term crops, with little persistence per season and the price of the product is still uncertain. [9]who had researched on the development of the model of using the sufficiency economy theory and the agricultural area in the Pattani watershed was something that should be done, but had limitations is the uncertainty of prices and was often easily affected by climate change in the area. The behavior of using pesticides can be discussed as follows: the period of using pesticides found that most of the samples used pesticides less than 1 year, 51.8%, followed by 1-5 years, 32.0%, 6-10 years, 9.8 percent, and the smallest sample using pesticides more than 10 years, 6.4 percent. The time of exposure to chemicals per time was found that most samples touched 0-1.00 hours, 80.8 percent, followed by touch 1.01-2.00 hours, 16.2 percent touched 2.01- 3.00 hours, 2.5 percent and the smallest sample exposed 3.00 hours up to 0.5 percent, respectively. The frequency of the average pesticide exposure per week showed that most samples whether the touch 1-2 days / week, 83.8 percent, followed by exposure, 3-4 days / week, 11.0 percent feel 5-6 days / week and 4.5 percent among the least exposed daily 0.7 percent respectively. The frequency of receiving information about the safety of pesticide use found that most samples receive information about 1-2 times / week, 74.0 percent, followed by 3-4 times / week, 14.0 percent 3-4, and the least sample group is 5-6 times / week and 7-8 times / week or more the same amount is 6.0 percent, respectively, and the channel to receive information about the safety of using

pesticides found that most samples. It was received information from television 38.5%, followed by farmers, 19.8%, agricultural officials 18.8%, radio 11.0% and family members 10.2% respectively. Because it was in line with short-term farming, which was vegetable, lentil, cucumber, which requires short-term pest eradication. Which allows the respondents to give opinions that can be used in less than 1 year, which is consistent with the research of [10] discusses the prevention of hazardous chemicals from pesticides plants depend on the practices of farmers who used those chemicals. In the practice of using pesticides of farmers practice before spraying the chemicals that the farmer was doing most frequently is level 1. Examine the pesticide spraying equipment to be ready for use, 76.5%. No. 2 wore a cloth to cover the nose while mixing pesticides. 69.2% ranked 3rd, read labels to understand before mixing pesticides, 66.2%, ranked 4th, wearing gloves while mixing pesticides, 61.2%, ranked 5th, not using hands for mixing chemical pesticides 50.2%, ranked No. 6, no chemical pesticides are concentrated more than the label determined 42.2%, which farmers in the area was worn of the practice of preventing the use of chemicals, It was consistent corresponds to [10]. Who was discussed the protection of pesticide hazards, based on the practices of those farmers who used those chemicals in their own practice in spraying chemical pesticides; behaving before spraying chemicals, before using pesticides should read the label attached to the chemical container to understand how to use the size, quantity, prevention methods and solutions. In the mixing of pesticides to the correct ratio specified in many pesticide labels, can be mixed together but be sure that the mixture was properly proportioned and must be prepared for water clean enough to pay for body wash in the event of an emergency such as chemical splashes into the eyes or spills the body, etc., while mixing.

## Conclusion

The study on the study of factors related to pesticides used and the level of true enzyme enzymes in the blood of farmers in Pattani watershed. The southern region of Thailand had found a medium risk factor, but there was a notable observation that the use of chemicals in growing crops if used continuously in the upper area of the Pattani watershed will have an impact on the environment. It was surrounded by both humans and animals in the lower area due to the continuous flow of water in the Pattani river and not being systematically protected. The suggestion in this research were various suggestions as follows.

1. Suggestions for policy implementation;
  - 1.) the creation of alternative policies and participation for people in the linkage of pesticide use and the level of choline esters in blood of farmers in the Pattani watershed
  - 2.) improvement of guidelines for the management of pesticide used and the level of choline esters in blood of farmers in Pattani watershed
  - 3.) establishing or establishing an organization to manage pesticide use and the level of choline esters in the blood of farmers in the Pattani watershed to drive various concepts to continue.
2. Suggestions in practice;
  - 1.) management of pesticide used and the level of choline esters in blood of farmers in Pattani watershed with a committee that comes from all sectors in the management
  - 2.) implementation can be performed well when there was a clear and consistent approach to the local culture.

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