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Environmental Impact and Health Impact Form Pesticide of Para Rubber Farmers at Phon Subdistrict Kham Muang District Kalasin Province

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Abstract: Pesticides that are purposely applied suppress plant and animal pests and to protect agricultural and industrial products. However, the majority of pesticides is not specifically targeting the pest only also affect plants and animals and leads to loss of biodiversity. This research aimed to study environmental impact and health impact form pesticide of para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province. The samples of this study were 60 farmers with stratified random sampling techniques, the soil and para rubber at Phon Subdistrict Kham Muang District Kalasin Province which had been collection areas by dividing the sample into 4 groups by village growing regions. The instrument of this research were divided in to three kinds which are the blood cholinesterase testing kit by reactive study and the GT-pesticide residual test kit for detecting the chemical in the soil sample. The results revealed that the pesticide in the soil form para rubber plantations at Phon Subdistrict Kham Muang District Kalasin Province before the participatory process showed there Methamidophos, Monocrotophos and Dicrotophos in 4 groups but after the participatory process do not showed. The farmers after the participatory process experimental group the amount of the cholinesterase level in the blood better than the control group.

Key words: Environment impact, health impact, chemical pesticide, para rubber, farmer, protection

INTRODUCTION

Pesticide is the name used to describe a range of substances or mixtures used to kill, reduce or repel many types of pests (Fait *et al*., 2001). Pesticides are a special kind of products for crop protection. Crop protection products in general protect plants from damaging influences such as weeds, diseases or insects. A pesticide is generally a chemical or biological agent (such as a virus, bacterium, antimicrobial or disinfectant) that through its effect deters, incapacitates, kills or otherwise discourages pests. Target pests can include insects, plant pathogens, weeds, molluscs, birds, mammals, fish, nematodes (roundworms) and microbes that destroy property cause nuisance, spread disease or are vectors for disease. Although, there are human benefits to the use of pesticides, some also have drawbacks such as potential toxicity to humans and other animals. According to the Stockholm Convention on Persistent Organic Pollutants, 9 of the 12 most dangerous and persistent organic chemicals are pesticides. Pesticides are categorized into four main substituent chemicals: herbicides; fungicides; insecticides and bactericides (UNEP, 2005; Gilden *et al*., 2010).

Pesticides that are purposely applied suppress plant and animal pests and to protect agricultural and industrial products. However, the majority of pesticides is not specifically targeting the pest only also affect plants and animals and leads to loss of biodiversity. Many pesticides are not easily degradable, they persist in soil, leach to groundwater and surface water and contaminate wide environment. Depending on their chemical properties they can enter the organism, bioaccumulation in food chains and consequently influence also human health. Overall, intensive pesticides application results in several negative effects in the environment that cannot be ignored (Carson, 2002).

Therefore, the researcher as an university's lecturer had studied the environmental impact and health impact form pesticide of Para Rubber Farmers at Phon Subdistrict Kham Muang District Kalasin Province by surveying to solving those problems.

The research's purposes:

- To studies the environmental impact form para rubber plantations at Phon Subdistrict Kham Muang District Kalasin Province
- To studies the health impact of para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province

MATERIALS AND METHODS

The sample of this research were divided into three kinds which are: the 60 para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province which had been selected by stratified random sampling technique. The soil form para rubber plantations at Phon Subdistrict Kham Muang District Kalasin Province which had been collection areas by dividing the sample into 4 groups (group 1: village 1 Ban Phon, group 2: village 2 Ban Phon, group 3: village 3 Ban Phonngarm, group 4: village 5 Ban Phonnariang) by nature growing regions. The rubber plantations were converted using simple random drawing of each group with a plot to dig up soil samples from each row is the average of the combined total equal to at least 1 kg/sample. Samples were collected at harvest, farmers have been sending samples to a laboratory to detect the chemical in the soil sample in each group.

The para rubber at Phon Subdistrict Kham Muang District Kalasin Province which had been collection areas by dividing the sample into 4 groups by village growing regions. The rubber plantations were converted using simple random drawing of each group with a plot to the para rubber pulp samples from each row is the average of the combined total equal to at least 1 kg/sample. Samples were collected at harvest, farmers have been sending samples to a laboratory to detect the chemical in the para rubber pulp sample in each group. The instrument of this research were divided in to three kinds which are:

- The blood cholinesterase testing kit by reactive paper for detecting blood cholinesterase of para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province
- The GT-pesticide residual test kit for detecting the chemical in the soil sample
- The GT-pesticide residual test kit for detecting the chemical in the para rubber pulp sample

RESULTS AND DISCUSSION

The major findings revealed as following:

- The pesticide in the soil form para rubber plantations at Phon Subdistrict Kham Muang District Kalasin Province before the participatory process showed there (Table 1)
- Methamidophos in 4 groups (group 2: 1.87 mg kg^{-1}, group 3: 1.24 mg kg^{-1}, group 1: 0.92 mg kg^{-1}, group 4: 0.09 mg kg^{-1} in order)
- Monocrotophos in 4 groups (group 1: 1.75 mg kg^{-1}, group 3: 1.15 mg kg^{-1}, group 2: 0.60 mg kg^{-1}, group 4: 0.43 mg kg^{-1} in order)
- Dicrotophos in 4 groups (group 1: 1.28 mg kg^{-1}, group 3: 0.98 mg kg^{-1}, group 2: 0.58 mg kg^{-1}, group 4: 0.49 mg kg^{-1} in order)
- The pesticide in the soil form para rubber plantations at Phon Subdistrict Kham Muang District Kalasin Province after the participatory process do not showed in 4 groups
- The para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province before the participatory process had cholinesterase level at risk level 51.70%, safe level 30.00%, unsafe level 16.70% and normal level 1.70% in order (Table 2)
- The para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province after the participatory process had cholinesterase level at (Table 3)
- Control group had cholinesterase level at risk level 53.30%, safe level 43.00%, unsafe level 3.30% and normal level 0.00% in order
- Experimental group had cholinesterase level at risk level 50.00%, safe level 40.00%, unsafe level 3.30% and normal level 6.70% in order

The para rubber farmers in Phon Subdistrict Kham Muang District Kalasin Province Thailand, after the participatory process had environmental impact and health impact form pesticide were better than before the

Table 1: The pesticide in the soil form para rubber plantations at Phon Subdistrict Kham Muang District Kalasin Province before the participatory process

	Groups (mg kg^{-1})			
Pesticide	1	2	3	4
Methamidophos	0.92	1.87	1.24	0.09
Monocrotophos	1.15	0.43	0.60	1.75
Dicrotophos	0.98	0.49	0.58	1.28

Table 2: Cholinesterase level of the para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province before the participatory process

Cholinesterase level	n = 60	Percentage
Normal	1	1.7
Safe	18	30.0
Risk	31	51.7
Unsafe	10	16.7

Table 3: Cholinesterase level of the para rubber farmers at Phon Subdistrict Kham Muang District Kalasin Province after the participatory process

	Control group		Experimental group	
Cholinesterase level	n = 30	Percentage	n = 30	Percentage
Normal	-	-	2	6.7
Safe	13	43.4	12	40.0
Risk	16	53.3	15	50.0
Unsafe	1	3.3	1	3.3

participatory process shows that the participatory process making more behavior receiving for the para rubber farmers in Phon Subdistrict Kham Muang District Kalasin Province Thailand which relating to the participatory process directly to the program's target which is accorded to the Klinman *et al*. (2012) who found that the agriculturist of jasmine experimental group the amount of the enzyme cholinesterase in the blood higher than the control group had not significant statistical level of 0.05.

CONCLUSION

From this research, participatory process of para rubber farmers for resolve the impact used to chemical pesticides in Phon Subdistrict Kham Muang District Kalasin Province Thailand was rated as a high efficiency and they also had environmental impact and health impact form pesticide were better than before participatory process. Information from the study was giving beneficially to resolve the impact used to chemical pesticides in community at the future.

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