PRIORITIZATION OF INSECTICIDE FOR MONITORING IN PRASAE RIVER AREA

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Abstract

Prioritization of 7 insecticides used around Pra-Sae river area (Cypermethrin, Methomyl, Carbaryl, Chlorpyrifos, Parathion-methyl, Methamidophos, and Endosulfan) was based on yearly usage, toxicities in aquatic animals and mammals, impacts on environment, including the opinions from the toxicological and ecological specialists. The priority for monitoring of these insecticides was 1) Cypermethrin, Chlorpyrifos and Endosulfan 2) Methomyl 3) Parathion-methyl and Carbaryl 4) Methamidofos.

Keywords: pesticide, Prasae River area

Introduction

Prasae has been the important river in Eastern sea banks that flows into the Gulf of Thailand around Baan Pak Nam, Pak Nam Krasae, Klang, Rayong Province. About 80% of the land utility was used for agriculture for example; rice growing, gardening, crop growing, animal farming, and fishery. Most agriculturalists applied the chemicals to prevent their products from pests and to be more productive[1]. The previous study by interviewing 141 families of agriculturists using chemicals around Pra-Sae river areas implied that the insecticides mostly used were Cypermethrin, Methomyl, Carbaryl, Chlorpyrifos, Parathion-methyl, Methamidophos, and Endosulfan[2]. This study was further performed to determine the priority for monitoring among these insecticides.

Material and Methods

The determinants for prioritization were yearly quantities of usage, toxicities in aquatic animals and mammals, impacts on environment and the opinions from 5 specialists (2 toxicologists, 2 ecologists and 1 agricultural chemist).

The data in any category were ranked from 1 (lowest impact) to 7 (highest impact) points. Summation of the points represented the priority rank of each insecticide.

Results and Discussion

The priorities for monitoring among the insecticides around Pra-Sae river areas were as follow: (1) Cypermethrin, Chlorpyrifos and Endo-sulfan (2) Methomyl (3) Parathion Methyl and Carbaryl (4) Methamidophos (Table 1-2). It should be noted that endosulfan was still used whilst it has been banned.

The on going project is the study of accumulation of these 7 insecticides in the mullets which are the local fish in Prasae River for assessment of safety in mullet consumption.

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Table 1 The toxicities of insecticides used around Pra-sae river areas

	Cypermethrin	Methomyl	Carbaryl	Chlorpyrifos	ParathionMethyl	Methamidophos	Endosulfan
Toxicity Level (WHO)	II Moderately hazardous	Ib Highly hazardous	II Moderately hazardous	II Moderately hazardous	Ia Extremely hazardous	Ib Highly hazardous	II Moderately hazardous
LD50 in Rat (mg/kg)	303 mg[3]	17.0 – 23.5[4]	500 – 850[5]	118 - 245[6]	2.9 – 3.2[7]	18.9 – 21[8]	40 – 50[9]
LC50 96 hr. in Rainbow trout (mg/l)	0.00082[10]	3.4[11]	4.27 – 6.18[12]	0.009[13]	2.7[11]	25 – 51[8]	0.0014[14]
Soil degradation (half life: days)	30[15]	30[15]	10[15]	30[15]	5[15]	6[15]	50[15]
Water Degradation (Half life: pH 7 : days)	>50[10]	266[16]	10[16]	35[16]	8 Summer[16]	27[8]	22[17] (pH 7.3)
Bioaccumulation	Extremely low[3]	No Evidence[4]	Extremely low[5]	Not has potential[18]	Low[7]	No evidence[19]	High Potential[9]

Table 2 Summary of the category points of insecticides used around Pra-sae river areas

	Points						
	Cypermethrin	Methomyl	Carbaryl	Chlorpyrifos	ParathionMethyl	Methamidophos	Endosulfan
Quantity of active ingredient in a cycle year[2]	5	6	7	4	3	2	1
Rank from assessment by specialists	5	4	4	6	3	2	7
LD_{50} in mammal (Rat)	2	6	1	3	7	6	4
LC_{50} (96 hr) in fish (Rainbow trout)	7	3	2	5	4	1	6
Degradation in soil	6	6	3	6	1	2	7
Degradation in water (pH ~ 7 – 8)	6	7	2	5	1	4	3
Bioaccumulation	4	1	4	6	6	4	7
Total (point)	**35**	**33**	**23**	**35**	**25**	**21**	**35**
Ranking Number	**1**	**2**	**3**	**1**	**3**	**4**	**1**

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ลำดับสารกำจัดแมลงที่ควรเฝ้าระวังบริเวณลุ่มน้ำประแสร์

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จัดลำดับความสำคัญของสารกำจัดแมลงที่เกษตรกรบริเวณลุ่มน้ำประแสร์ นิยมใช้ จำนวน 7 ชนิด ได้แก่ ไซเปอร์เมทริน เมทโธมิล คาร์บาริล คลอไพริฟอส พาราไธออนเมธิล เมธามิโดฟอส และเอนโดซัลแฟน จากข้อมูลปริมาณการใช้ในรอบปี ความเป็นพิษในสัตว์น้ำและสัตว์เลี้ยงลูกด้วยนม ความเป็นพิษต่อสิ่งแวดล้อม รวมทั้งสอบถามความคิดเห็นจากผู้เชี่ยวชาญด้านพิษวิทยาและนิเวศน์วิทยา สามารถจัดลำดับความสำคัญของสารกำจัดแมลงที่ควรเฝ้าระวังบริเวณลุ่มน้ำประแสร์ ได้ดังนี้ 1) ไซเปอร์เมทริน คลอไพริฟอส และเอนโดซัลแฟน 2) เมทโธมิล 3) เมธิล พาราไธออน และคาร์บาริล 4) เมธามิโดฟอส

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