

# RISK MANAGEMENT OF DUE TO EXPOSURE TO PESTICIDE POISONING FOR TOBACCO FARMERS IN THE JEMBER DISTRICT

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## INTRODUCTION

The main problem is the use of pesticides at this time when farmers use pesticides and not on the basis of necessity be indicative, but carried out "blanket cover system", it means there is not a plant pest or noxious poison that is constantly sprayed to plant. Besides spraying technique is sometimes downwind, causing farmers unknowingly inhale pesticides. Excessive pesticide use behavior as it actually causes new problems that their pesticide residues in agricultural products, and ultimately harm the farmers and the wider community both his safety and health (MOH, 2006).

The issue of pesticide use also occurs in tobacco farmers in Jember district, most of the farmers do not pay attention to the rules of the use of pesticides and the use of PPE is not standardized so it is very risky to poisoning by pesticides. Jember is one of the major tobacco-producing areas in Indonesia. Types of tobacco grown in this region are the na-Oogst Besuki tobacco. Besides to its rich aroma, this type of tobacco were famous because of its elastic so it is fitting to be a cigar wrapper. That's what makes this tobacco known in international market

Pesticides are chemical substances that are used for material used to control, reject, lure, or eradicate pests. Pesticides have a major role in increasing agricultural production. Based on the experience in Latin America with the use of pesticides can increase production up to 40% on cocoa. In Pakistan, pesticides help increase sugarcane production by 33%, and based on the record FAO pesticide use can save 50% on the results of the cotton plant (Sudomo, 1992; Mahyuni, 2015)

In agriculture, use of pesticides has been perceived benefits to increase production. The presence of pesticides benefits and advantages such as rapid reduce the population of pests of plants with a longer period of control, easy and practical to use it, easily manufactured on a large scale and easily transported and stored. It was economical beneficial in use of pesticides. However, that does not mean the use of pesticides does not cause adverse effects.

Pesticides enter the body through the skin, absorption through the skin continue for pesticides still in the skin, through the mouth (ingestion) due to accident, negligence or intentional (suicide) would result in severe poisoning and death, through breathing can be a powder, droplets or steam can cause serious damage to the nose, through the throat if inhaled quite a lot. Then through blood circulation can finally get into the organs systematically. Organs are usually exposed to toxins are the lungs, liver (hepatic), central nervous system (brain and spinal cord), bone marrow, kidneys, skin, nervous edge, and blood. The toxic effects on the body also will give local effects such as irritation, allergic reactions, dermatitis, ulcers, acne and other symptoms (Ekki, 2007).

Manifestations class organophosphate pesticide poisoning occurs in various organs in the body. Mild symptoms that often arises is dizziness, blurred vision, hyper saliva, nausea, vomiting, diarrhea, and even can cause severe bronchospasm and respiratory muscle paralysis with manifestations of shortness of breath, as well as abnormalities in the heart, namely the occurrence of cardiac arrhythmias. On acute exposure, class of organophosphate pesticides can cause respiratory problems. Disruption of the respiratory center will cause a symptom that leads to the progressive bradipneu breathing. Health problems occur due to the dose and frequency that do not fit. As an example, a dose of 1 ml of pesticides with high value active ingredients used for 1 ha of crops, farmers use pesticides in their application for the organophosphate class of ½ ha with a reason to pests or plant pests (OPT) that attack die soon. The frequency of spraying more than 3 times a month is not good for health and the standard pesticide spraying (Arifiyanto, 2008).

Risk analysis is a process consisting of the steps that have been formulated, having the sequence (steps) and assist in making better decisions by looking at the risks and impacts that may occur. Risk management is a systematic method that consists of

establishing the context, identifying, researching, evaluating, treatment, monitoring and communicating risks associated with any activity, process or function so as to minimize losses of the company (AS / NZS 4360; 2004).

The process of risk analysis as contained in the Risk Management Standard AS / NZS 4360, which include (1) Communication and consultation, risk analysis needs to be communicated to all parties. Communication used may be circular, practical guidance, communication forums, handbooks or guidelines; (2) define the context (purpose), this process takes place within the framework of the organization's strategic, organizational and risk management context; (3) Risk identification, this step seeks to identify risks to be managed, should be using a good system. Risk identification should include either exists or does not exist in the organization; (4) Risk analysis, aiming to separate small and large risks and provide the data evaluation and improvement; (5) Risk evaluation, is to evaluate the risks if those risks are acceptable or not, (6) Risk management is the realization of a risk management efforts workplace.

The objective of this study was to analyze the risk of pesticide poisoning in the tobacco farmers in Jember.

**METHODS**

The type of study was a descriptive observational research. It was conducted on tobacco farmers in Jember. Samples taken in this study were all 96 farmers. The variable in this study is the risk management consists of four components: risk identification, risk analysis, risk evaluation and risk control. Data collection techniques hazard identification / risk assessment and risk derived from observation, interviews, brainstorming discussions with nine experts and documentation. Analysis of the data by examining the data, scoring for risk assessment and to describe and illustrate the data managed by comparing the occupational health and safety risks using the standard AS / NZS 4360: 2004. Risk assessment methods used was the standard AS / NZS 4360: 2004.

Values risk level is then confirmed with the existing standard tables (eg from ANZS / Australian New Zealand Standard, No. 96, 2004).

**Table 5. Analysis Severity, Based on AS / NZS 4360 Standard**

Level	Description	Rating
Catastrophic	The death of many people, the activity is stopped, irreversible damage to the environment area	100

Disaster	Death in one to several people, irreversible damage to the local environment	50
Very serious	Permanent disability, temporary damage to the local environment	25
Serious	Non-permanent disability	15
Important	Needed medical treatment, occurs exhaust emissions but not damage the environment	5
Noticeable	Minor injuries, mild pain, loss of small, temporary cessation of activities	1

Source: AS/ANZ 4360:2004, Risk Management Standard

**Table 2. Analysis of Possible, Based on AS / NZS 4360 Standard**

Level	Description	Rating
Almost certain	Injuries were almost happened if contacting by source	10
Likely	Probable 50:50	6
Unusual but Possible	One event that is unusual but still have the possibility to occur	3
Remotely possible	An event that is a very small possibility of	1
Conceivable	Never happened despite years of exposure to the hazard occurs	0.5
Practically Impossible	It is obvious that had never happened	0.1

Source: AS/ANZ 4360:2004, Risk Management Standard

**Table 3. Analysis of Exposure, Based on AS / NZS 4360 Standard**

Level	Description	Rating
Continuously	Happened several times in a day	10
Frequently	Once happen in a day (often)	6
Occasionally	Once a week to once a month (sometimes)	3
Infrequent	Once a month to once a year (not often)	1
Rare	Has been known to occur (rarely)	0.5
Very rare	Not known occurrence (very rare)	0.1

Source: AS/ANZ 4360:2004, Risk Management Standard

Determining the level of risk carried out after the third component of the risk of a predetermined amount (consequences, exposure and probability).

$$\text{Level of Risk} = \text{consequences} \times \text{exposure} \times \text{likelihood}$$

From these calculations, next step was grouped according to the risk level criteria.

**Table 4. Level of Risk Analysis**

Level	Category	Action
>350	Very high	Cessation of activity until the risk is reduced
180-350	Priority 1	Requiring treatment as soon as possible
70-180	Substantial	Requires improvement
20-70	Priority 3	Need for attention
<20	Acceptable	Doing business as usual

Source: Septianingrum (2013)

**RESULT AND DISCUSSION**

**Pesticide Poisoning Risk Identification**

The frequency distribution of pesticide poisoning suffered by farmers can be seen in the following table:

**Table 5. Distribution of Respondents by Risk of Pesticide Poisoning**

Symptoms of Poisoning	Experiencing Toxicity (%)	Not Experiencing Toxicity (%)
Blurred Vision	12	88
Watery Eyes	32	68
Sore Eyes	25	75
Decreased consciousness	3	97
Saliva lot out	1	99
Nausea	4	96
Coughs	18	82
Vomiting	2	98
Out of breath	11	89
Dizziness in front of head	43	57

According to the above data, it appears that the risk of poisoning showed that the majority of 43% were headache, watery eyes were 32%, sore eyes were 25%, cough were 18% and blurred vision were 12%. Improper use of pesticides can give side effects of poisoning. There are several factors that affect the inappropriateness of the use of pesticides such as the level of knowledge, attitude/ behavior of pesticide users, the use of protective equipment, as well as the lack of information related to the risk of pesticide use. In addition more farmers get information about pesticides from the clerk manufacturer of pesticides than health workers (Raini, 2001).

WHO estimates that each year about 25 million cases of pesticide poisoning, or about 68 493 cases every day (Remembering Injured, 2007). Data from Nishtar Hospital, Multan Pakistan, during the years 1996-2000 there were 578 poisoning patients, including 370 patients from pesticide poisoning (54 people died). In general, pesticide poisoning victims are farmers or agricultural workers, 81% of which are aged 14-30 years old (Ahmad, 2007; Raini, 2007). Study was conducted by Ginting (2011) on factors related to the occurrence of pesticide poisoning in farmers spraying citrus in the village Cinta Rakyat, District Merdeka, Karo Regency in 2010 showed that the results of the study obtained by the proportion of the prevalence of pesticide poisoning in the village Cinta Rakyat of 36.7% and of the statistical test results indicating the relationship between age, lower education, long-exposure ≤ 2 hours, and PPE that were unfavorable to the incidence of pesticide poisoning. Other studies on long exposure to organophosphate cholinesterase enzyme activity declined in the blood of the growers conducted by Rustia (2010) obtained the result that all respondents in the study were poisoned with a proportion of 71.4% and 28.6% mild poisoning being. Research was conducted by Utami (2010), the analysis of risk factors for the incidence of pesticide poisoning in vegetable farmer in the village Pandansari, District Paguyangan, Brebes regency in 2010 obtained the result that there was a relationship between duration of spraying, employment, PPE as well as the dosage with events pesticide poisoning (Djojsumarto, 2008).

The following table describes the assessment and ranking of risk contained in tobacco farmers.

**Table 6. Distribution of Respondents by Risk Assessment**

Symptoms of Poisoning	C	L	E	Result
Blurred Vision	25	3	1	75
Watery Eyes	15	6	3	270
Sore Eyes	15	3	3	135
Decreased consciousness	50	1	0.5	25
Saliva lot out	15	0.5	0.5	3.75
Nausea	5	1	3	15
Coughs	15	3	6	270
Vomiting	15	1	1	15
Out of breath	25	3	3	225
Dizziness front of head	15	6	1	90

**Table 7. Analysis of Risk Level**

Symptoms of Poisoning	Level	Category
Blurred Vision	75	Substantial
Watery Eyes	270	Priority 1
Sore Eyes	135	Priority 1
Decreased consciousness	25	Priority 3
Saliva lot out	3.75	Acceptable
Nausea	15	Acceptable
Coughs	270	Priority 1
Vomiting	15	Acceptable
Out of breath	225	Priority 1
Dizziness in front of head	90	Substantial

**Risk Management Control**

Control methods against pesticide poisoning include:

1. Adherence to the dosage of pesticides,  
Dose, all pesticides are toxic, doses greater the toxicity, enables the farmer pesticide users. Directly affect the dose of pesticide hazards of pesticide poisoning, it is determined by long exposure. For a dose of spraying in the field, especially organophosphate class, the recommended dose of 0.5 to 1.5 kg / ha
2. Individual Hygiene  
Personal hygiene behaviors ranging from the preparation, spraying through spraying hand washing with soap and running water after dispensing pesticides. Bath by running water and soap after spraying and change clothes were needed. Poor personal hygiene will make a residue of pesticide can be attached to the body or clothing worn while performing the application of pesticides. Personal hygiene to reduce the risk of poisoning is to have to do all the processing is complete and correct so that residues of pesticides does not stick to the body or clothing can cause poisoning symptoms appear (WHO, 2008)
3. The use of PPE.  
The use of personal protective equipment is recommended for the complete pesticide sprayers. The use of PPE by applicator or spraying pesticides will reduce the risk of exposure to pesticides, based Permenkes No. 258 / Menkes / Per / III / 1992 concerning the Terms of Use of Pesticides, for a minimal protective gear should be used based on the type of work and the classification of specific pesticide spraying outside the building with the classification of pesticides which are:
  - a. Pesticides are very dangerous: boots, overalls long sleeves and pants long sleeves, a hat, protective mask, goggles and gloves.
  - b. Pesticides are very dangerous: canvas shoes, frocks long sleeves and pants long sleeves, hats, masks.
  - c. Dangerous pesticides; canvas shoes, frocks long sleeves and long pants, hats, masks.
  - d. Pesticides are quite dangerous: canvas shoes, long-sleeved frocks and trousers, hat.

**CONCLUSION & RECOMMENDATION**

According to the results, there were still many health complaints experienced by tobacco farmers, among others blurred vision, watery eyes, sore eyes, decreased consciousness, saliva lot out, nausea, coughs, vomiting, out of breath and dizziness in front of head. Some of these fall into several categories which require some specific action.

Control methods against pesticide poisoning were adherence to the dosage of pesticides, individual hygiene and use of PPE (Personal Protection Equipment).

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