

BEHAVIOR LEVEL OF KNOWLEDGE, ATTITUDE, AND ACTION OF CONSUMERS IN PESTICIDE RESIDUES ON VEGETABLES AND FRUITS FOR SALE IN BADUNG MARKET DENPASAR IN 2019

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ABSTRACT

Badung Market is the biggest market located in Denpasar, Bali. The market is a traditional trading center that sells food, clothing, and shelter needs. The need for vegetables and fruits can also be obtained at the market. Due to the increasing need for them, farmers use pesticides to increase agricultural yield. But the use of pesticides on vegetables and fruit is suspected to have been excessive both in terms of type, composition, dose, time, and interval. Pesticide residues are certain substances contained in agricultural products including vegetables and fruits. Pesticide residues have an indirect effect on consumers, but in the long run they can cause health problems, including neurological disorders and the metabolism of the cholinesterase enzyme. The purpose of this study was to determine the level of consumer behavior towards residues on vegetables and fruits based on the level of knowledge, attitudes, and actions. This research was a descriptive survey research. The population of this study was all the consumers who bought vegetables and fruits with a sample of 100 respondents. Sampling was carried out accidentally by taking respondents who were buying vegetables and fruits then interviews and questionnaires were conducted. Based on the results of the study, it was found out that the level of consumer behavior in vegetables and fruits that contained pesticides with respect to knowledge was moderate (55%), attitude (moderate 67%), and action (moderate 73%)

Keywords: pesticide residues, behavior level, vegetables and fruits

INTRODUCTION

Badung Market is located in the village of Dauh PuriKangin and is the largest traditional market in Denpasar, Bali Province. The market is a gathering place for thousands of traders who sell various needs such as food, clothing, and including vegetables and fruits. Vegetables and fruits sold in Badung market are imported from plantations or agriculture in Bali or outside Bali so that even small traders can buy vegetables and fruit and then resell them in other traditional markets. Vegetables and fruits that come from plantations or agriculture are not necessarily free from the effects of the dangers of pesticides. The traders get vegetables and fruit to be sold, directly from farmers who sell their garden crops. Vegetables and fruit sold by traders in Badung market have not received special treatment. The traders do not clean vegetables before being sold to consumers. From this, it is feared that there will still be pesticide residues attached to the vegetables, making them unsafe for consumption [5].

Pesticides are chemicals that are used to control the development / growth of pests, diseases, and weeds. Without the use of pesticides there will be a decrease in agricultural yields. Extensive use of pesticides at every stage of the plant can cause a lot of pesticide residues left behind in agricultural products and in the agricultural environment. Pesticide residues found in agricultural products have a bad impact on human health.

Several studies have been conducted on the analysis of pesticide residues on vegetables and fruit that are sold in traditional and modern markets. In 2009 a pesticide residue content study was carried out on cabbage, tomatoes, and carrots in Malang, East

Java. Samples were taken randomly from several supermarkets and then analyzed in the laboratory with Gas Chromatography tools. The results showed that pesticide residues with active ingredients endosulfan found in cabbage with levels of 7.4 ppb. In addition, pesticide residues were found with active ingredients chlorpinos, meditation, malation, and carbanil. In the carrot sample, the highest active content of endosulfan was found to be 10.6 ppb [7].

In 2013 a research was carried out on the identification of organophosphate pesticide residues in potato vegetables in Makassar's Lottemart supermarket and Makassar Eggplant Market. Laboratory test results showed pesticide residues of <10 mg / kg. In 2014, pesticide residue analysis was also carried out on fruit tomatoes and vegetable tomatoes at the supermarket in Makassar. The results showed that pesticide residues were found with the active ingredient profenofos in vegetable tomatoes [6].

Consumers of vegetables and fruits are very susceptible to the influence of the presence of pesticide residues in the vegetables and fruits consumed. The risk for consumers is poisoning of pesticide residues found in agricultural products. Risks for consumers can be in the form of direct poisoning by consuming agricultural products contaminated with pesticides or through the food chain. Although it is not impossible for consumers to suffer acute poisoning, but the risk of consumers is generally in the form of chronic poisoning, not immediately felt, and in the long term it may cause health problems [2].

Along with the development of knowledge and technology and public awareness of health, now some people are more interested in consuming vegetables that are truly healthy, not only looking at their outward appearance, but they place more emphasis on the condition in vegetables. One such consumer choice is vegetables that are free of pesticide residues. There are several methods for removing pesticide residues, but many do not know that. The level of behavior such as knowledge and attitudes of consumers of vegetables and fruits greatly affect their health in order to avoid the dangers of residues in vegetables and fruit consumed.

METHODS

This research was conducted through descriptive survey. The location of the study was at Badung Market in Denpasar, a section selling vegetables and fruits. The population of this research was all consumers of vegetables and fruits with a total sample of 100 people. The sampling technique with accidental sampling was done by conducting interviews and filling out questionnaires for consumers who were shopping.

FINDINGS AND DISCUSSIONS

Characteristics and level of behavior of respondents were taken as many as 100 respondents (n = 100) to fill in the questionnaires that weredistributed. The following Table (Table 2) depicts the distribution of respondents by age and level of education:

Table 1. Distribution of Age and Education Level of Vegetable and Fruit Consumer Respondents

Age (year)	N	Percentage (%)
16-25	8	8
26-35	11	11
36-45	40	40
46-55	17	17
56-65	24	24
Education Level		
Bachelor	6	6
Senior High School	60	60
Junior High School	25	25
Diploma 3	4	4
Diploma 2	2	2
Diploma 1	3	3

It can be seen that the majority of vegetable and fruit consumer respondents aged 36-45 years (40%). For the education level of respondents, most fruit and vegetable consumers have a high school education level with a percentage of 60%. The level of consumer behavior of vegetables and fruits can be seen in the following Table 2.

Table 2. Distribution of the Level of Consumer Behavior Based on Knowledge, Attitudes, and Actions

Behaviour		Total
Knowledge	N	Percentage (%)
Good	34	34
Fair	55	55
Poor	11	11
Attitude		
Good	33	33
Fair	67	67
Attitude		
Good	27	27
Fair	73	73

The consumers of vegetables and fruits mostly had moderate behavior level with a percentage of 55%. Most of the attitude behavior (67%) was moderate, and the behavior of the actions had a medium category with a large percentage of 73%.

The level of consumer knowledge was mostly moderate (55%). It is seen in consumers (60%) that did not know that good vegetables rotted fast. Vegetables and fruits that are given pesticides will have a longer shelf life and will not rot easily. Consumers also largely answered incorrectly about the effectiveness of removing pesticide residues by running water. Washing lettuce and mustard greens with running water can remove pesticide residues by 60-70% [10,1]. Decreasing levels of pesticide residues with running water is possible because pesticides are easily absorbed by water. Usually this type of pesticide is organophosphate pesticides which have water-soluble properties.

67% of the consumers had a moderate level of attitude behavior. It can be seen that 54% of consumers disagree if all vegetables and fruit contain insect and grass poisons. Most consumers of vegetables and fruit had a moderate level of action that is equal to 73%. It is seen that only 15% of them washed vegetables and fruit with certain antiseptic liquids. Washing vegetables and fruits with certain antiseptic / detergent liquids can reduce pesticide residues in chilies by 16.59% [9]. Washing lettuce using antiseptic liquid / detergent can reduce pesticide residues by 70.1%. Detergents can reduce pesticide residues because they have surfactants. Surfactants are chemical compounds whose molecules have two poles, each of which is hydrophilic and lipophilic. In the washing process using water, the hydrophilic part will interact with water, while the lipophilic part will interact with lipophilic pesticides. Thus, the surfactant acts as a bridge and by itself will increase the effectiveness of washing pesticides using water. Usually the types of pesticides that can be lost with surfactants are organochlorines such as Aldrin, Lindan, Heptachlor, Hexachlorophene, and others [4].

As many as 26% of consumers often cook vegetables until they were cooked, but with the condition such that the container was not closed. Factors that influence the reduction of pesticide residues include (1) evaporation, (2) mechanical and physical treatment, and (3) due to washing with detergent. If cooking vegetables with a container being not closed, then the possibility of pesticides being evaporated becomes greater and the evaporated pesticides may be brought back to the vegetables [3].

If consumers often consume vegetables and fruits that contain pesticide residues, this is very dangerous for their health. The toxicity of pesticide residues can be acute or chronic through the gastrointestinal. Pesticides can have neurotoxic effects through the inhibition of the enzyme *acetylcholinesterase* in nerve synapses and myoneural junctions that are reversible. Clinical symptoms of pesticide poisoning are a cholinergic

reaction. The severity depends on the amount of pesticides consumed with clinical symptoms such as dizziness, muscle weakness, diarrhea, sweating, nausea, vomiting, no response to pupils, blurred vision, shortness of breath and convulsions [8].

CONCLUSION

The results showed that the majority of vegetable and fruit consumers were in the category of having moderate knowledge (55%), moderate attitude (67%), and moderate action (27 %).

REFERENCES

- [1] Alen, Y, Zulhidayanti, Netty,S. 2015.' Pemeriksaan Residu Pestisida Profenofos Pada Selada (*Lactuca sativa* L) Dengan Metode Kromatografi Gas'. *Jurnal Sains Farmasi & Klinis*, 1(2), pp. 140-149.
- [2] Djojsumarto,P. 2004. 'Teknik Aplikasi Pestisida Pertanian. Kanisius. Yogyakarta.
- [3] Fitriadi,B.A, Ayutia,C.P. 2016. 'Methods of Pesticide Residue Reduction on Agriculture Product'. *Jurnal Rekayasa Kimia dan Lingkungan*, 11(2), pp.61-71.
- [4] Lukitaningsih,E, Sudarmanto,B.S.A, Noegrohati,S. 2002. ' Uji Efektifitas Daya Bersih Beberapa Sediaan Surfaktan Terhadap Residu Pestisida Pada Buah Apel Segar. *Majalah Farmasi Indonesia*, 13(4), pp. 200-206.
- [5] Marbun,L.H, Nurmani,Taufik,A. 2015. 'Analisis Residu Pestisida Organofosfat Pada Sayuran Serta Tingkat Perilaku Konsumen Terhadap Sayuran Yang Beredar Di Pasar Tradisional Pringgane Kecamatan Medan Baru Tahun 2015' Karya Tulis Ilmiah. Departemen Kesehatan Lingkungan. Universitas Medan. Medan.
- [6] Marsun,I.F. 2004. 'Studi Kandungan Residu Pestisida Pada Tomat Buah Dan Tomat Sayur Pada Pasar Swalayan Di Kota Makasar'. Skripsi. Program Studi Kesehatan Masyarakat. Universitas Islam Negeri Allaudin. Makasar.
- [7] Munarso,S.J, Miskiyah, Wisnu,B. 2009. 'Studi Kandungan Residu Pestisida Pada Kubis, Tomat, Dan Wortel Di Malang Dan Cianjur'. *Buletin Teknologi Pasca Panen Pertanian Badan Litbang Pertanian*, 5(1).
- [8] Raini,M. 2009. 'Toksikologi Pestisida Dan Penanganan Akibat Keracunan Pestisida'. *Media Litbang Kesehatan*, 17(3).
- [9] Sembiring,S. 2011. 'Pengaruh Pencucian Terhadap Residu Pestisida Profenofos Pada Cabai Merah'. Skripsi. Fakultas Farmasi. Universitas Sumatra Utara. Medan
- [10] Zaenab, Nita,N.Y, Alifia,C.B. 2016. Identifikasi Residu Pestisida Chlorpyrifos Dalam Sayuran Sawi Hijau (*Brassica Rapa Var.Parachinensis* L) Di Pasar Terong Kota Makasar'. *Media Kesehatan Politeknik Kesehatan Makasar*, 11(2), pp. 52-59.