



## Evaluation of Environmental Risks in the Use of Insecticide in Hashtgerd Area using EIQ

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### Introduction

Recently, there is an increasing concern about the effects of pesticides on non-target organisms. Residual of pesticides cause environmental pollution and put in danger the human health. The problem is always in contact with pesticides, there are numerous risks related to the environmental and human health threat at different levels of their cycle, including production, sale, use in the field and ultimately for residue in food occurs. This study consider the harmful effects of pesticides in Hashtgerd study area and their potential and environmental risks using EIQ index. Environmental Impact Quotient (EIQ) is a model based on algebraic equations which by it can be classification chemical pesticides based on environmental hazards and risks to human health and toxins that cause minimal risk are selected. The ultimate purpose of this study was to determine 5 insecticide have been the highest consumption in the region Hashtgerd and then determine the potential environmental risks of them by EIQ index, so that eventually we can identify and eliminate hazardous insecticides.

### Materials and Methods

Hashtgerd study area is one of 609 countries study area that is located in the Alborz province. This area with an extent of about 1170 km<sup>2</sup> because of the proximity to the metropolis of Tehran and focus a large number of agricultural, industrial and service units has an important economic and political position. The numerical value of the EIQ is average of the three main components include of the potential damage to the health of farm workers, the potential damage to consumers through the direct effect of toxic residues in food products or through ground water contamination and potential negative effects on the environment, including aquatic and terrestrial organisms show. The describes components of the EIQ are contains 11 variables. All input data for the impact of low, medium and high are judged to be harmful than, the one, three or five into account. Information on types of pesticides through questionnaires and interviews with farmers of all crops and gardens in the area (120 questionnaires in four cities in the study area) were collected. Information on pesticides and their effects from data bases IUPAC and the Pesticide Manual, 1997 and Crop Protection, 2003 were collected.

### Results and Discussion

Because EIQ index for imidacloprid, diazinon, malathion and phosalone pesticides has been most affected by the ecological effects, It can be concluded that in the land area that these insecticides were used, biotic intensity are at highest risk. In a study that examined environmental hazards of cotton production in Turkey, the role of ecological effects of pesticides on EIQ was more than consumer parts and farm workers. In examining of the pesticides registered in the United States, toxicity of farm workers, consumers and ecological were 37, 8 and 84.4 respectively and the final average EIQ for insecticides registered was 43.1. According to this another factor considered is the farm environmental impact of pesticides. Malathion insecticide in Hashtgerd region with farm environmental impact 42.18 as the most dangerous environmental toxins known and then insecticide diazinon that had the highest consumption in frequency of use, with farm environmental impact 41.76 was next in rank.

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Although Imidaclopride compared to other pesticides had a higher EIQ index so the potential toxicity was more but because of active ingredient and low dosage in terms of farm environmental impact was in third place. Therefore, with the expansion of the ecosystem-based approach to manage pests and method of integrated pest management, it can be greatly reduced environmental hazards arising from the use of insecticides. Among the major insecticides used in the Hashtgerd region potential toxicity of imidaclopride and farm environmental impact of malathion was more. The highest risk in all three components of farm workers, consumers and ecological related to Imidaclopride that has raised the most dangerous insecticides name as the main consumption in the Hashtgerd region. The results showed that based on the environmental impact index, most of environmental hazards of insecticides in the Hashtgerd region are due to lack of proper knowledge and incorrect selection of some insecticides and their use is excessive. In Imidaclopride and deltamethrin that farm workers effect of them on the final score EIQ was high, safety spraying will reduce the effects of this component by far.

#### **Conclusion**

The results showed that among major consumed insecticides in the area Hashtgerd, potential toxicity of Imidacloprid and farm Environmental impact of Malathion was greater. Highest risk of all three components of farm workers, consumers and ecological, related to Imidaclopride insecticide that referred to as the most dangerous major pesticide consumption in the Hashtgerd region.

**Keywords:** Ecological Effect, Environmental impact quotient, Pesticides