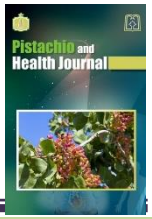

Important strategies for reducing pesticide residues in pistachio products

Hadi Eslami (PhD)[1]

[1] *Department of Environmental Health Engineering, School of Health, Occupational Safety and Health Research Center, NICICO, World Safety Organization and Rafsanjan University of Medical Sciences, Rafsanjan, Iran*

Letter to Editor	***Received:*** 13.02.2021	***Accepted:*** 16.03.2021	***Doi:*** 10.22123/PHJ.2021.281161.1093

Pesticides are chemical compounds widely used in protecting agricultural products through controlling pest populations or killing them in farms and orchards [1]. However, the presence of pesticide residues in agricultural products, such as fruits and vegetables as well as in the environment, is likely to be considered a serious threat to the health of humans and other organisms [2].

Pistachios (Pistaciavera L.) are among the most important agricultural and commercial products in the world, especially in Iran [3]. Pesticides have been used in an unprincipled and uncontrolled manner in the recent years. This has happened for two main reasons; firstly, pesticides have been used in an attempt to increase productivity of pistachio orchards; secondly, the pests have turned out to be resistant to some toxins or pesticides [4].

In Iran, over 14,000 tons of agricultural pesticides are used annually. Given their high rate of consumption and low degradability, most of these pesticides, including diazinon and chlorpyrifos, have the potential for being accumulated in agricultural products. This is likely to pose a chronic risk to the health of organisms because they are exposed to very low amounts of pesticides through the consumption of agricultural products, such as pistachios [2, 5]. Research on pesticide and toxin residues in pistachios in different parts of Iran indicates that out of 18 pesticides investigated, concentrations of residues of 15 pesticides used for pest control in pistachios have had a high health risk [6]. Major reasons for the excessive consumption of agricultural pesticides, especially in Iran, include the lack of monitoring of imported pesticides, excessive unauthorized sales of pesticides, low quality of pesticides, and the lack of monitoring of the sales of pistachio products containing excessive concentrations of pesticides owing to the lack of laboratory equipment and high costs of pesticide analysis [7].

According to the policy document of the National Institute of Health Research in Iran and that of the Department of Health Sciences and Nutrition of the Medical Sciences Academy [8], six basic strategies have been proposed for reducing pesticide residues in agricultural products. Accordingly, these strategies include propagation of organic agriculture, increased monitoring of pesticide and toxin imports, equipping laboratories to more accurately measure pesticide residues in major agricultural products such

as pistachios, training farmers to increase their awareness of proper uses of pesticides, reviewing existing laws, creating identity cards for products, and increasing essential supervisions [8].

Organic, biological, or sustainable agriculture is a type of agriculture that does not use chemical fertilizers, pesticides, toxins, and hormones. Besides, it does not apply genetic manipulations to produce agricultural products, such as pistachios. Instead, to increase productivity and to produce healthy crops, biological fertilizers or composts are used, with natural predators of pests, such as beneficial insects and microorganisms employed [6, 9]. However, it is worth mentioning that the production of organic agricultural products and organic pistachios has a higher cost than other methods because it needs more labor force. Nevertheless, part of these costs can be compensated due to the lack of the need for purchasing pesticides and toxins. In general, major obstacles to the development of organic agriculture in Iran include the lack of awareness of organic production methods among the farmers and the lack of supportive and motivational policies for farmers [4, 8].

References

1- Sadat SAA, Ilbeigi V, Valadbeigi Y, Soleimani M. Determination of pesticides phosalone and diazinon in pistachio using ion mobility spectrometry. International Journal for Ion Mobility Spectrometry. **2020**;23:*127-31*.

2- Dini A, Alizadeh A, Alizadeh E. Assessment of acetamiprid and chlorpyrifos residues on fresh and dried pistachio nuts. Pistachio and Health Journal. **2018**;1(2):*1-6*.

3- Eslami H. Pistachio, Quality and Quantity in Iran. Pistachio and Health Journal. **2019**;2(3):*74-5*.

4- Arabameri M, Mohammadi Moghadam M, Monjazeb Marvdashti L, Mehdinia SM, Abdolshahi A, Dezianian A. Pesticide residues in pistachio nut: a human risk assessment study. International Journal of Environmental Analytical Chemistry. **2020**:*1-14*.

5- Morteza Z, Mousavi SB, Baghestani MA, Aitio A. An assessment of agricultural pesticide use in Iran, 2012-2014. Journal of Environmental Health Science and Engineering. **2017**;15(1):*1-8*.

6- Taghizadeh SF, Goumenou M, Rezaee R, Alegakis T, Kokaraki V, Anesti O, Sarigiannis DA, Tsatsakis A, Karimi G. Cumulative risk assessment of pesticide residues in different Iranian pistachio cultivars: applying the source specific HQS and adversity specific HIA approaches in Real Life Risk Simulations (RLRS). Toxicology letters. **2019**;313:*91-100*.

7- Ghavami MB, Goli S, Mohammadi J, Vatandoost H. Susceptibility level of Ornithodoros tholozani (Acari: Argasidae) to some pesticides in north west of Iran. Persian Journal of Acarology. **2015**;4(1):*83-94*.

8- B D, M AP, Z A. Policy Brief for Reducing Contaminants and Residual Pesticides in Iran's Agricultural Crops. Community Health. **2015**;2(4):*256-65*.

9- Bartzas G, Komnitsas K. Life cycle analysis of pistachio production in Greece. Science of the Total Environment. **2017**;595:*13-24*.