International Journal of Advanced Multidisciplinary Research
ISSN: 2393-8870
www.ijarm.com
DOI: 10.22192/ijamr Volume 4, Issue 6 -2017

Research Article

DOI: http://dx.doi.org/10.22192/ijamr.2017.04.06.011

Measure Granulating Diazinon Insecticide Remaining in Qualitative Cultivars Rice Grain in Western Mazandaran of Iran

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Keywords

phosphorous insecticide, Diazinon, remaining, rice, qualitative cultivars

Abstract

To evaluate the Diazinon remaining, 36 samples of rice at deferent stages of cultivation, harvesting and strong in the ware house, after spraying by Diazinon insecticide as long as there was no trace of insecticide in the rice, from cities of Ramsar,Tonekabon, Abbasabad (west of Mazandaran province), Selected and studied. The highest measured levels of Diazinon after spraying in August before the harvest were 1,0/95, 1/07 ppm in 2011 and 1/2 , 1, 0/97 ppm in 2012 at qualitative cultivars in cities mentioned in the west of Mazandaran province were reported. The lowest measured concentrations of the insecticide after two months of harvest were 0/09 ppm in 2011-2012, at Ramsar, and abasabad in qualitative cultivars. It was found that the biennial averages of Diazinon poison remaining in qualitative cultivars samples until one month after harvest were higher than permissible limit at Ramsar, Tonekabon and Abbasabad. The results, showed that the biennial average of Diazinon poison remaining two months after harvest at Tonekabon was higher than permissible limit hower this average was lower than permissible limit at Ramsar and Abbasabad (0/09 ppm). After there and Six months from the harvest, there was no trace of Diazinon at this studied regions.

Introduction

Mazandaran province uses Diazinon insecticides in a large volumeand this study aimed to investigate the level of organophosphorus insecticide in qualitative cultivars in rice grain produced in Ramsar,Tonekabon and abbasabad West Part of Mazandaran of Iran. In the field of remaining amount of Diazinon insecticide, some researches have been done in different areas of the world (Abbot 1996; Ahmad and et al, 2008;Alamgir et al,2012;Arjmandi and et al.,2009;Chein and et al,2000; Chen and et al, 2009; Doyli and et al, 2009;Futagami and et al,1997;Hasanzade and et al,2014;, Khazaee and et al,2010; Kobayashi and et al, 2005; Puglise and et al,2004;Shayeghiand et al,2001;Sherma and et al,2005;Skopec and et al,1993;Soon and et al, 2007;Struger 2002Sudo and et al,2002;Sumitra and et al, 2008;Tavakoli 2007;)

Materials and Methods

36 Samples of rice grain were collected from different regions of Mazandaran province in north of Iran. The amount of 2 kg of paddy rice from the fields and from warehouses were collected. In laboratory, the samples were crushed by crusher machine and put in to disposable containers or freezer bags.

5 grams from milled sample of rice was weighted and placed in centrifuge tubes with lids. Then 10 ml of acetonitrile, 10ml of deionized water, 1 gr of sodium chloride, 6gr of magnesium sulfate and 1/5 gr of sodium nitrate were added to the samples. These samples were shaken by vortex for 1 minute and then centrifuged for 5 minute at 4000 RPM. 5ml from surface solution of the centrifuged samples was taken and transported in a 14-ml centrifuge tube; then 50 mgr of PSA and 150 mgr of magnesium sulfate were added. The following, tubes were shaken by vortex for 30 seconds and centrifuged for 1 minute at 4000 RPM. 1/5 ml from each sample extract was poured in to twisty vials with lids and completely dried in the evaporation apparatus. Finally, 1ml and 1µ of methanol will be added to this solution and GC/NPO apparatus, respectively; then amount of Diazinon will be measured.

Results

PhpsphorousDiazinoninseeticide remaining in rice qualitative cultivars samples at west of Mazandaran (Ramsar, Tonekabon, Abbasabad) was measured in 2011 and 2012; The resulting date are shown in figures 1 and 2, respectively. The average of the two years it has been shown in Figure 3.

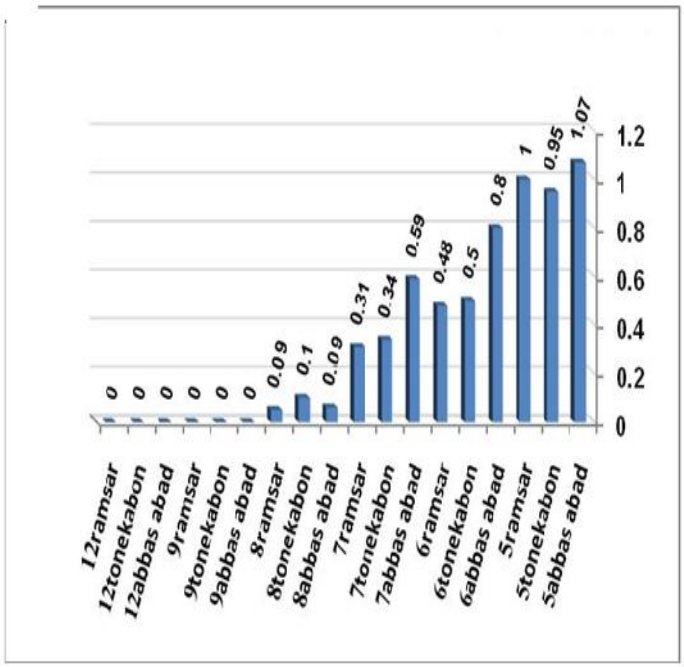

Figure 1-Diazinon value measured in milligrams per kilogram of sample quality rice varieties in different regions of the West of Mazandaran 2011

Figure 1 shows the Diazinon poison remaining of rice qualitative cultivars samples at Ramsar, Tonekabon and abbasabad, in 2011. According to the results, maximum concentration of diazinon was 1/07 ppm that was observed at Abbasabad in August, one month before harvest (after two times spraying at 15 June and 31 July). Also, after one month of harvest, Diazinon poison remaining in samples of all three regions was higher than permissible limit. After two month of harvest, Diazions poison remaining only in Tonekabon was higher than permissible limited; the Diazinon remaining in Ramsar and Abbasabad were 0/09 ppm that one less from the permissible limit. According to national standards, the maximum amount of Diazinon in rice, is 0/1ppm. Three and six months after harvest, there was no trace of Diazinon in rice qualitative cultivars samples.

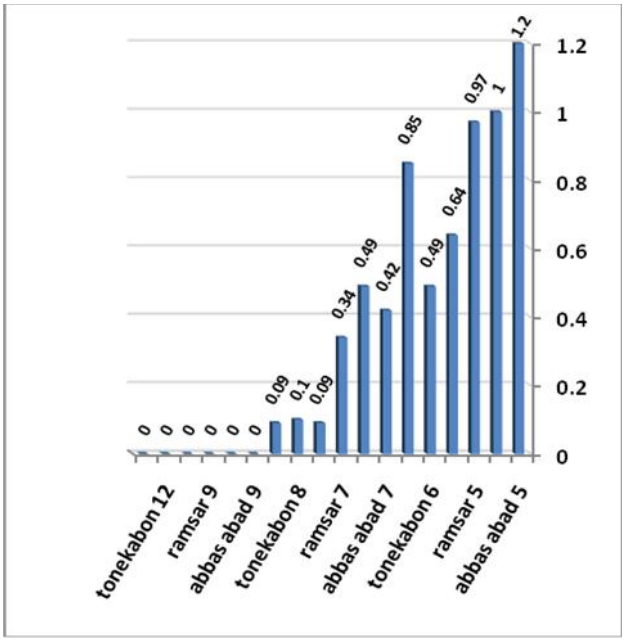

Figure 2- the measured Diazinon amount of rice qualitative cultivars samples at different regions in west of Mazandaran, 2012.

Figure 2 shows the Diazinon poison remaining of rice qualitative cultivars samples at Ramsar, Tonekabon and Abbasabad, in 2012. According to the results obtained in 2012, maximum concentration of Diazinon was 1/2 ppm observed at Abbasabad in August, one month before harvest (after two times spraying at 15 June and 31 July). The minimum concentration of phosphorous Diazinonpoision remaining in the samples, was 0/09 ppm that obtained from Ramsar and Abbasabad, two months after harvest. According to figure 2, we find that after two months of harvest, the amount of Diazinon remaining in some samples was higher than permissible limit. However after three and six months of harvest, there is no trace of Diazinon in rice.

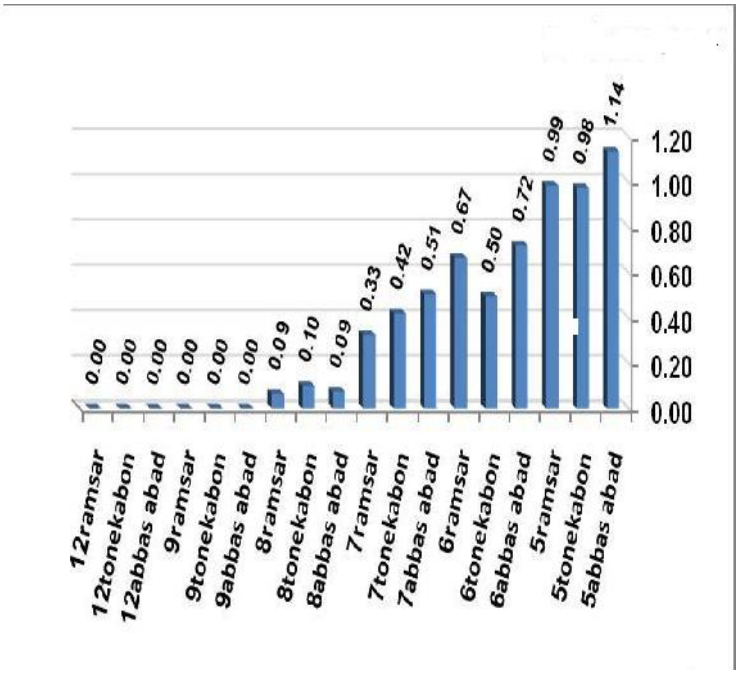

Figure 3- The measured Diazinon amount of rice qualitative cultivars samples at different regions in west of Mazandaran based on the biennial average (mg/kg).

Figure 3, shows the Diazinon poison remaining of rice qualitative cultivars samples at Ramsar, Tonekabon and Abbasabad. The results show that the Diazinon poison remaining of all studied samples in this regions after one month of harvest, were higher than permissible limit. Based on the biennial average of qualitative cultivars samples after two months of harvest, Diazinon poison remaining at Tonekabon was higher permissible limit; at this time the amount of Diazinon poison remaining at Ramsar and Abbasabad were 0/09 ppm, that are lower than permissible limit. As can be seen in figure 3, after three and six months of harvest, there is no trace of Diazinon based on the biennial average.

Discussion

results of this study indicate that in most samples after two months of harvest, Diazinon insecticide has been observed; Due to the permissible limit of this insecticide according to national standards (0/1 ppm), it would be a serious warning to consumers and health of region and country. Unlike previous researches in Iran, Diazinon poison remaining of Tarom cultivars samples in Mazandaran,Province are higher than permissible limit. In addition, the amount of Diazinon remaining has been increased during the previous years; thus farmers yet use from these poisons uncontrolled. Despite the efficiency of new methods such as use of Tricograma bee, Bacillus turgensis bacteria and resistant cultivars to stem borer, this data indicate that there is not special attention to the new methods of pest management. According to the research done, Diazinon poison in samples of Tarom at Amol and Babolcities, was lower than permissible limit (Fallah 2000). Also, another study indicates increase of Diazinon poison remaining (pbb 16/2) on the samples of Tarom at Amolcity (Shokrzadeh, et al 2013). However, in the present study, that has been done at different areas of Mazandaran during two years, Diazinon poison remaining has increased dramatically, so that it maximum value was 1/8 ppm. Indiscriminate use of poison in two three times, before taking rice skin, harvest immediately after spraying, lack of planning and refusal to implement of integrated pest management program, are reasons for increasing amount of remaining poison in rice samples. Cpmparison of this research with studies conducted in 2008 and 2011, indicated that Diazinon poison remaining was higher than permissible limit.

According to manufacturer company recommendation, Diazinon poison will eliminate after three weeks; while in this research, Diazinon insecticide was entranced from samples even up to two months after harvest. This is likely due to the light stability of insecticide in the environment. A study in 2010 on the water used to irrigate the rice field at Amol, shows that phosphorous Diazinon poison sprayed on the rice fields, stays in the samples up to two months after harvest (Gasempour and et al.,2002). The maximum amount of this poison in samples after harvest was 1/4 ppm and the lowest was measured in latest week of the second month. Comparison of this study with previous researches, indicates that amount of the phosphorous Diazinon poison remaining in Tarom sample was higher than permissible limit but the maximum of this poison in present study was much higher from previous studied (Arjmandi and et al.2009).

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Quick Response Code

DOI:10.22192/ijamr.2017.04.06.011

How to cite this article:
Seyed Esmaeil Mahdavian and Mohsen Morovati. (2017). Measure Granulating Diazinon Insecticide Remaining in Qualitative Cultivars Rice Grain in Western Mazandaran of Iran. Int. J. Adv. Multidiscip. Res. 4(6): 94-98.
DOI: http://dx.doi.org/10.22192/ijamr.2017.04.06.011