*IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*
*e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 8, Issue 9 Ver. I (Sep. 2015), PP 28-30*
*www.iosrjournals.org*

# Dissipation of hexaconazole in/on mango

Shailesh Tayade[1], Z. P. Patel[2], A. D. Phapale[3] and Susheel Singh[4]
[1](Ph.D Scholar, Deptt. of Entomology, N.M. College of Agriculture, N.A.U., Navsari-396 450, Gujarat, India)
[2](Principal, College of Agriculture, N.A.U., Waghai- 394 730, Gujarat, India)
[3](Ph.D Scholar, Deptt. of Plant Pathology, N.M. College of Agriculture, N.A.U., Navsari-396 450, Gujarat, India)
[4](Assistant Professor, F.Q.T.L. N.M. College of Agriculture, N.A.U., Navsari-396 450, Gujarat, India)

***Abstract:*** *Experiment was carried out to study the dissipation pattern of hexaconazole in/on mango fruits at Food Quality Testing Laboratory, Navsari Agricultural University, Navsari-396 450. The spray concentration of 0.0025 per cent (recommended) resulted in 1.293 µg $g^{-1}$ of initial deposition which gradually dissipated to 0.800, 0.573, 0.383 and 0.123 µg $g^{-1}$ at 1st, 3rd, 5th, and 7th day of application, respectively. The linear time v/s residue concentration plot showed slow rate of degradation where, regression equation was denoted as y= -0.131x + 2.109 by exhibiting $R^2$ value of 0.942. Moreover, the equation also showed 2.29 and 13.8 days of half life and waiting period, respectively. In case of double to recommended dose (0.005 %) initial deposition of 2.263 µg $g^{-1}$ was registered at zero day after application. The regression equation of hexaconazole was worked out as y= -0.139x + 2.412 ($R^2$ = 0.950) with 2.16 days as half life and 15.19 days of waiting period.*

## I. Introduction

Mango (*Mangifera indica* L.) is appropriately called as "King of fruits" and also considered as "National fruit of India". The mango is a fleshy stone fruit belonging to the genus *Mangifera*, consisting of numerous tropical fruiting trees in the flowering plant family, Anacardiaceae. It is native to south asia, from where it has been distributed worldwide to become one of the most cultivated fruit in the tropics. Its fame is mainly due to its excellent flavor, delicious taste and high nutritive value and became the choicest fruit of sub-continents. Number of varieties of mango having unusual diversity of flavor and taste are under cultivation in India. In many parts of the country mango serves as staple article of food for several months during the year. Out of total world production of mango, India's share is about 65 per cent (Mukharjee *et al*., 2007). Of the 777 lakh MT fruits produced in India, mango occupies second position with an annual turnover of 176.95 lakh MT from an area of 24.81 lakh ha.

In Gujarat, Alphonso, Kesar, Rajapuri, Neelam, Totapuri and Langra are leading varieties of mango which are grown commercially. Among them, Alphonso (*Haphus*) and Kesar are mainly cultivated in south Gujarat region and have good potential for export. The major mango growing districts in Gujarat are Valsad, Navsari, Junagadh, Surat, Amreli, Bhavnagar and Kutch. While, south Gujarat accounts larger area under mango cultivation that is 28000, 22800 and 7900 ha in Valsad, Navsari and Surat districts with an annual turnover of 1,68,000, 2,01,600 and 63,200 MT, respectively (Anonymous, 2012). Introduction of various Agri-Export zones in India has made mango a good source of foreign exchange. Indian producers find it easier to expand sales to the European Union. Europe's acceptance of different varieties is greater, because of a large demand from Indian immigrant groups. Moreover, a lion's share of Indian mango goes to the Gulf countries, efforts are being made to exploit Russian, American and Asian markets. About 13,000 MT of Alphonso and Kesar mangoes are exported to Middle East, UK and Netherlands every year.

So far 67 diseases have been recorded on mango, among them diseases like, anthracnose, *Colletotrichum gloeosporides* Pens. and powdery mildew, *Oidium mangiferae* Berthet are the major considered constraints in south Gujarat region. Alphonso and Kesar varieties of Valsad and Navsari districts are not only being famous in Gujarat and India but also they are gaining more importance in western countries in view of export potential. Mango growers are therefore more worried about the damage inflicted by diseases. To minimize the economic losses caused by these diseases, various pesticides are being used over this crop on massive scale at flowering and fruit development stage. Due to lack of awareness, the farmers of our country do not follow the prescribed dosage and use pesticides at any stage of the crop. The injudicious and indiscriminate use of pesticides over crop results in accumulation of residues in food and food commodities with consequential hazards. Therefore, it was felt necessary to carry out detail study of hexaconazole residues in/on mango.

## II. Materials And Methods

A field experiment was carried out at farmer's orchard at village Kesali, Tal- Gandevi, Dist- Navsari. The fungicide treatment was fixed on the basis of the findings of monitoring study of the present investigations. For the sake of dissipation study, the hexaconazole (Trigger® 5 EC) was imposed at their recommended

(0.0025%) and double to recommended doses (0.005%) to study its dissipation in agro climatic zone of south Gujarat. The treatment was imposed three times, the first spray of treatments to mango trees was taken at pea nut (grain formation) stage (08/02/2012) thereafter; second (24/02/2012) and third spray (08/03/2012) was taken by keeping an interval of fifteen days. In order to study the dissipation pattern of hexaconazole, the marble sized mango fruits (1 kg) were collected immediately at 0 day (2hrs), thereafter further samples drawn subsequently at $1^{st}$ , $3^{rd}$ , $5^{th}$ , $7^{th}$ , $10^{th}$ and $15^{th}$ day after last spray application (Third spray). Thus, the collected samples at each sampling day were sealed in polythene bag (sampling bag) and brought to Food Quality Testing Laboratory, Navsari Agricultural University, Navsari for pesticide residue analysis. Moreover, the samples were also collected at the time of harvest when the fruits were become marketable.

**Extraction and clean-up**

A representative sample of mango fruits was cut into small pieces, homogenized and 15 g sub sample was drawn in 50 ml polyphenol tube with three replicates. The samples were extracted with 15 ml of 1% acetic acid in acetonitrile. Then, reagents like anhydrous magnesium sulphate ($MgSO_4$) and 1.5 g anhydrous sodium acetate were added in each sample and shake by hand for 1.0 minute. The samples were mixed in vertex mixture for 1.0 minute and centrifuged for 1.0 minute at 3500 rpm. Thus, from obtained supernatant extract, 6 ml aliquot was drawn with the help of pipette in to 10 ml polyphenol tube and subjected to clean up with 300 mg PSA (Primary Secondary Amines) and 900 mg anhydrous $MgSO_4$. Mixed in vertex mixture for 1.0 minute and centrifuged for 1.0 minute at 3500 rpm. The layer was allowed to separate and took 2 ml aliquot in to graduated test tube and evaporate to near dryness under the gentle stream of nitrogen. During the evaporation of aliquot, parameters of Turbovap were $25^0$C temperature and gentle flow of nitrogen at 25 psi for 30 minute. After dryness, the residues were reconstituting in toluene up to 2.0 ml or marked earlier. Among the 2.0 ml aliquot as final volume, 1.0 ml was pipette out and filled in GC vial for estimation of above mentioned analytes (Synthetic pyrethroids, Triazole and Organophosphate). Thus, the samples prepared by this method (QuEChERS) were run on Gas Chromatography equipped with ECD.

## III. Results And Discussion

During the present study, three sprays of hexaconazole at 0.0025 per cent (recommended dose) were taken over mango trees. This spray concentration resulted in 1.293 µg $g^{-1}$ of initial deposition which gradually dissipated to 0.800, 0.573, 0.383 and 0.123 µg $g^{-1}$ at $1^{st}$, $3^{rd}$, $5^{th}$, and $7^{th}$ day of application, respectively. When studied per cent dissipation, it was observed that within $1^{st}$ day after spray 38.14 per cent of initial deposition was dissipated followed by 55.67, 70.36, and 90.46 per cent within $3^{rd}$, $5^{th}$ and $7^{th}$ days, respectively. The residues of hexaconazole were reached to BDL at $10^{th}$ days of its application. The linear time v/s residue concentration plot showed slow rate of degradation where, regression equation was denoted as y= -0.131x + 2.109 by exhibiting $R^2$ value of 0.942. Moreover, the equation also showed 2.29 and 13.8 days of half life and waiting period, respectively (Table-1).

In case of double to recommended dose (0.005 %) initial deposition of 2.263 µg $g^{-1}$ was registered at zero days after application which declined to 0.071µg $g^{-1}$ at $10^{th}$ day of its application by imparting 96.86 per cent degradation. The persistence of this dose (0.005 %) was found to be prolonged by one sampling interval as compared to recommended dose (0.005 %). Moreover, at 15 days of sampling, residues in/on mango fruits were found below detectable level of 0.06 µg $g^{-1}$. The regression equation of hexaconazole was worked out as y= -0.139x + 2.412 ($R^2$ = 0.950) with 2.16 days as half life and 15.19 days of waiting period.

In the similar fashion, Reddy *et al*. (2013) reported 1.82 and 2.16 µg $g^{-1}$ as initial deposition originated from spraying of hexaconazole at 100 and 200 ml $ha^{-1}$, respectively. Both the doses required 10 and 15 days to reach below detectable level of 0.01 mg $g^{-1}$ by showing waiting period of 7.62 and 10 days for safe harvest of mango. The present findings are more or less in conformity on build up and decline of residues of hexaconazole in mango.

## References

[1]. Mukherjee, I., Singh, S., Sharma, P.K., Jaya, M. and Kulshrestaha, G. (2007). Extraction of multi-class pesticide residues in mango fruits: application of pesticides residues in monitoring of mangoes. Bulletin of Environmental Contamination and Toxicology, **78**: 380-383.

[2]. Anonymous (2012). Area and production of Hort crops, Director of Horticulture Gujarat state, Krishi Bhavan, Gandhinagar. Fide: http://agri.gujarat.gov.in.

[3]. Reddy, Narendra C., Anitha, Kumari D., Lakshami, B. K. M. and Reddy, Jagdishwar (2013). Residue dynamics of imidacloprid and hexaconazole on mango. International Journal of Bio-resources and Stress Management, **4** (2):263-265.

**Table 15: Dissipation of hexaconazole in/on mango fruits**

| Days After Application | Rate of Application | Residues (µg/g) | | | Mean | SD | % dissipation | LOD (µg/g) | LOQ (µg/g) |
|---|---|---|---|---|---|---|---|---|---|
| | | R-I | R-II | R-III | | | | | |
| 0 (2 hrs after application) | Control | - | - | - | - | - | | 0.0213 | 0.0638 |
| | LD | 1.35 | 1.26 | 1.27 | **1.293** | 0.05 | - | | |
| | HD | 2.25 | 2.19 | 2.35 | **2.263** | 0.08 | - | | |
| 1 | Control | - | - | - | - | - | - | | |
| | LD | 0.90 | 0.80 | 0.70 | **0.800** | 0.10 | 38.14 | | |
| | HD | 1.52 | 1.65 | 1.52 | **1.563** | 0.08 | 30.93 | | |
| 3 | Control | - | - | - | - | - | - | | |
| | LD | 0.51 | 0.56 | 0.65 | **0.573** | 0.07 | 55.67 | | |
| | HD | 0.99 | 1.20 | 0.98 | **1.057** | 0.12 | 53.31 | | |
| 5 | Control | - | - | - | - | - | - | | |
| | LD | 0.35 | 0.42 | 0.38 | **0.383** | 0.04 | 70.36 | | |
| | HD | 0.71 | 0.65 | 0.75 | **0.703** | 0.05 | 68.92 | | |
| 7 | Control | - | - | - | - | - | - | | |
| | LD | 0.15 | 0.13 | 0.09 | **0.123** | 0.03 | 90.46 | | |
| | HD | 0.45 | 0.35 | 0.31 | **0.370** | 0.07 | 83.65 | | |
| 10 | Control | - | - | - | - | - | - | | |
| | LD | BDL | BDL | BDL | **BDL** | - | - | | |
| | HD | 0.06 | 0.09 | 0.07 | **0.071** | 0.02 | 96.86 | | |
| 15 | Control | - | - | - | - | - | - | | |
| | LD | BDL | BDL | BDL | **BDL** | - | - | | |
| | HD | BDL | BDL | BDL | **BDL** | - | - | | |
| At Harvest | Control | - | - | - | - | - | - | | |
| | LD | BDL | BDL | BDL | **BDL** | - | - | | |
| | HD | BDL | BDL | BDL | **BDL** | - | - | | |
| **Dissipation Study** | LD | | | HD | | | | | |
| **Regression equation** | y = -0.131x+2.109 | | | y = -0.139x+2.412 | | | | | |
| **$R^2$** | 0.942 | | | 0.95 | | | | | |
| **DT50 (days)** | 2.29 | | | 2.16 | | | | | |
| **Waiting period (days)** | 13.8 | | | 15.19 | | | | | |
| **MRL mg $kg^{-1}$** | 0.02 | | | | | | | | |

LD= Lower dose (0.0025 %) Recommended
HD= Higher dose (0.005 %) Double to recommended
ND= Not detected
BDL= Below detectable limit