Imposing Maximum Residue Limit on Spices : A Key to Smoothen Export

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Introduction

Growing food demands has compelled farmers to compromise with the quality of crop. To ensure maximum crop production and storage life,farmers and traders use pesticides which potentially expose the consumers to toxic residual effects of the chemicals. The limit values of these residues are set to verify that the food is safe to consume.The Maximum Residue Limits (MRL) can be expressed as the concentration of pesticide residue predicted to occur in or on food as a result of pesticide application according to Good Agricultural Practise (GAP) and product label specifications.The MRL is not a toxicological parameter rather a trading standard established by national and international bodies (e.g., Codex Alimentarius) to ensure that residues are monitored in international food trade.

Spices are low volume high value crops which are most demanded and expensive products in the Indian market. Spices are primarily used for adding aroma and flavour into the food product as well as for medicinal purpose. India is one of the leading countries for production, consumption and exportation of spices worldwide that is why India is known as the land of Spices. Major Spices includes Black Pepper, Cardamom, Ginger, Turmeric and Chilli and minors are Cumin, Coriander, Celery, Fennel, Fenugreek, Ajwain, Dill seed, Garlic, Tamarind, Clove and Nutmeg. India exports tonnes of spices annually, which play a significant role in India's GDP. Cumin (*Cuminum cyminum L.*), often known as jeera, is a seed spice crop with high export potential among the spices crop.It is widely used in food cuisines and savouries as an organoleptic nutritious element, as well as having therapeutic properties. It is a high-value seed crop among spices that is grown extensively in Rajasthan and Gujarat's arid and semi-arid regions. As evident Cumin is more prone to insect pests and diseases an array of fungicides and insecticides are used to control these diseases which leads in the accumulation of residue in the cumin seeds. Crossing the MRL value in spices at international level is the most important reason for the cancelation of Indian export consignments which ultimately increases the risk of national and international trade.

Food safety in India is based on the Codex Alimentarius Commission's guideline of risk assessment (CAC). It is important to study the facts concerning pesticide action and persistence/dissipation under tropical Indian circumstances in order to accurately use the potential of pesticides in agriculture and health programs without harming the environment. It is also necessary to determine the status of pesticide residues in order to assure consumer safety and to overcome trade barriers on an international level. As a result, pesticides and their residues are frequently encountered, posing a serious health risk which is a matter of great concern. Many times, Internationally,

Joint Food and Agriculture Organization (FAO), World Health Organization (WHO), Codex Alimentarius Commission (CAC) member countries establish science-based food standards to ensure food safety, quality and fairness of international trade. India is a signatory to the CAC, and the National Codex Contact Point (NCCP), CAC's operations are administered by the Food Safety and Standards Authority of India (FSSAI). Since 2012, the ICAR-All India Network Project on Pesticide Residues (AINP-PR) has forged a partnership with the FAO, WHO, Joint Meetings on Pesticide Residues (JMPR) and Codex Committee on Pesticide Residues (CCPR) for the fixation of Codex MRLs in Spices, taking into consideration the challenges regarding consumer safety and export of spices from India. All India Network Project on Pesticide Residues (AINP-PR) establishes well protected system as a key success factor for the spices crops export worldwide.

Systematic Representation of Fixation of Codex MRL on Spices crops by India

ICAR-AINP on Pesticides

Residues Data Generation

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Submission of data to FAO/WHO/JMPR through FSSAI-NCCP

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FAO/WHO/JMPR Data Evaluation, Risk Assessment & Proposal of MRL

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Codex Committee on Pesticide Residues Adoption of Proposed MRL

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Codex Alimentarius Commission Approval of Adopted MRL and Notification by CCPR

Monitoring of pesticide residue at national level (MPRNL)

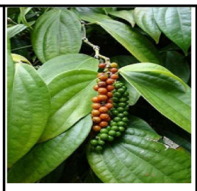
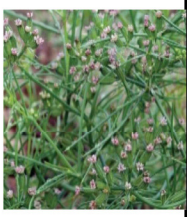
Since 2008, pesticide residue monitoring data has been compiled on various spices via central sector scheme on "Monitoring of Pesticide Residue at National Level (MPRNL)" under the ICAR-sponsored All India Network Project on Pesticide Residues (AINP-PR) and the Department of Agricultural Cooperation governed by Ministry of Agriculture and Farmers Welfare.

Significance of MPRNL

- In order to bring limelight to extension efforts for Integrated Pest Management, identify crops and locations with a rising percentage of pesticide residues (IPM).
- To promote infrastructure at quarantine stations for check the entry of items which having pesticide residues exceed the MRL.
- Pesticide residue testing and certification in export and import consignments.

In 2014-15, India submitted pesticide residue data collected on spice crops by the AINP-PR to the FAO/WHO JMPR for risk analysis and evaluation of suggested MRLs, which were addressed at the CCPR meetings. During the 49th session of the CCPR which were scheduled in 2017, the CCPR formed and approved Codex MRLs (CXLs) for 19 combinations of pesticide-spice for five different spices (cardamom, coriander, fennel, cumin, and pepper (Table 1). CCPR then made the MRLs available for international use. It also has been proved as a great achievement by India.

Table 1. Codex MRLs on different spices based on pesticide residue monitoring data generated by ICAR-AINP on Pesticide Residues (2012-17)

Commodity			Pesticide	Codex MRL (mg/kg)
Black Pepper			a. Dithiocarbamates b. Acetamiprid	0.1 0.1
Cardamom			c. Ethion d. Chlorpyrifos e. Bifenthrin f. Dithiocarbamates g. Cypermethrin h. Triazophos i. Cyhalothrin-L j. Profenophos	5 1 0.003 0.1 3 4 3 2
Coriander seed			k. Phorate l. Triazophos m. Profenophos	0.1 0.1 0.1
Cumin			n. Dithiocarbamates o. Profenophos	10 5
Fennel			p. Dithiocarbamates q. Phorate r. Triazophos s. Profenophos	0.1 0.1 0.1 0.1 0.1

Pesticides residue mitigating factor

Pre-Harvest interval

The concept of a Pre-Harvest Interval (PHI) is significant in driving healthy farming practises, healthy edible produce, residue-free goods, and improved export without pesticide residues as well as consignment rejection. Based on the dissipation rate of the sprayed pesticide molecules, a PHI of 25-38 days is often effective in resolving pesticide residues in harvested produce. Pesticides used in seed spices and their dissipation rates should be thoroughly assessed, with preference was given to those with shorter durations. Sustaining clean curing and storage facilities is also crucial in order to protect the product from extraneous pollutants that may be introduced owing to unsanitary conditions, resulting in contaminated commodities. Produce that has been graded before being sold in the market will almost surely fetch a higher price.

Good Agricultural Practices (GAP)

Another emerging concept is in the Good Agricultural Practices (GAP) field is of seed spices crops that may lead to reduction of excessive application of pesticides during crop growth.

Demonstrations Programme

Farmers usually used pesticides and chemical fertilizers to improve the performance of their crop which ultimately affect the export/ import consignments of spices crop. One of the biggest reasons is ignorance of farmers and lack of knowledge about MRL and GAP that is why there is a huge need of creating awareness among farmers and growers about these programmes through trainings and workshops.

Conclusion

Although the Codex MRL (at the global arena) for Spices has been fixed as a result of progress under the ICAR-All India Network Project on Pesticide Residues, for ensuring smooth export of spices and enhancing farmer's income.

Along with pre-harvest interval, GAP, IPM and regular training and workshop lead for the well establish system of mitigating pesticides residue from spices crops. Moreover, innovation of new and safer compounds with low residual toxicity potentially paves the path towards consumer preferences and health awareness.

References

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https://aicrp.icar.gov.in/pesticide/success-stories-2/

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