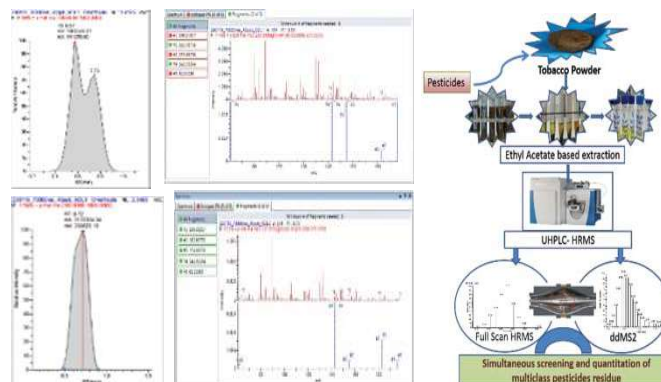


Name of the technology : **A novel method for simultaneous screening and quantitative estimation of multiple pesticide residues**

Year (s) of development : 2018-2023

Technology details

A rapid and sensitive method for multi-pesticide residue determination using LC high resolution MS/MS (ORBITRAP) technique in combination with triple quadrupole mass spectrometry (MS/MS) in tobacco matrix was developed to comply with the reducing trend in Guidance Residue Level (GRLs) in tobacco. The developed method is fast, selective, and sensitive (LOQs <40 ng/g) for large-scale multiresidue analysis of pesticides in tobacco matrix. The performance of the method was evaluated on ORBITRAP-LC-MS/MS against traditional LC-MS/MS. As a unique and single unified approach of sample preparation was analysed simultaneously using gas chromatography tandem mass spectrometry (GC-MS/MS) and LC-MS/MS. Method performance for 69 GC and 238 LC amenable pesticides are complied with SANTE/11813/2017 guidelines, with significant savings in time and cost. Furthermore, the vDIA-based non-target approach established the strength of retrospective data mining for identification of any suspected analytes. It is ideal for regulatory analysis of analytes ranging from non-polar organochlorine pesticides to polar pesticides.



As tobacco is an exportable commodity, in compliances of the trade barriers, the chlorantraniliprole 18.5 SC pesticide residue estimation was developed by GC-MS/SIM analytical method and based on this novel technology, Pre Harvest Interval (PHI) was established in connection to produces pesticide residue below GRL in tobacco leaf

Impact of the technology

The SDLs of the method ensured screening of different types of tobacco matrices for a wide range of pesticides at concentrations lower than the GRL of the pesticides. In compliance with the trade barrier, multiple pesticide residue level below GRL, can increase the exports of Indian tobacco. The detection technology will provide precise estimation of various pesticide viz., chlorantraniliprole, organochlorine, pendimethalin etc. residues which will guide farmer to employ timely application with proper dosage. The PHI based technology can be recommended to tobacco growers of particular location to envisage safe use of chlorantraniliprole in insect pest management.

Publications/commercialization

- Paul A, Khan Z, Bhattacharyya A, Majumder S and Banerjee K. 2021. Multiclass pesticide residue analysis in tobacco (*Nicotiana tabacum*) using high performance liquid chromatography-high resolution (Orbitrap) mass spectrometry: A simultaneous screening and quantitative method. *Journal of Chromatography A*, 1648: 462208.

Investigators/Developers

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