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Development and validation of chromatographic techniques for detection of thiamethoxam and imidacloprid pesticides in stingless bee

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Abstract

This study describes the refined analytical method for extraction and determination of thiamethoxam and imidacloprid pesticide residues in stingless bee (Meliponascutellaris). QuEChERS approach was used to develop a method for extraction, samples were extracted with acetonitrile (ACN), followed by salting out, solid phase extraction (SPE), cleanup with mixture of PSA and C18 sorbents while detection was performed by using high performance liquid chromatography coupled with diode-array detector (HPLC-DAD) and LC-MS/MS. The techniques were proven satisfactory by exhibited the linear chromatographic response ranges from 0.1 to 1µg mL-1 for the tested pesticides, with correlation coefficients above 0.998. The Limit of detection (LOD) and Limit of Quantification (LOQ) for thiamethoxam were 1.01 and 3.06 µg mL-1 by HPLCDAD while 0.1 and 0.3 µg mL-1 by LC-MS/MS and for imidacloprid were 1.04 and 3.15 g mL-1 by HPLC-DAD while 0.04 and 0.1 µg mL-1 by LC-MS/MS respectively. The proposed methods did not require more than 10 minutes for analysis; both the pesticides thiamethoxam and imidacloprid were observed in a very short retention time of 3.1 and 4.2 minutes. Good recoveries were observed for analytes, ranged between 70% and 120% with relative standard deviations between replicates of <10%. This method provides lower detection limits and improved recovery of thiamethoxam and imidacloprid, which will help researchers to evaluate their potential negative impact on environment and ecology.

Biography:

Asma Rahman has completed his Master in Chemistry in 2011 from University of Science and Technology Bannu, KP, Pakistan. She worked as lecturer of Chemistry in Chanab group of Colleges, Islamabad, Pakistan (from 2011 upto 2014). She got TWAS-CNPq fellowship in 2016 for PhD studies in Brazil. Now she is in the Final year of her PhD. During her Ph.D. she is involved in three scientific projects. The first one is the chromatographic determination and extraction of neonicotinoid pesticides (Thiamethoxam and Imidacloprid). The second part involves acute, oral and topical toxicity analysis of neonicotinoid pesticides in stingless bee. While the third and final part of my Ph.D. project involves biochemical and biomarkers study of the given pesticides. And thus she assure her great role in any scientific project related to Analytical/Inorganic, environmental, and green chemistry.

Speaker Publications:

1 "Proficiency test exercise on the determination of natural levels of radionuclides in mushroom reference material", ccreditation and Quality Assurance /Vol 12 Issue 6:311-316

2"Mohammad Shah Amran, Mohammad Zakir Sultan, Asma Rahman, Mohammad A. Rashid, Study of the antidiabetic effect in alloxan induced diabetic rats of the isolated compounds from the kernel of Mangifera indica, Dhaka" Univ, J. Pharm Sci/ Vol 12 issue 1:77-81, 2013.

3."Interaction of Duloxetine Hydrochloride with Deoxyribonucleic Acid Measured by Fluorescence Spectroscopy", Dhaka University Journal of Pharmaceutical Sciences/ Vol 14 Issue 2:199-206

4"Antidiabetic Activity of Compounds Isolated from the Kernel of Mangifera indica in Alloxan Induced Diabetic Rats", Dhaka University Journal of Pharmaceutical Sciences/ Vol 12 issue 1

5"European Heart Journal "- Cardiovascular Imaging, Volume 15, Issue suppl 2, Pp. ii168 - ii195

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