

Analytical method development and validation of dimethoate pesticide using HPLC method

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Dimethoate is a widely used organophosphate insecticide used to kill insects on contact. Dimethoate acts by interfering with the activities of cholinesterase (anticholinesterase), an enzyme essential for the proper functioning of the central nervous system of insects and humans. It is suspected as human teratogen & carcinogen by USFDA. It is moderately toxic by ingestion, inhalation and dermal absorption. Where humans prolonged exposed to dimethoate may result coughing, chest discomfort, impaired memory and concentration, disorientation, severe depressions.

The reversed-phase high-performance liquid chromatographic (RP-HPLC) method has been developed to quantify dimethoate in raw material and in insecticide containing dimethoate using C-18 analytical reverse-phase column. Mobile phase consisted of Acetonitrile-water (60:40 v/v), pumped at a flow rate of 1.0 ml/min at ambient temperature and the retention time was about 4.76 min with symmetrical peaks. dimethoate was detected by ultraviolet absorbance at 205 nm with no interference of commonly used excipients. The method was linear over the concentration range 5-25 mcg/ml ($R^2 = 0.9981$). The results obtained showed a good agreement with the declared contents in case of pesticides. The proposed method is rapid, accurate, economical and selective and it may be used for the quantitative analysis of dimethoate. This optimized and validated chromatographic method can be used in future routine determinations of pesticides in environmental waters and vegetables.

Biography

C. Pavan Kumar, student of M.Pharm Pharmaceutical Analysis, JSS College of Pharmacy, Mysore. He completed distance course from WIPO Academy-Geneva regarding "Intellectual Property Rights", and participated in various National & International seminars. His current area of research is on method development on pesticide samples.

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Validated spectrophotometric determination of para-phenylenediamine in hair dyes

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p-Phenylenediamine (p-PD) is a monocyclic arylamine compound; its chemical formula is $C_6H_8N_2$ and its molecular weight is 108.15 g/mol. Since hair dyes are available freely in the market and as they are believed to be effective, without side effects they are consumed regularly. Short-term exposure to high levels of PPD (acute effects) may cause severe dermatitis, eye irritation and tearing, asthma, gastritis, renal failure, vertigo, tremors, convulsions, and coma in humans. Eczematous contact dermatitis may result from long-term exposure (chronic effect) in humans.

A simple, sensitive, rapid, robust and reproducible method for the determination of para phenylene diamine was developed using UV-Spectrophotometer. The analysis was performed using alkaline solution of Folin's reagent and Ninhydrin reagent in acetone with UV detector at 453nm and 431nm respectively. The proposed method using Folin's reagent showed linearity in the concentration range from 0.2 – 12mcg/mL and ninhydrine reagent showed linearity in the range of 0.2-0.8mcg/mL. The method was validated with respect to system suitability, linearity, precision, limit of detection (LOD), limit of quantification (LOQ), accuracy (recovery), ruggedness, and robustness. The developed method can be used for routine analysis of p-phenylene diamine in hair dyes. The methods were validated in accordance with the current ICH guidelines. The precision results, expressed by intra-day and inter-day relative standard deviation values, are satisfactory ($RSD < 2.00\%$).

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