

5th International Conference and Exhibition on Analytical & Bioanalytical Techniques

August 18-20, 2014 DoubleTree by Hilton Beijing, China

Development of bioanalytical methods for environmental monitoring of toxic chemicals

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The talk is on biotechnological approaches for the development of low cost field kits for detection, separation, identification and quantification of toxic chemicals. Toxic chemicals can be detected, identified and quantified by various chemical and instrumental methods, but monitoring from the environment is cumbersome, time consuming and costly. Alternatively enzymatic methods could be used in the field for monitoring of these toxic chemicals because of their exceptional performance capabilities, which include high specificity and sensitivity, rapid response, low cost and user-friendly operation. The analysis can be done in the field in an hour time. The operation cost and time is relatively less as compared with the other instrumental methods. The principle of operation also is so simple that parascientific personnel can also operate. The main principle involved in this method is the biochemical reaction between the toxic chemicals and its inhibition caused on the specific enzyme. The methodology involved was selection, extraction and standardization of enzyme activity from different sources and their inhibitory studies in the presence of different toxic chemicals for detection, identification and quantification. Paper and thin layer chromatographic methods, using enzymes and chromogenic reagents were standardized for detection and separation of various toxic chemicals. Tablet method was developed for quantification of various toxic chemicals using the same principle. Standard graphs were prepared for quantification. Based on these methods, field kits were developed for detection, separation, identification and quantification of various toxic chemicals. These developed biotechnological methods were successfully used for monitoring of toxic chemicals.

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