CONTRIBUTION OF THE THESIS

This is the first reported study on the:

- ELISA methods for Organochlorine pesticides based on egg yolk antibodies.
- Formation of non-covalent imprinted polymers for Organochlorine pesticides.
- Computational studies of Molecular Imprinting process.

The other highlights of the thesis are:

- Colorimetric ELISAs were developed for OCPs with the detection limits up to ng levels.
  The IC$_{50}$ values obtained were 10 ppb for DDT and endosulfan. Chemiluminescence ELISA for DDT was performed and offered a IC$_{50}$ value of 0.2 ppb.
- The ELISA method was compared with the GC and HPLC methods and found to be comparable to GC and better than HPLC in terms of sensitivity.
- Molecular Imprinted polymers were synthesized for OCPs using different polymerization techniques. A good imprint (imprinting factor) was obtained for heptachlor bulk polymers prepared in combination with MAA as functional monomer.
- Sol-gel imprinting was successfully performed using ethylene bisphenol as template analogue for DDT.
- The process of molecular imprinting and the interactions responsible were understood using computational methods with density functional theory.
- The studies depicted the importance of electrostatic interactions in molecular imprinting for poorly functionalized molecules as OCPs.
- The MIPs formed were employed as clean up sieves (MISPE) for extracting the pesticides from soil and milk samples. Recoveries up to 80% were obtained for MISPE.
✓ The polymers were also used for formatting the ELISA. Detection limits up to $\mu g \, g^{-1}$ level were obtained.

✓ The immunoassays based on MIPs can be adapted as high throughput method for screening large numbers of environmental samples.