Detection of 4-methyl-*N*-nitrosopiperazine in antitubercular drugs using MIP based sensor

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N-nitrosoamines are broad class of compounds, mostly classified as carcinogens, that have been identified as impurities of food, medicines and water. Contamination of numerous drugs with nitrosamines results from manufacturing processes or long-term storage of finished drug products [1]. This poses a serious threat to the population. Nitrosamine impurities in drugs are strictly controlled and their level should not exceed the acceptable intake limit (AI) set by the relevant authorities. For the routine determination of nitrosamines, separation techniques with mass spectrometry detection: GC-MS and LC-MS are used, ensuring low detection limits (LOD). Nitrosamines are volatile, polar and highly water-soluble compounds, and their isolation and determination is a challenge.To determine the level of 4-methyl-N-nitrosopiperazine (MNP) in antitubercular drug rifampicin, we have developed an MIP based sensor film which allows us to detect MNP in rifampicin at sub ppt concentration, even with the presence of other active pharmaceutical ingredients. This is crucial, since rifampicine in drug products is often used in combination with isoniazide, pyrazinamide and ethambutol for complex therapy. Polytiophene-based MIP films were deposited on Pt and Au electrodes by potentiodynamic electropolymerisation. MIP contained monomers modified with thymine moiety for selective binding of target molecules. In our analytical assay we have used differential pulse voltammetry to determine NMP in presence of redox probe.

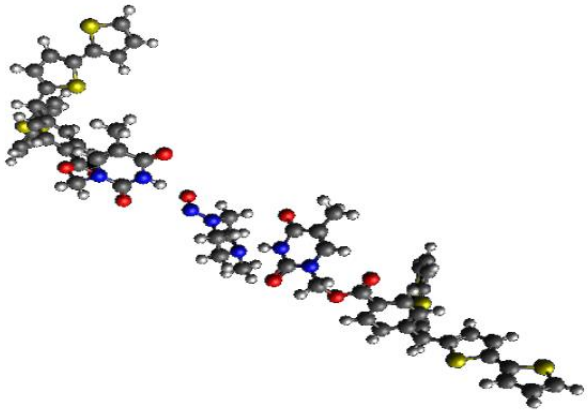

Figure 1. A complex between 4-methyl-N-nitrosopiperazine and two functional monomeres.

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References

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