NEW NANOPHOTONIC DETECTION METHOD BENZO[*a*]PYRENE

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Benzo[a]pyrene (BaP) is the representative of polycyclic aromatic hydrocarbons (PAHs) family, the substance of the first hazard class. The problem of food safety in the world community became relevant. Especially important are issues of detection, detention and further standardization of permissible levels of carcinogenic substances in food and environmental water. Of particular interest are such known carcinogen compounds as PAHs containing a system of condensed nuclei.

In present work for the development of a novel nanophotonic assay method as a PAH representative benzo[a]pyrene (3,4-benzpyrene) was choose.

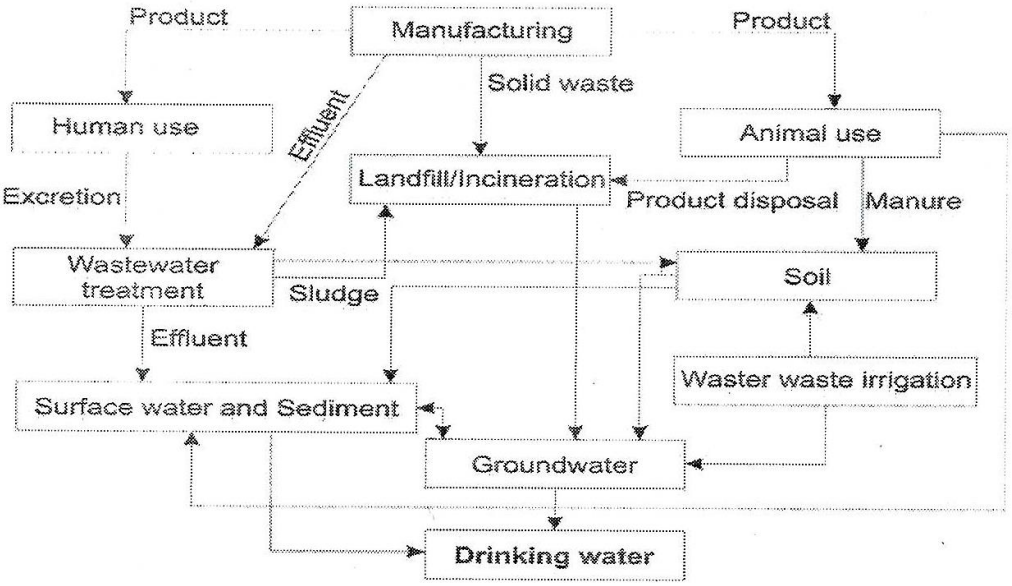
BaP is slightly soluble in water and is poorly volatile. Humans may be exposed to BaP in food, tobacco and other plant smoke by motor engines waste products, and some occupational environments, and through contacts with BaP containing products such as coal tar, coal tar-based shampoo, asphalt and creosote-treated wood. Besides, some concentration of BaP is present in drinking water. The maximum/median intake level for the BaP in μg/day per person is 0,36/0,05. Penetration pathways of BaP in drinking water are shown in Figure 1.

There are many methods for detection BaP such as chromatography, immunochemical, chemical and biological one. But these methods have a lot of shortcomings, among which are complex and expensive equipment, big assay duration etc.

We proposed a new nanophotonic electrochemiluminescent sensor based on quantum-dimension as detectors structures for BaP detection. The reaction of quantum dots with the analyte – benzo[a]pyrene, during electrolysis bring to detector's elements excitation of ECL analytical signal. It gives information about analyte content.

The advantages of this sensor are simple and miniature construction, quick and cheap assay procedure, selectivity, high sensitivity and selectivity. Formed in this way the sensor can be arbitrary, including sizes.

Figure 1: Penetration pathways of BaP in drinking water.



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