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New solid phase reagents for selective concentration of polynitrophenols

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Chlorine–substituted phenols are initianal substances which produce dioxins, nitro - substituted phenols are used as pesticide components. Photometric method doesn't permit to detect them at the detection limit. Therefore, the development of selective and express concentration method for the following determination is of great necessity. Deferent creations of properties of phenolic compounds were used for selective sorption method.

The aim of our research is to obtain new solid phase reagents for selective preconcentration of polynitrophenols and phenol. We used new solid phase extraction method for the determination of phenolic-type compound in the nature and waster waters. Our technique of preconcentration was estimated for the following substances: phenol, 2,4-dinitrophenol and 2,4,6-trinitrophenol. Two types of sorbent as matrix were used for concentrating of phenols: silica and silohrom. Silohrom was modified by 1-aminoanthraquinone, n-aminoacetophenon, silica – 2, 3, 5-triphenyltetrazole chloride. Surface attached molecules selectively react with phenolic compound presented above. Formation of azocompound between phenol and immobilized reagent is the basis of selective concentration of pollutant. Residual concentration of phenol was determined using the 4-aminoanipyrine colorimetric procedure. The principle separation of polynitrophenols is based on the molecular complex formation between polynitrophenols (those which are mentioned above) and surface attached molecule. The interaction between intense acceptor (nitrophenols) and intense donor (2, 3, 5-triphenyltetrazole chloride), on the one hand, and electrostatic attraction on the other hand are the bottom of this process. The nitrophenols react with immobilization molecular and form colored products. This fact may be applied for the test-detection of nitrophenols. It should be also stated that other phenolic-type compounds don't form such colored products. This aspect provides the selectivity of the detection. The sorbent samples were then analyzed using FT-IR for the detection of the attached groups. Methods of diffuse reflection spectroscopy and spectrophotometry were also used. The sorption of different nitrophenol structures and phenol on the modified sorbent was also studied. The optimal conditions of phenols preconcentration (optimal pH, time of the interface, sorption isotherm) were found.

The use of these new procedures for analyses significantly improves the accuracy of the determination of phenols.