**A new approach to the determination of oil hydrocarbons on soil**

Andrey V. Soin1, Elena Yu. Savonina2, Tatiana A. Maryutina2

1Department of Natural Resources and Environmental Protection of Moscow, 11 Novy Arbat street, building 1, 119019 Moscow, Russia, e-mail: soinandrey@yandex.ru

2 Vernadsky Institute of Geochemistry and Analytical Chemistry, Russian Academy of Sciences, 19 Kosygin street, 119991 Moscow, Russia; e-mail: savoninae@mail.ru

Existing methods used for the determination of oil hydrocarbons in soils are time-consuming due to the necessity of laborious sample pretreatment prior to instrumentation analysis. Fast and accurate determination of oil hydrocarbons in soils is a very important problem for analytical chemistry and environmental management.

A new approach to the pretreatment of polluted soil samples is proposed. The technique is based on continuous-flow (dynamic) extraction of pollutants from soils using a microcolumn packed with a particulate sample. The microcolumn is a hollow cylindrical container with two screwed caps with orifices for the pumping of an extraction reagent. Cellulose acetate filters at the column inlet and outlet prevent the washout of the sample from the container. The separation procedure is not as laborious as traditional techniques, complete automation being possible. No additional clean-up step is needed before the subsequent analysis of extracts.

The analysis of samples contaminated with oil hydrocarbons was based on a certified standard procedure used in environmental monitoring for IR-spectrometric determination of oil products in soils. Sample preparation was carried out in accordance with the standard procedure as well as in a microcolumn. Elution curves show that 60 mL of the eluent are sufficient for the extraction in MC. The dependence of extraction efficiency of oil hydrocarbons on soil type, sample weight, eluent volume, and extraction time was systematically studied. Results on oil hydrocarbons content obtained using extraction in microcolumn, Soxhlet extraction and batch extraction were compared. It has been shown that the recovery of oil hydrocarbons after extraction using microcolumn is 70-94%. No filtration step is required before the determination of oil hydrocarbons in the microcolumn effluent. The technique enables the extraction to be performed within 60 minutes.

The proposed approach to the sample pretreatment in soil analysis opens a new door into the development of new analytical methods for the control of oil and oil products contents in contaminated soils.