



**“Gheorghe Asachi” Technical University of Iasi, Romania**



---

## **POLYCYCLIC AROMATIC HYDROCARBONS IN VEGETABLES GROWN IN URBAN AND RURAL AREAS**

**Alina Soceanu, Simona Dobrinas\*, Gabriela Stanciu, Viorica Popescu**

*University Ovidius of Constanta, Department of Chemistry and Chemical Engineering, 124, Mamaia Blvd.,  
900527, Constanta, Romania*

---

### **Abstract**

Vegetables are an important part of a healthy diet because of their nutritional value. Contamination in vegetable may prove hazardous for population. Polycyclic aromatic hydrocarbons (PAHs) are compounds widespread in the environment, many of them showing carcinogenic effects. These compounds can reach the food chain by different ways and, therefore, the analysis of PAHs in food is a matter of concern.

The present work provides data regarding levels of PAHs: acenaphthene (Ace), acenaphthylene (Acy), fluorene (F), naphthalene (Np), anthracene (An), fluoranthene (Fl), phenanthrene (Ph), benzo[ $\alpha$ ]anthracene (B[ $\alpha$ ]An), benzo[k]fluoranthene (B[k]Fl), chrysene (Chry), pyrene (Py), benzo[ghi]perylene (B[ghi]Pe), benzo[ $\alpha$ ]pyrene (B[ $\alpha$ ]Py), dibenzo[ $\alpha$ ,h]anthracene dB[ $\alpha$ ,h]An, indeno[1,2,3-cd]pyrene (I[1,2,3-cd]Py) in different vegetables (potato, celery, dill, parsley, carrot, cucumber, onion, garlic, cabbage, spinach). Bulb, stem, leaves and fruit were taken into account. Samples were collected from rural and urban areas from Romania, belonging to Dobrogea region.

The RSD values were less than 4.7%, indicating that the GC-MS method is precise. The calculated  $R^2$  values were above 0.998, indicating the linear relationship between targeted spiking levels and mean introduced concentrations, within the working range of concentrations. LOD and LOQ values were determined using calibration standards.

An analytical procedure was used, based on extraction and clean-up step, followed by the injection of concentrated extracts in gas chromatograph Hewlett-Packard 5890. A look at total PAH contents reveals that leafy vegetables showed higher values while chrysene was below the limit of quantification for most studied samples. Sample location appears to be one important factor affecting vegetables PAH contents. The obtained results show that PAHs were detected at higher concentrations in urban areas than in rural areas.

*Key words:* GC-MS; polycyclic aromatic hydrocarbons, vegetables

*Received: March, 2014; Revised final: August, 2014; Accepted: September, 2014*

---

---

\* Author to whom all correspondence should be addressed: [sdobrin@univ-ovidius.ro](mailto:sdobrin@univ-ovidius.ro), telephone: +40241606486