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# THE EFFECT OF SLUDGE ON CROP YIELDS, HUMUS CONTENT IN THE SOIL AND THE ACCUMULATION OF HEAVY METALS AND PAHS

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The industrialization and urbanization of Poland results, among other things, in the generation of increasing amounts of sewage. After it is treated, sludge is obtained. The more accurate sewage treatment is, the higher sludge weight becomes. Their proper management constitutes a problem.

Because of the amounts of nutrients and organic matter contained in the sludge it would be advisable to utilise it biologically, especially in agriculture, to a bigger extent than presently. In Poland agriculture uses only between 5 to 8% of sludge, which is little when compared to the potential. However, the most common obstacles here are hygienic reasons and heavy metal content. Less attention is paid to organic pollutants, including PAHs.

Taking the above into consideration, vegetation tests (plant container tests) were conducted, the aim of which was to determine:

- ◆ The manurial value of N contained in sludge
- ◆ The loading of sludge with heavy metals and PAHs
- ◆ The occurrence of PAHs accumulation in the soil and plants.

It was found that sludge nitrogen was a good nutrient source for plants, the yields of which increased along with the increasing amounts of sludge. Nitrogen exhibited both the direct action and the after-effect on crop yields. No accumulation of PAHs was observed in the grown plants and PAHs content in the soil was small, although showing a positive trend along with sludge doses. The applied sludge resulted in an increase in the total humus content in the soil.

## THE EFFECT OF FERTILIZATION WITH SLUDGE ON PAHs CONTENT IN THE SOIL

| PAHs            | FERTILIZATION  |      |        |
|-----------------|--|------|--------|
|                 | PK   | NPK  | SLUDGE |
|                 | $\mu\text{g} \cdot \text{kg}^{-1} \text{d.m. of soil}$ |      |        |
| F1              | 2.0  | 3.6  | 9.0    |
| B(a)P           | 2.0  | 2.0  | 3.0    |
| IP              | 3.0  | 3.4  | 6.0    |
| B(b)F           | 2.8  | 3.6  | 5.6    |
| B(k)F           | 2.6  | 2.8  | 5.0    |
| B(ghi)P         | 2.4  | 2.4  | 3.2    |
| TOTAL of 6 PAHs | 14.8   | 16.8 | 31.8   |