



Magyarország-Románia  
Határon Átnyúló Együttműködési  
Program 2007-2013  
Programul De Cooperare  
Transfrontalieră  
Ungaria-România 2007-2013

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# Gyógyszerek és származékaik akkumulációs tulajdonságainak vizsgálata a Körösök ökoszisztémájában - HURO projekt és kutatási előzményei

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Projektazonosító: HURO/0901/086/2.2.2 Pharmariver

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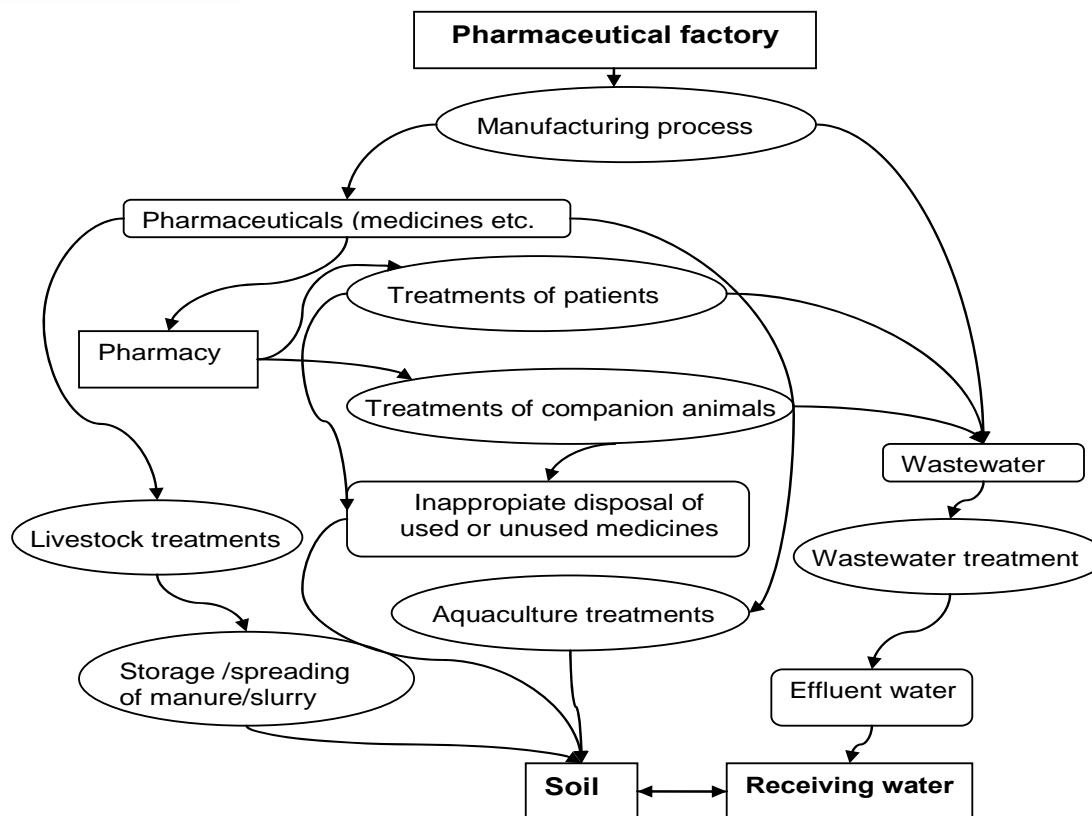
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## Research background of the project

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## Origins of pharmaceuticals in the environment

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## General background

- Intensive use of different xenobiotics including pharmaceuticals leads to the growth of persistent pollutants quantities in the natural and waste waters as well as in sediments. So these compounds might accumulate in the different aquatic organisms also.
- Among others, the contaminant effect of medicines and endocrine disruptors has become evident only in the last years.
- Monitoring of these contaminants that were previously neglected, moreover, often considered harmless, that, however, have significant effects, has become possible due to the more up-to-date analytical methods and instruments.
- There are several persistent compounds, like antibiotics and non steroid inflammatories which cannot eliminate neither by wastewater purification, nor by drinking water treatments and thus they present in the environment.



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**Aims:** Accumulation of pharmaceuticals especially some antibiotics (oxitetracycline, flumequine, sulphonamide and nitrofurans) and inflammatory drugs in waste water, sediment and fish tissues were studied by researchers of HAKI.

**Methods:** Combination of “screen” (ELISA) and HPLC technique was applied for determination of different antibiotic compounds, metabolites and residues. Non steroid inflammatories were detected with GC-MS method.

### Results:

-Our results have shown that concentrations of different antibiotics and metabolites in different Hungarian waters and sediments represent average values, so currently the risk of the accumulation is likely low. However application of some antibiotics (like oxitetracycline (OTC)) used in aquaculture might have high risk.

-Other results demonstrated that non steroid inflammatory drugs might be decomposed at least with 50 % through the storage of sludge. Especially high concentrations of ketoprofen was found in all samples (~150 ng g<sup>1</sup>) even after some years storage (~28 ng g<sup>1</sup> in compost). Negligible NSAID concentrations were found in control samples of Körös river and oxbow river Körös.

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## Objectives

**General objective of the project is a complex study on the pharmaceutical pollution of the Körös Rivers Basin around of Romanian-Hungarian border. Our specific aims are pointed to the most frequently used antibiotics and non steroid inflammatories in the human and animal therapeutics.**

**The Körös Rivers are cross the Romanian - Hungarian border at several points and the main basin might found in Romania. As Körös falls into Tisza River basin of Körös Rivers is a part of the basin of Tisza River which is the second important river of Hungary. Thus pollutions including pharmaceutical might affect bought countries especially around of the borderlands. By these reasons results of the project might give beneficial new knowledge to boht countries.**



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## Project activities



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- Two sampling (late spring, and early autumn) will be carried out to survey of pharmaceuticals in water, sediment, two fish species and indicator macrophytes with the working knowledge of lie of the lands. Basic chemical constituents will be determined. Fish will be catch by electric fishing and composition of the fish fauna will be evaluated.
- Analysis of the pharmaceutical compounds will be carried out by different instrumental methods: Primarily, screenings of the different antibiotics with ELISA tests will be conducted to screen a large sort of medicines (tetracycline, sulphonamide and nitrofuran) in laboratories of both institutions.
- The concentrations of the most abundant antibiotics (e.g. oxitetracycline, and basic nitrofuran compounds) will be studied by HPLC with fluorimetric detection.
- Non steroid inflammatories (ibuprofen, ketoprofen, naproxen, diclofenac and indomethacin) will be analysed by GS-MS method in gas-chromatographic laboratory of HAKI.



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