

University of Kadiz, Spain

Erasmus Mundus: Master in Water and Coastal Management

Module: Biomarkers

Proposal 2016:

on using biomarkers for assessment of water quality conditions in the river basins of Tashkent region, Uzbekistan.

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1. Introduction

Nowadays water quality related with agriculture, industrial activities in economically quickly developing Uzbekistan become great challenge. Particularly, where highly populated and industrialized areas. We would prefer to choose water Basin of Sirdarya River, Tashkent region mainly because of the following reasons:

- ✓ Tashkent region is one of the most populated area of the country;
- ✓ The capital and the biggest city Tashkent, is located in this region (population more than 3 million, 2015);
- ✓ Both upstream and downstream parts of the river basin is within this region, which means there is no issues with getting samples (in the Central Asia there are some problems with transboundary river basins);

Despite recent studies the real source of pollutants (agriculture, industry, sewage discharge and mining etc.) was not discovered yet. In this proposal I will try to check water contamination with heavy metals (Fe, Ba, Mn, As) along the riverside (2.).

2. Materials and Methods

During one year at the beginning of each month three times (8 am, 12 pm and 8 pm) we will collect water samples from Charvak reservoir (upstream) until Shardara reservoir, between abovementioned reservoirs there are more than 40 sampling sites. This is too much, so I am going to focus on the sites which are located before and after big cities (Tashkent, Chirchik, Gazalkent, Bekabad, Parkent, Angren and Almalik). That would be around 15 sampling points. In our country we are not so concerned about dredged materials because we do not dredge riverbed. It is almost impossible to use our rivers for transportation purposes. They are too shallow to be dredged. For better results the following LOE (line of evidence) are going to be used:

- Chemical concentrations;
- Toxicity tests;
- Biomarkers, (exposure, effects depending on the source of contaminants: metals, organic compounds)

For battery of tests solid phase (that means we are dealing with water column) will be good enough because, as we mentioned before we are focusing on water pollution.

3. Discussion

At some sampling sites especially near to the big cities we are expecting high concentration of heavy metals. According to Regulations of Uzbekistan, there is a Maximum Admissible Concentrations (MAC) of metals. According to previous studies it will be difficult to find toxic metals like mercury, cadmium, lead in water samples. As we noted before we could get results that, concentration of metals such as Fe, Ba are exceeded MAC. The main source for this should be agricultural discharges. In Tashkent region the most part (more than 70 %) of dwellers work in agricultural sector. Due to high demand for agricultural products usage of chemical fertilizers are increasing (1.).

Sometimes even low, relatively innocuous concentrations of pollutants can produce deleterious effects on organisms, which are difficult to be predicted (3.). Therefore, it is necessary to develop the system of early warning signals or biomarkers that convincingly reflect adverse biological responses (3.). Unfortunately, in Uzbekistan till now there is no such system.

4. References:

1. https://uz.wikipedia.org/wiki/Toshkent_viloyati
2. http://www.carecnet.org/wp-content/uploads/2011/08/uzbek_angl.pdf
3. <http://www.hindawi.com/journals/bmri/2014/806598/>