Baseline survey on water and sediments: Agrochemicals, Hydrocarbons and Heavy Metals in an emergent mixed production area

Monza, L1; Dufilho, A1; Macchi, P1; Latini, L1; Indaco, M1; Pechen de D'Angelo, A1; Londonio A2; Smichowski, P3; Loewy, R1
liliiana.monzagmail.com
1. LIBIQUIMA-CITAAC, Facultad de Ingeniería, Universidad Nacional del Comahue UNCo-CONICET
2. Comisión Nacional de Energía Atómica CNEA-CONICET
3. Comisión Nacional de Energía Atómica CNEA-CONICET

INTRODUCTION

Main economic activities of the studied region

World’s leading producer of pears, 36,877 ha cultivated.

Enlargement of the agricultural area. Crop diversification.

Hydrocarbon basin- Geologic formation VACA MUERTA

- Second world reserve of tight gas
- Fourth world reserve of shale oil
- 35 years of expected exploitation

The hydrographic basin of the Neuquen river is extremely important as it comprises the major water resource for agriculture, agroindustrial, mining and drinking water (app. 400.000 inhabitants). There is a great public concern about the potential impact of the expected productive development on the water quality. It is necessary to run independent studies providing current baseline information.

Objective:
The aim of the present study is to assess the ecological condition of the middle and lower basin of the Neuquen river, addressing three main aspects: hydromorphology, biology and chemical status.

METHODS AND MATERIALS

The studied area embraces an extension of 120 km including two dams, a regulated section (12 m3/s) and the river after the water restitution (300 m3/s). 28 sampling sites were selected in the river, in the dams, and in farm drainages. Water and sediments samples were taken along 4 sampling campaigns. Organochlorine pesticides and pyrethroids (GC-μECD); organophosphate pesticides and carbamates (GC-NPD, GC-MS), heavy metals (ICP-OES, ICP-MS), AHs and PAHs (GC-FID, GC-MS) were analyzed. At the same time, aquatic macroinvertebrates were sampled using the multi habitat method. Basic physicochemical, hydrological and habitat data were measured in situ.

RESULTS

The reference value for non-contaminated sites, TPL (µg/g) (UNEP), was exceeded in sites 3 and 4. However, the non detection of PAHs in addition to the evaluation indexes show a biogenic source of the detected compounds.

The objective is to classify the water body according to the Directive 2000/60/CE, with very minor anthropogenic alterations from those normally associated with undisturbed conditions. This is an initial recognition survey from which an ordinary monitoring program is strongly recommended.