



**PROTOCOL:**

**Certification of the efficiency of the drinking water filtration devices for removing the contaminants from tap water using the filters: Lokni Spectrum 22+ and Lokni Taste 56**

**Aim of the study:**

The aim of this study was to certify the adsorption of the pharmaceutical residues and environment pollutants contained in water on the two filtration devices provided by the company LOKNI s.r.o., address in Vratislavova 4/27, 128 00, Praha 2, company registration number: 02508991, C 220255 registered at the Municipal Court in Prague, and specifically with two filters with commercial marks Lokni Spectrum 22+ and Lokni Taste 56. For this purpose a filtration process has been performed on a model sample of 500 litres of drinking water containing pharmaceutical residues and other potential contaminating substances (pesticides, insecticides, endocrine disruptors) with the concentration of 40 µg/L. For the filtration, a model mixture of the following substances: paracetamol, diclofenac sodium, ibuprofen, naproxen, ethinylestradiol, nonylphenol, bisphenol Z, sulfamethoxazole, ampicillin, benzopyrene, 4-nitrofenol, 4-chlorfenol, fenoxycarb, cis-trans permethrin, and deltamethrin was prepared in the concentration 40 µg/L in 500 litres of tap water from Hradec Králové city. The filtration experiment has been done independently for both filters.

The details of this study are specified in the attached report: *“Attached documentation to the aim of the study and development of the UHPLC-MS/MS method and the determination of the selected residues of contaminants”*, which is an integral part of this protocol.

In order to monitor the level of residues after the filtration, the following instruments have been used: Waters ACQUITY I-Class UHPLC system, Waters ACQUITY UPLC BEH C18, 1.7 µm, 2.1 x 100 mm chromatographic column, and Waters Xevo TQ-XS (Milford, MA, USA) mass spectrometer. The reliability of the method in term of the parameter of detection limits and method linearity has been verified. Prior to the analysis of the filtered effluent, the samples gained at the outlet of the filters have been pre-concentrated 200 to 500 times depending on the amount of obtained chloroform after individual extractions.

**Conclusion:**

After the filtration of the model mixture of 500 litres of artificially contaminated water, the efficiency of the filtration has been expressed in terms of the efficiency of the adsorbed contaminants in percent (%). With the tested filter Lokni Spectrum 22+ the efficiency of the contaminants adsorption has been achieved within the range 99.9636 – 100 % (see table 4 of the attached documentation). With the tested filter Lokni Taste 56 the efficiency of the contaminants adsorption has been achieved within the range 99.9777 – 100 % (see table 5 of the attached documentation). The value 100 % means the tested contaminants have not been detected in the filtered water. From the physical aspect of the process of adsorption, which is characterised by the adsorption balance, which determines the maximum amount of substance that is possible to be adsorbed under the given conditions on the given sorbent (in this case the surface of the tested filter), it is possible to assume/extrapolate that with the considerably lower and according to the valid limits also expected concentrations of residues of contaminating substances than those used in the model mixture, both of the tested filters Lokni Spectrum 22+ and Lokni Taste 56 will be able to remove efficiently the potential contaminants even when filtrating up to a hundred times bigger volume of water.

The protocol has been processed and the guarantee of the correctness of the data is approved by:

Prof. RNDr. Dalibor Šatínský, Ph.D

In Hradec Králové, on 30<sup>th</sup> Oct 2023