

SUMMER CAMP OF ENVIRONMENTAL SCIENCES

AGRI-KNOWS PROJECT

6.7. -11.7.2014

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INTRODUCTION

WHAT WE DID ?

At the beginning of the week we listened to presentations of our hosts and so we found out what we are going to do and explore.

Aims of the camp and also of the project were to transfer the knowledge about different types of pollutants in the soil, especially pesticides and nutrients.

Our mainly pesticide was imidacloprid, which is used for treating plants against insects.

Imidacloprid belongs to group of neonicotinoids, which effects on target organisms, on insects, because they have different nervous system.



In the market we can find it under different names and brands (Prestige, Confidor, ...).

Nutrients are necessary for growth of plants.

Plants require 16 different elements. Some are absorbed from soil in large quantities (N, K, P, Ca, S, Mg).

Farmers and particularly hobby gardeners want the best for their plants, so that they would grow well they use lots of fertilizers.

Because this group of people exaggerate, soil may become full of some substances.

The problem become when this substances come in water bodies.

There starts a process of eutrofication. With this algae starts to grow and cover the surface of water. As a result there is less oxygen and sunlight which step by step leads to death of water organisms.



Our researching of polutants in soil was devided on four days.

First day we visitted Biotehcnical school of Nova Gorica, where we collected soil samples. We analized them on Tuesday at KGZ Nova Gorica. There we measured pH, potassium and phosphorus. On Wednesday and Thursday we worked at University of Nova Gorica where worked with imidacloprid and nutrients in soil.



pH measuring on field (Biotehcnical school).



Work in a laboratory (UNG).

Biotechnical School & University Of Nova Gorica

Diary of the day one.

Project Agri-Knows

- Cross border project between Slovenia and Italy
- Pollution because of Agriculture
- Education about pesticides
- Acknowledging problem of polluted environment



Day 1 Schedule

- Lecture about project Agri-knows
- Lecture about pesticides
- Taking samples of soil around Biotechnical school's campus (zucchini, peas, american blueberries, apples, peaches and apricots)
- Preparation of soil colones in university lab
- Ph measurements (two times)



TUESDAY – The Agricultural Institute



Preparation of soil samples from biotechnical school

- Crushing + cleaning of samples with machine



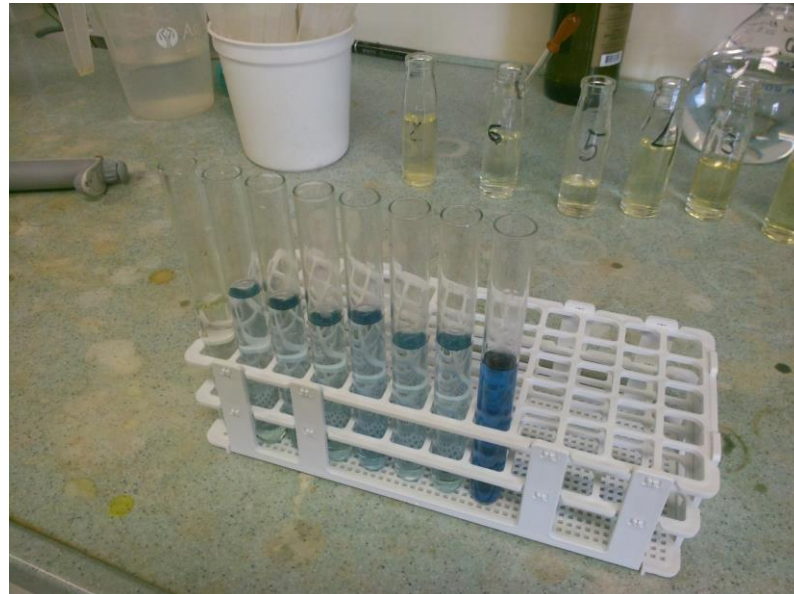
Measuring of pH

- Prepare the solution of dH₂O + soil → plastic flesk
- Measure pH with electrode

Sample number	Plant	pH
1	Pumpkin	7.33
2	Peas	7.13
3	American blueberry	6.40
4	Apple	5.27
5	Peach	5.79
6	Apricot	5.35

Measuring of phosphorus (P)

- Concentration depends on the intensity of the blue color (among molybdate solution)
- Filtrate the solution → Spectrophotometry
- Result: $mg [P]/100 g [soil]$



Measuring of potassium (K)

- Method of AAS – atomic absorption
- Prepare the solution → filtration → measurement with AAS
- Results: $mg [K] / 100 g [soil]$



Measuring of organic carbon

- Prepare the solution of soil, chromatic + sulphuric acid and dH₂O → green colour of solution
- Measure the intensity of green colour with spectrofotometer





AGRI-KNOWS

Knowledge transfer in agriculture as
an added value in protecting the
environment

SET UP OF EXPERIMENTS Nicola David



2007-2013

cooperazione territoriale europea
programma per la cooperazione
transfrontaliera

Italia-Slovenia

evropsko teritorialno sodelovanje
program čezmejnega sodelovanja

Slovenija-Italija



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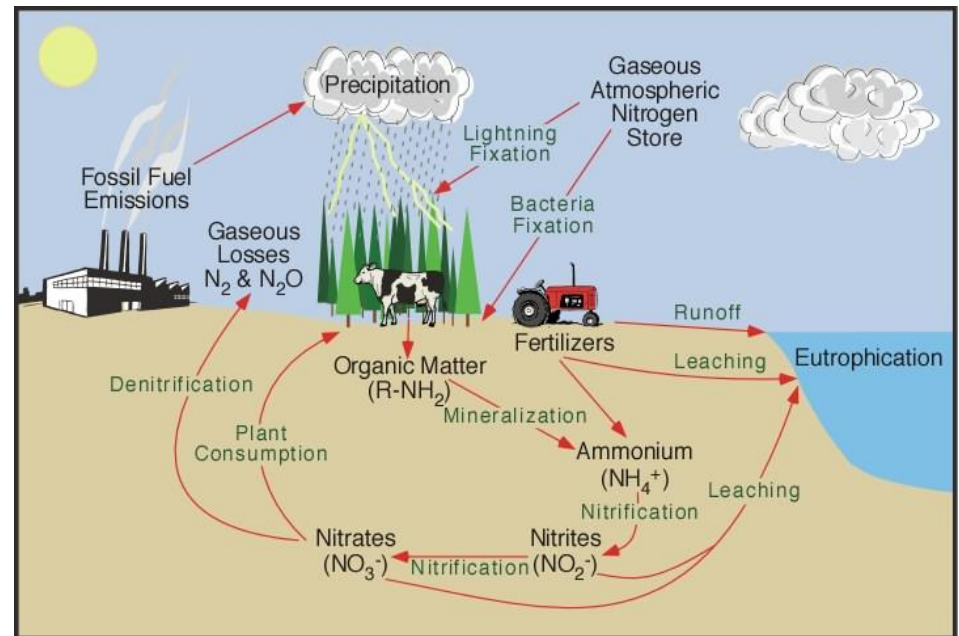
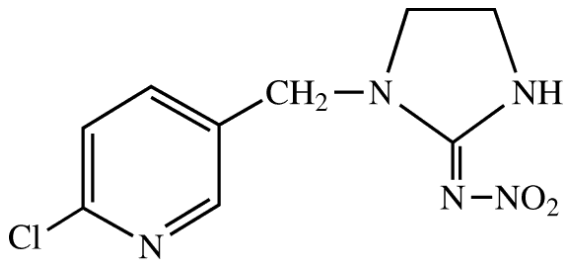
Progetto cofinanziato dal Fondo europeo di
sviluppo regionale

Projekt sofinancira Evropski sklad
za regionalni razvoj

Microcosms experimental

Aim:

- Study of the behavior of N and imdacloprid in the soil.



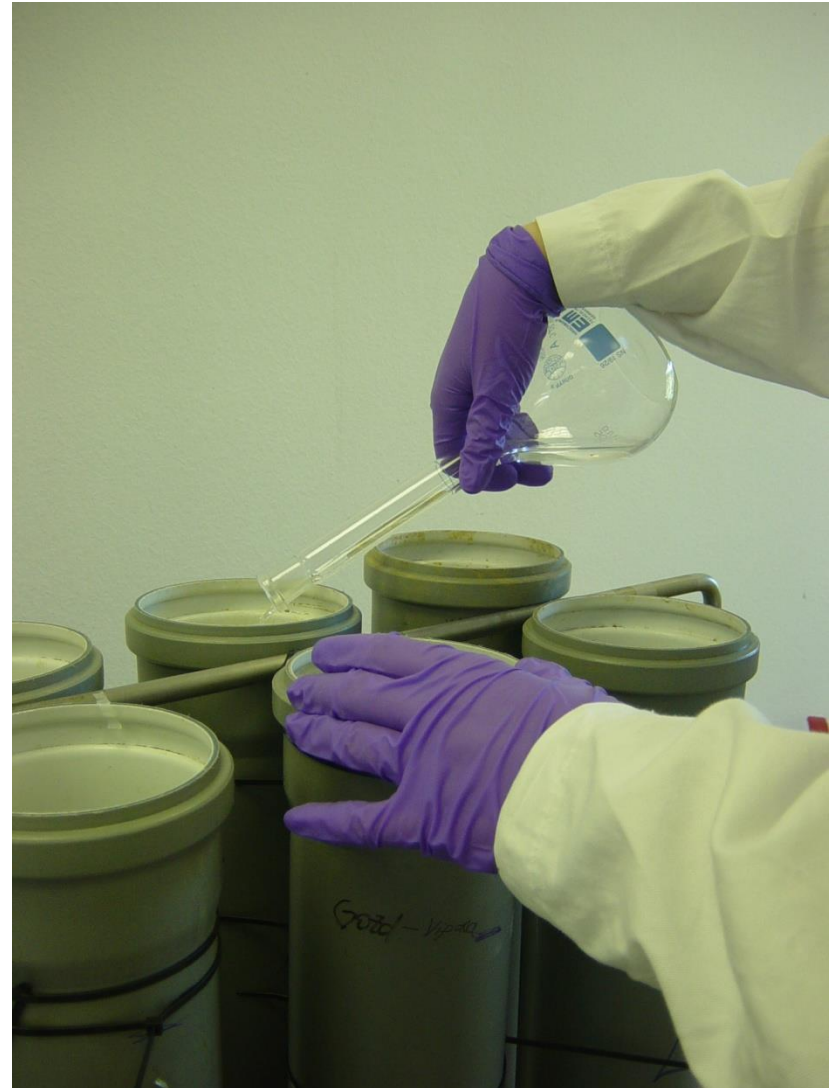
Experimental setup

Thesis:

1: imidacloprid

2: ammonium nitrate

3: control



Experimental setup

soils:

- 1. agricultural soil (from biotechnical school)**
- 2. forest soil (nova gorica)**

6 columns

**4 elutions with 500 mL of water every ca.
1 h**

Methodology:

Imidacloprid added

1.77 g/m² ↔ 10.8 Kg/Ha

In 150 mL laboratory beaker weigh 0.015 g imidacloprid and add 10 ml of acetonitrile. The solution transfer into 500 ml flask and fill it with deionized water.

Ammonium nitrate added

0.8 g/m² ↔ 8 Kg/Ha

30 mg/L of nitrate and 8.7mg/L of ammonium

In laboratory beaker weigh 0.01936g ammonium nitrate and dissolved in water, the solution transfer into 500 ml flask.

Control

We put just water without any other compound, because we wanted to see if the soil is contaminated with imidacloprid before and original content of NO₃⁻ NH₄⁺

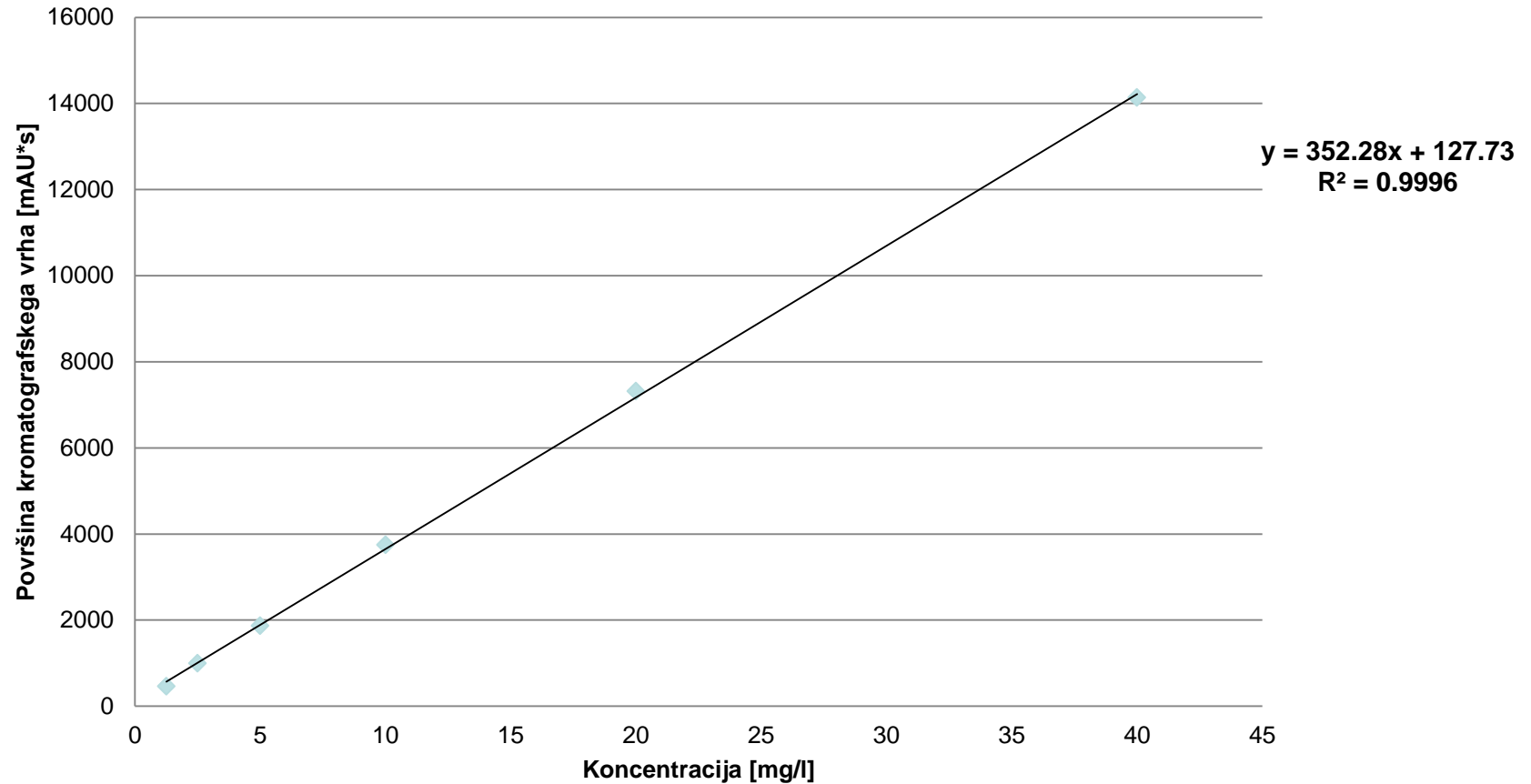


RESULTS

Prepared by: Eva Gričar and Ema Odra Raščan
Nova Gorica, July 2014

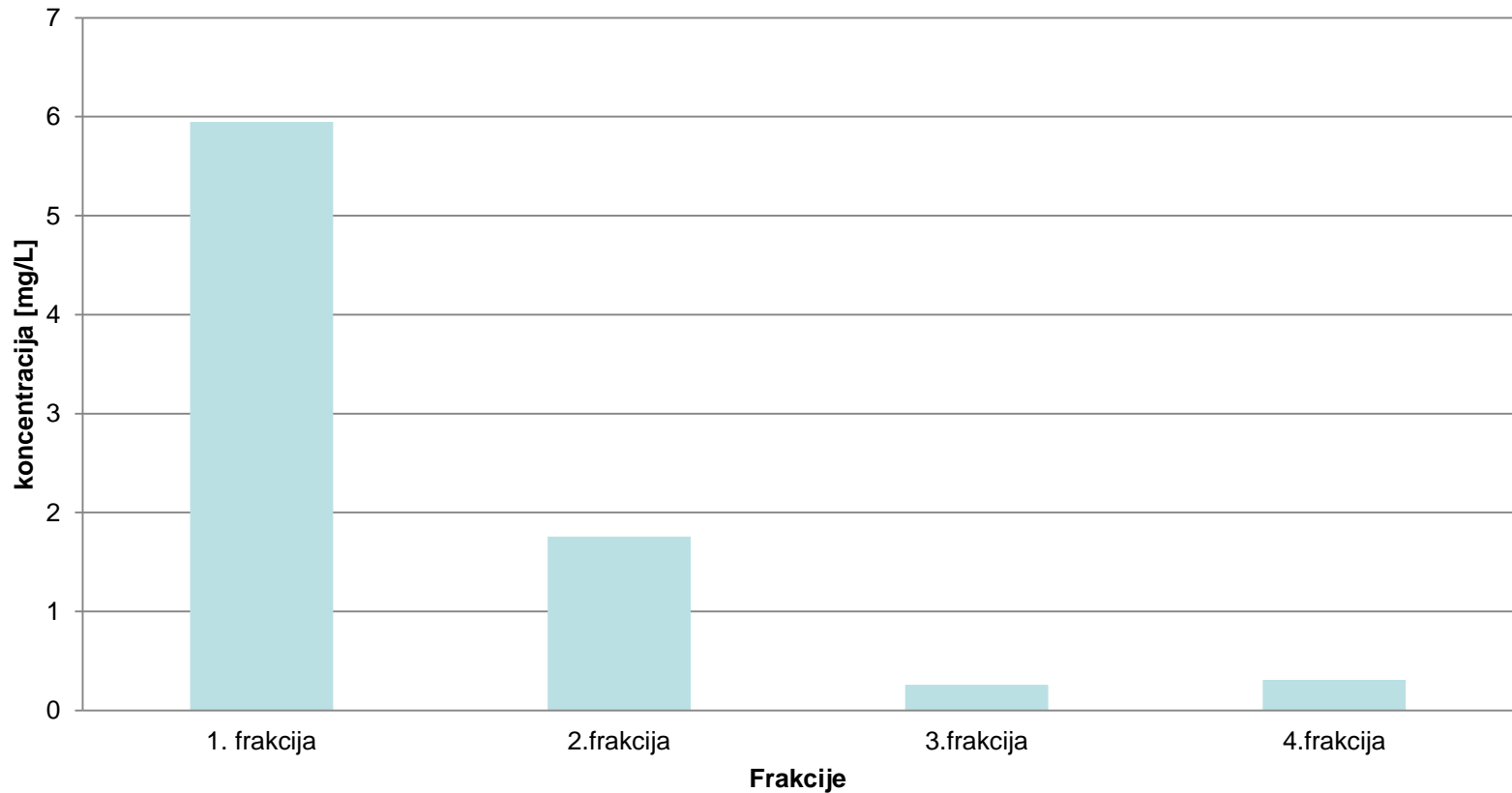
Calibration curve for imidacloprid

Umeritvena krivulja za imidakloprid



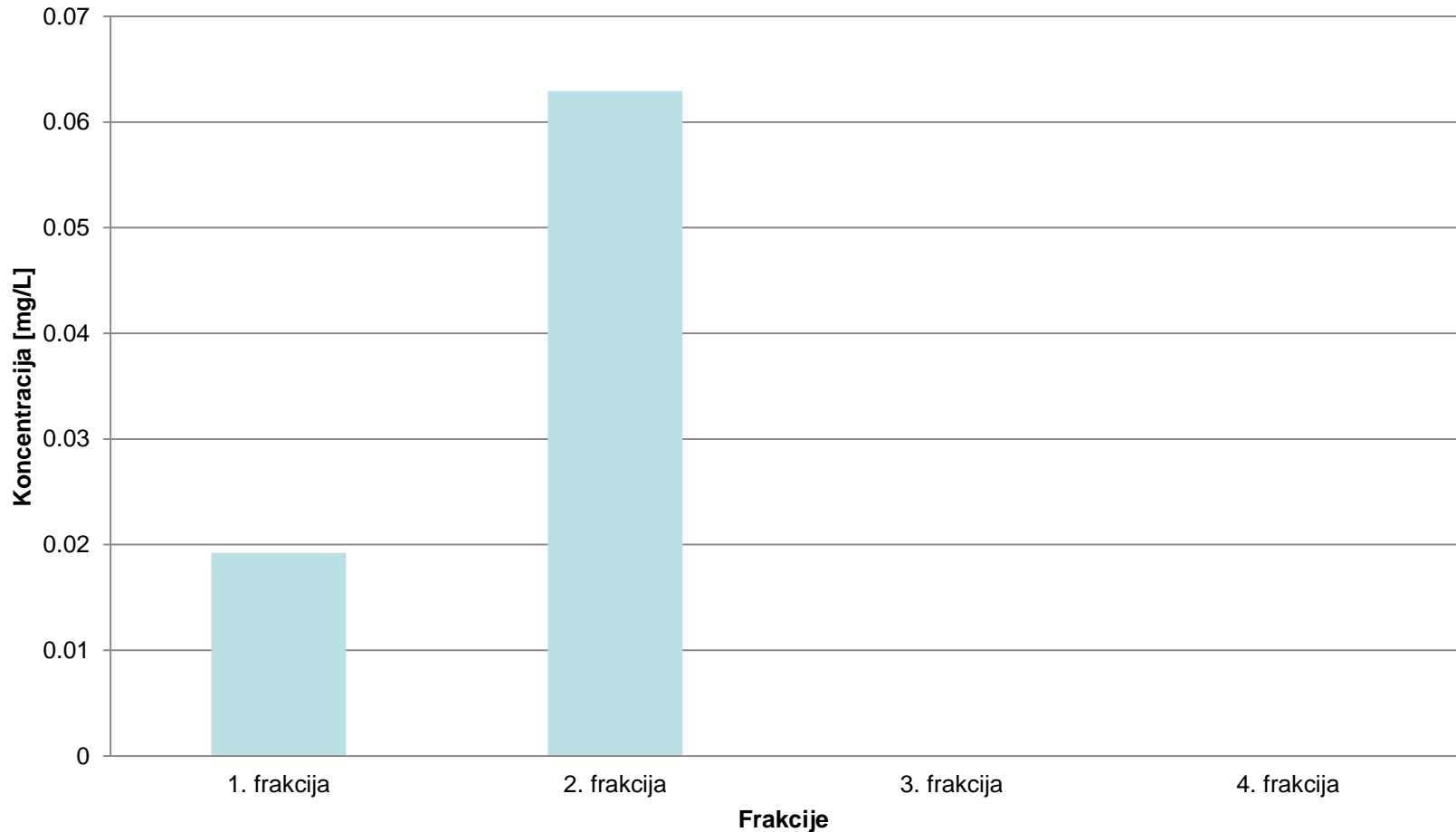
Rinsing imidacloprid from column 1: soil from the orchard

Izpiranje imidakloprida iz kolone 1: zemlja iz
sadovnjaka



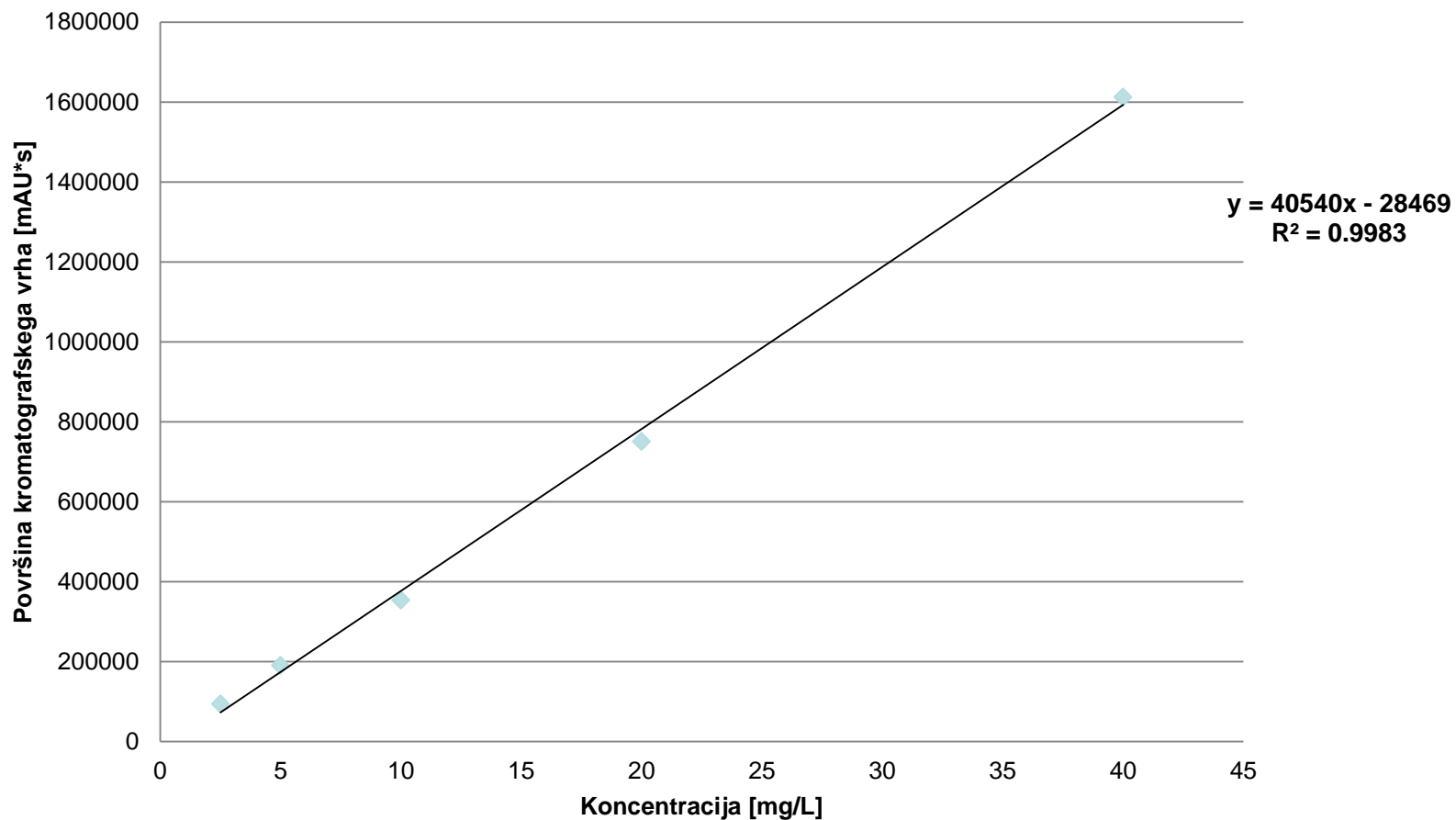
Rinsing imidacloprid from column 2: soil from the forest

Izpiranje imidakloprida iz kolone 2: zemlja iz gozda



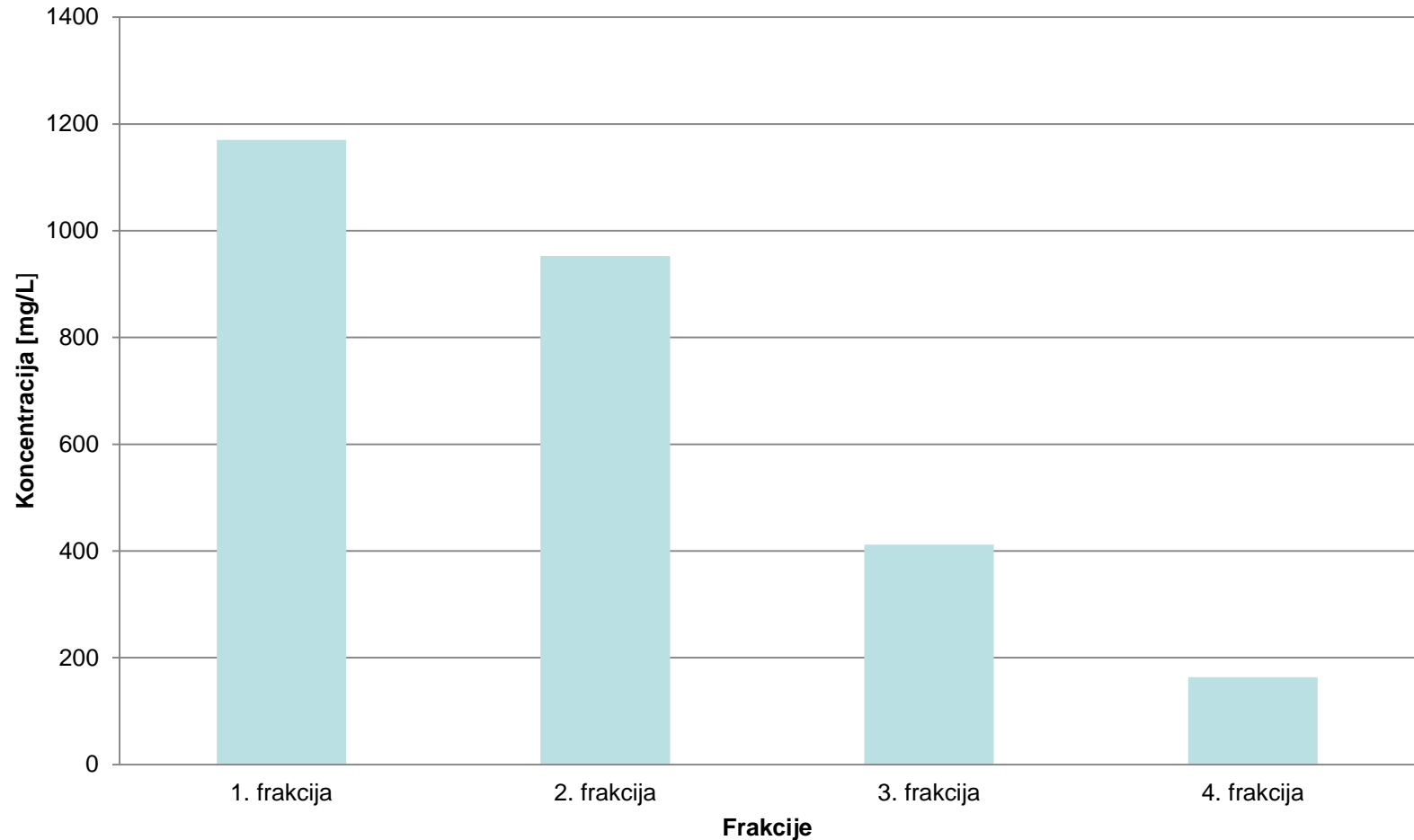
Calibration curve for nitrate

UMERITVENA KRIVULJA ZA NITRAT



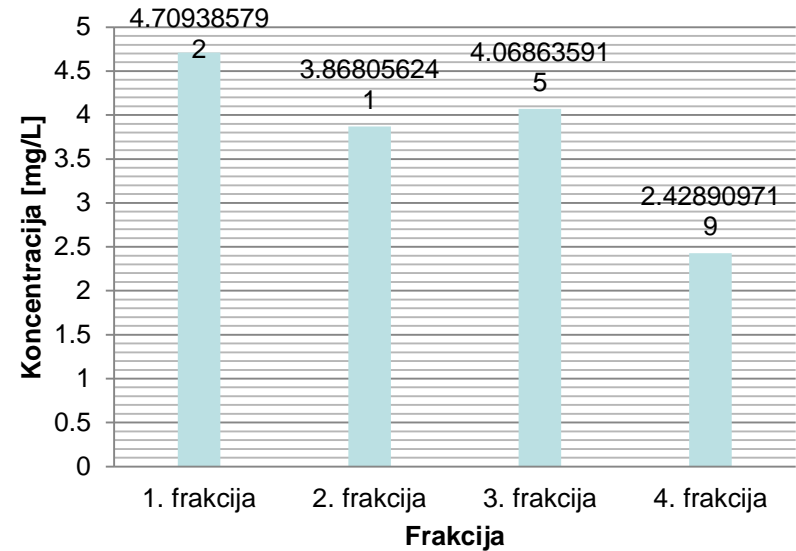
Rinsing nitrate from column 3: soil from the orchard

Izpiranje nitrata iz kolone 3: zemlja iz sadovnjaka



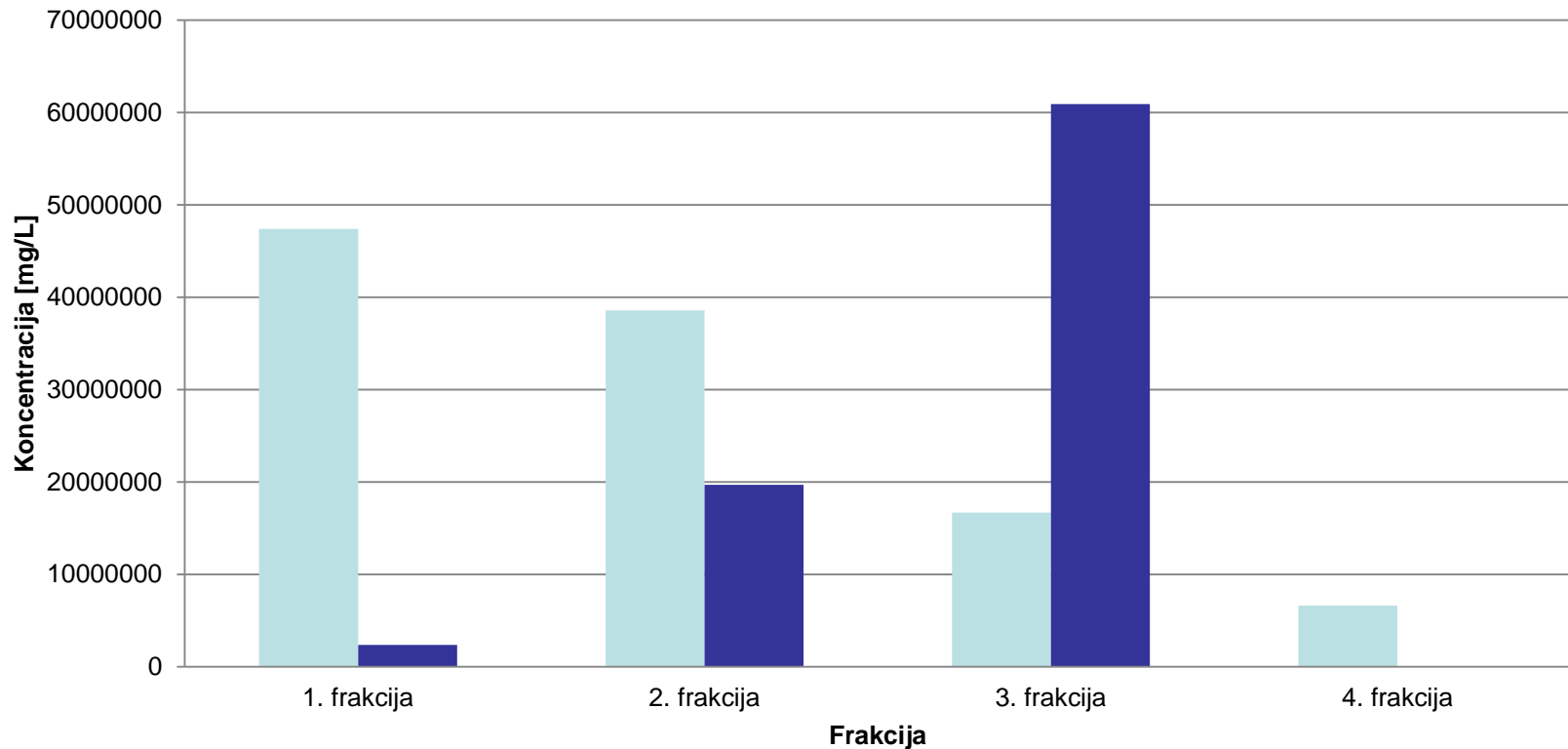
Rinsing nitrate from the 4th column: soil from the forest

- Izpiranje nitrata iz kolone 4: zemlja iz gozda



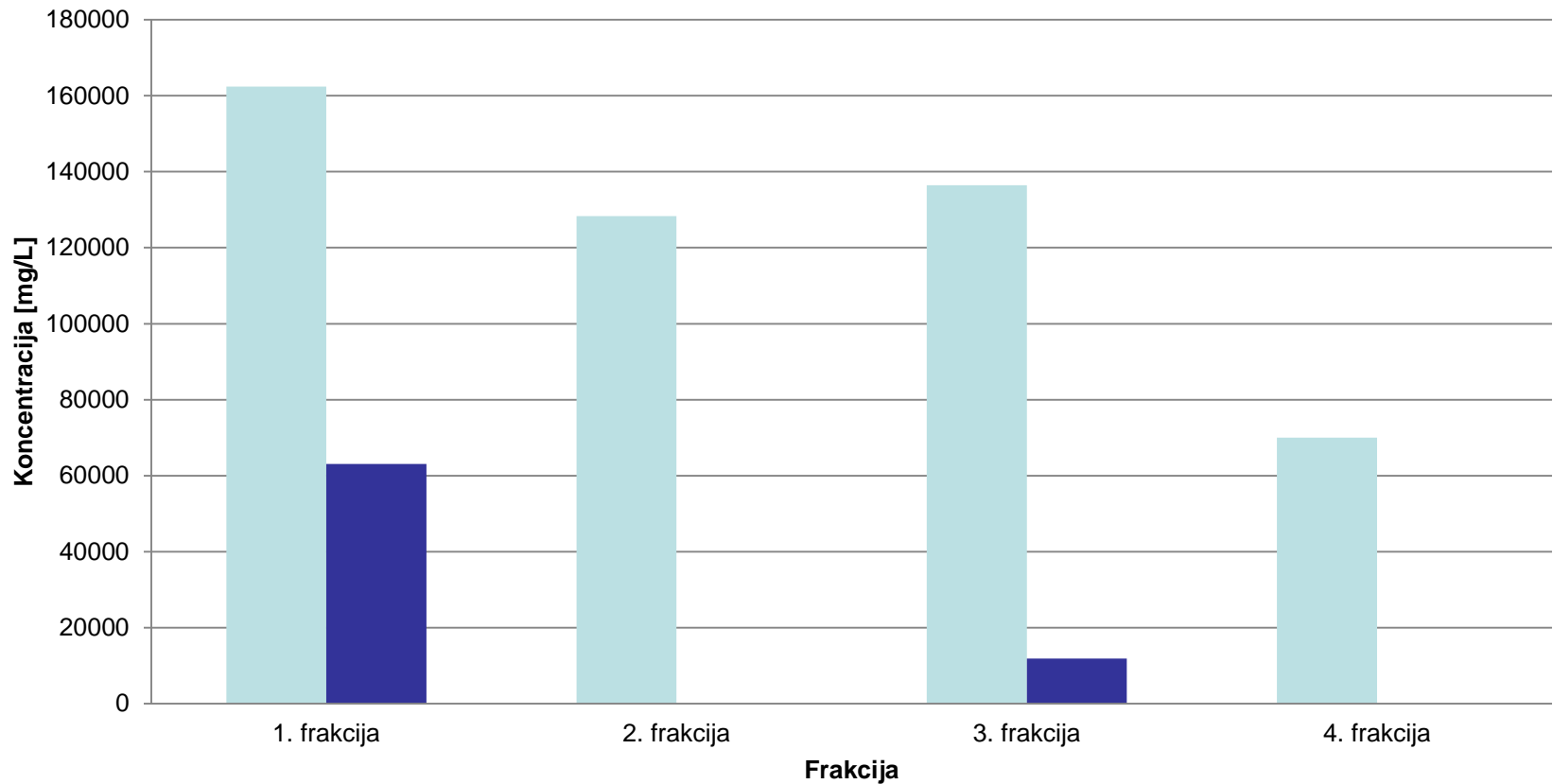
Comparison of rinsing the nitrate from the 3rd column with the control

Primerjava izpiranja nitrata iz 3. kolone s kontrolo

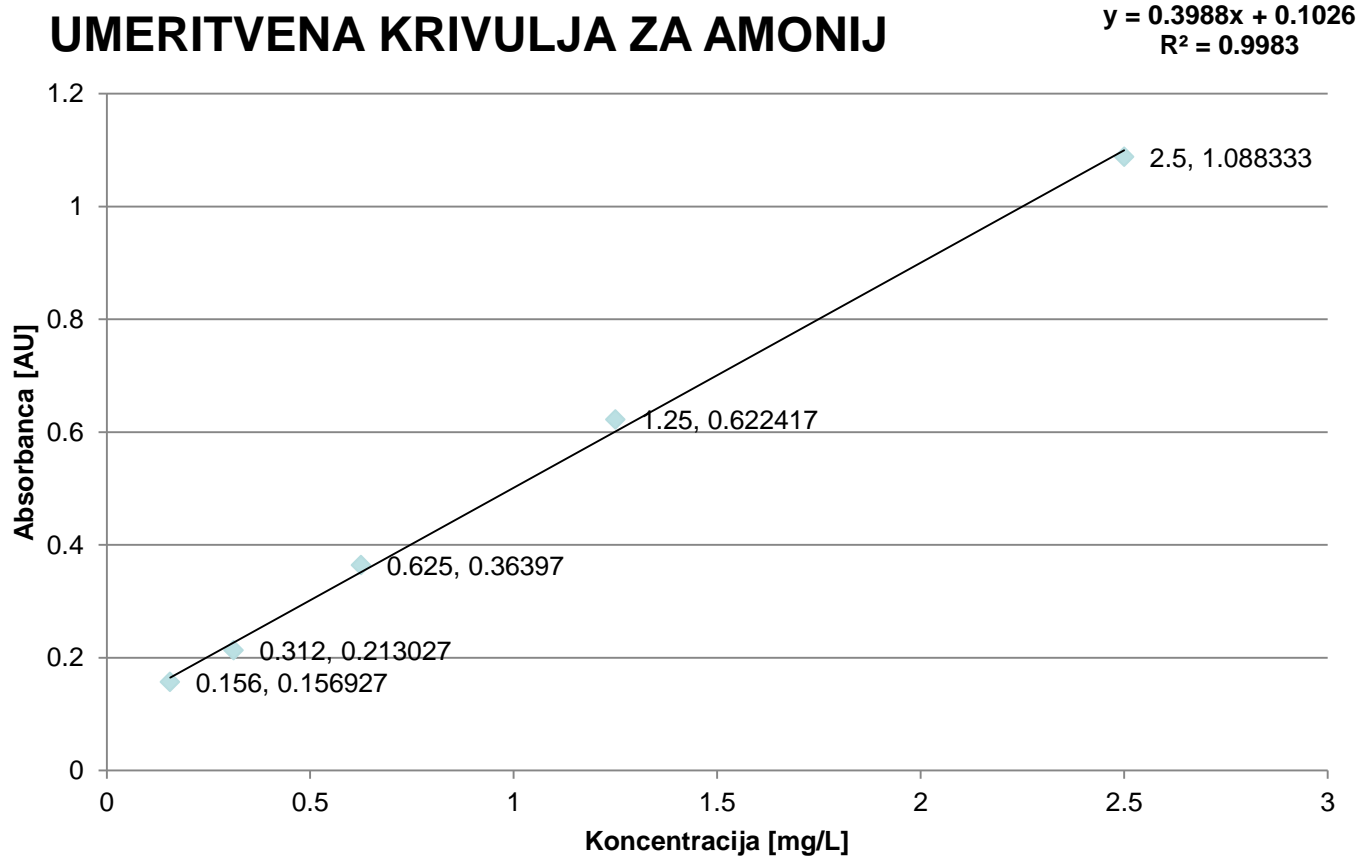


Comparison of rinsing the nitrate from the 4th column with the control

Primerjava izpiranja nitrata iz 4. kolone s kontrolo

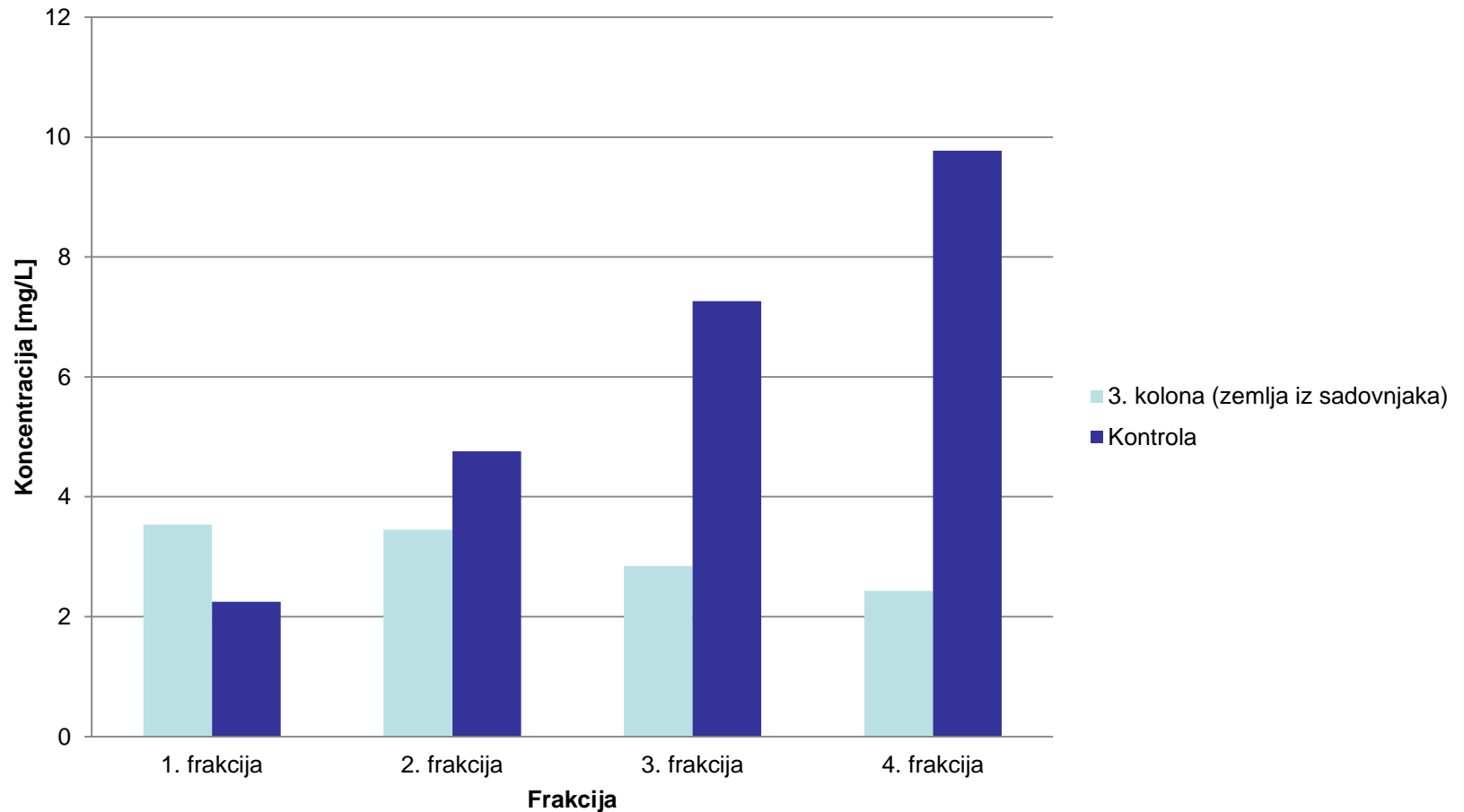


Calibration curve – ammonium ion



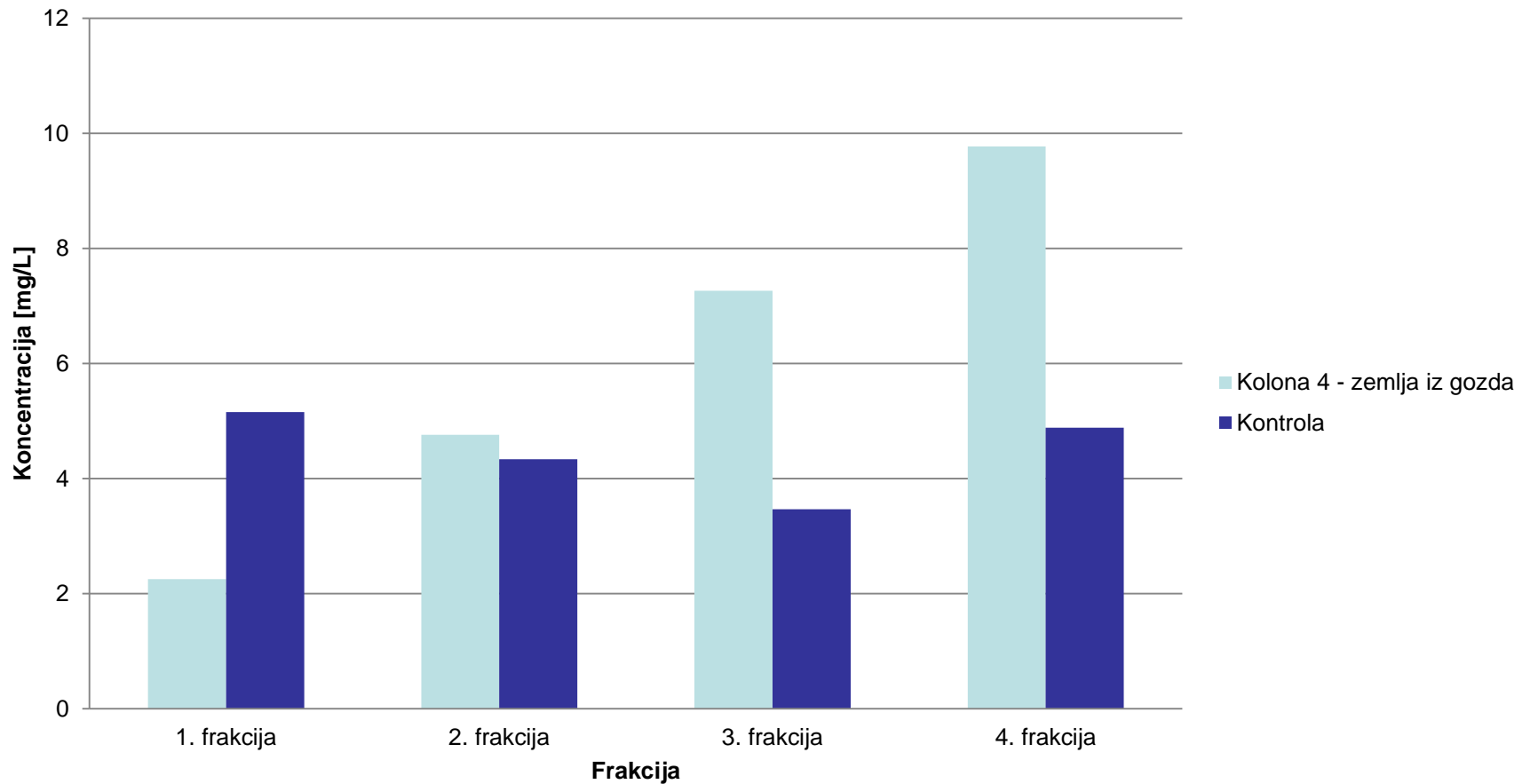
Rinsing ammonium ion from column 3: soil from the orchard

Izpiranje amonija iz kolone 3: zemlja iz sadovnjaka



Rinsing ammonium ion from column 4: soil from the forest

Izpiranje amonija iz kolone 4: zemlja iz gozda



DISCUSSION WITH CONCLUSIONS

- OBTAINING KNOWLEDGE OF POLLUTANTS FROM AGRICULTURE
- GETTING SKILLS IN EXPERIMENTAL FIELD AND LABORATORY WORK
- GETTING KNOWLEDGE ABOUT CHEMICAL ANALYSIS

AGRI-KNOWS

Knowledge transfer in agriculture
as an added value in protecting
the environment

Hvala za vašo pozornost!
Grazie per l'attenzione!

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