AGRI-KNOWS
Knowledge transfer in agriculture as an added value in protecting the environment

Kristina Kalister

Axel Di Bert

Nova Gorica, 5.7.2014

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

Aims and scope

- **Provide specific knowledge on the problem of environmental pollution caused by excessive use of nutrients, pesticides and other substances**
- Project AGRI-KNOWS implements state of the art knowledge of high level experts from different institutions working in the research and in the agricultural sector (universities and research institutes) to the future generations of technical sector.

Aims and scope

- Implementation of knowledge transfer:
  - Training for secondary school teachers and education of students in primary and secondary schools
  - performance of microcosm experiments at schools,
  - organization of workshops for students, field trips
  - open days for primary schools
  - Summer schools for young farmers
- **The ultimate goal: raise awareness and concern for the environment and human health**.

PROJECT PARTNERS

Univerza v Novi Gorici - LP

Dipartimento di Scienze Agrarie e Ambientali – Universita degli Studi di Udine - PP1

Kmetijsko gozdarska zbornica Slovenije, Kmetijsko gozdarski zavod Nova Gorica - PP2

Consiglio per la Ricerca e la Sperimentazione in Agricoltura - PP3

Solski Center Nova Gorica, Biotehniska Šola - PP4

ISIS Malignani - Državni zavod za izobraževanje Malignani - PP5

Istituto D'Istruzione Superiore "P.D'AQUILEIA" - PP6

Duration of the project

24 months: 1.10.2012 - 30.9.2014

Activities:

WP1: Coordination and project management

WP2: Research (Pedology, pollutants from agriculture, microcosm experiments)

WP3: Education (Teachers, students, young farmers)

WP4: Information and dissemination

WP1: Coordination and project management

The main aim is a coordinated, timely and effective implementation of the project and coordination relationships within the project team!

Formation of

- THE ADMINISTRATIVE COMMITTE: in which each partner shall appoint a delegate in order to supervise the work on the project
- TEAM LEADER: acting as a contact person and who is responsible for the working relationships and partnership with the Managing Authority and the Joint Technical Secretariat.

WP2: Research

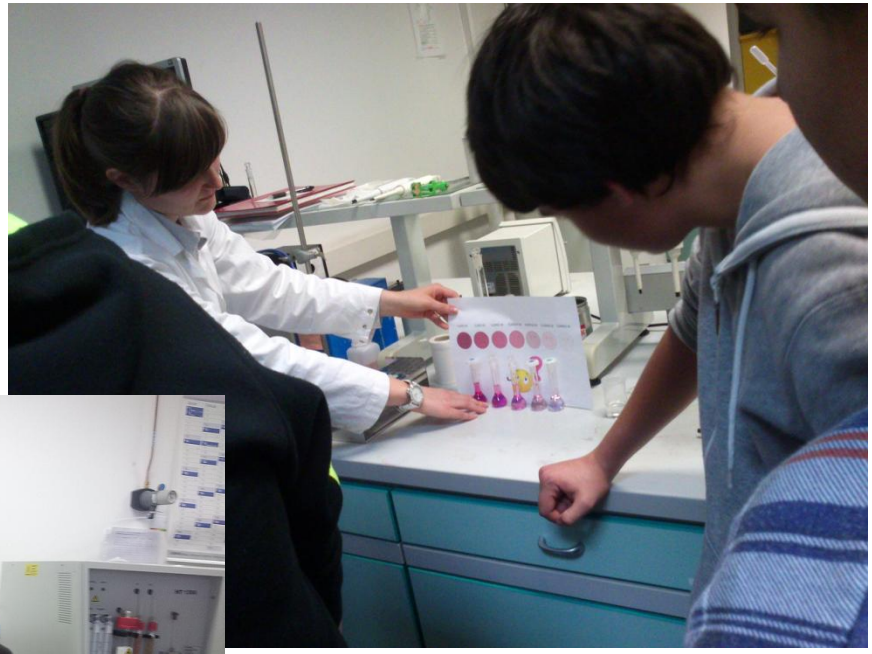
At different locations representative samples of soil were be collected:Selection of representative nutrients and pollutants (pesticides and drugs), whose mobility will be tested in microcosm experiments,

WP2: Research

– Construction and testing of appropriate columns for the execution of a microcosm experiments, Implementation microcosm experiments, Evaluation of the results.

WP2: Research

Layout and verification of analytical methods for the determination of nutrients and pollutants used in microcosm experiments,



- **SCHOOL ISIS "MALIGNANI" CERVIGNANO DEL FRIULI**

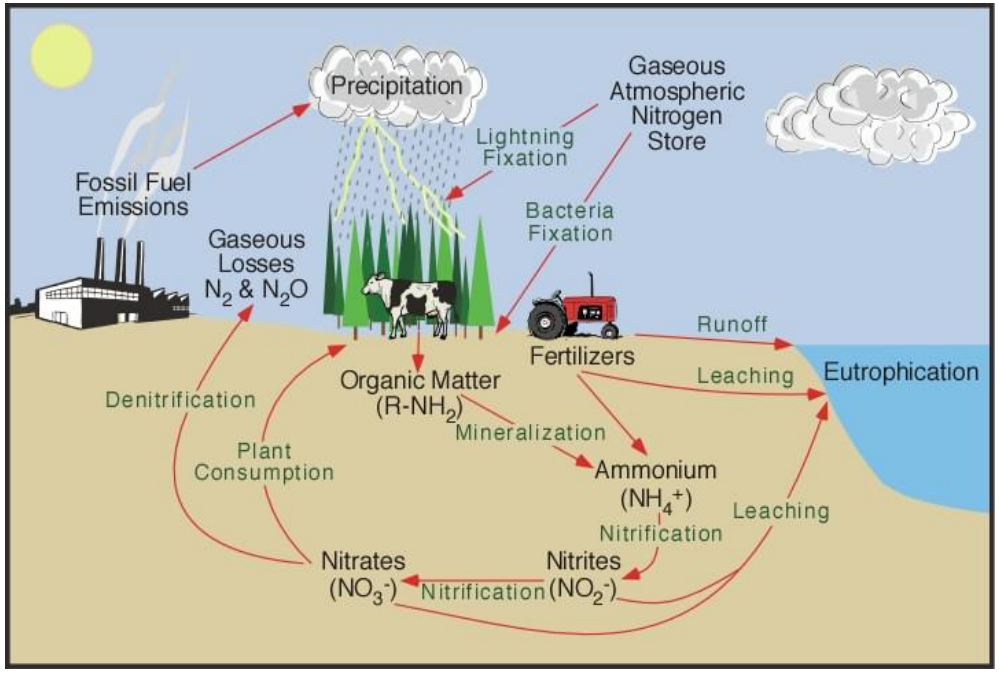
- **SCHOOL ITAS "PAOLINO D'AQUILEIA" CIVIDALE DEL FRIULI**

1 .Comportamento dell'azoto nei suoli

- **Anno 2013 – Prima parte**
- **Studio del comportamento dell'azoto derivante da fertilizzanti in cui questo elemento è presente in diverse forme (stati di ossidazione)**

Analisi di:
NH_4^+ Ammonio
NO_2^- Nitriti
NO_3^- Nitrati

- **Quattro suoli diversi (due per ogni scuola)**



Parte sperimentale – Stage estivo

Aggiunti 350 Kg/ha di azoto

Tesi 1: $Ca(NO_3)_2$
Tesi 2: $(NH_4)_2SO_4 + NH_4NO_3$
Tesi 3: Controllo (nessuna aggiunta)

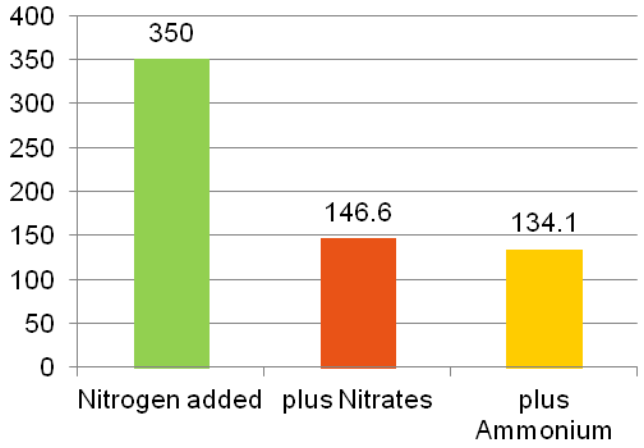
Effettuate sei eluizioni con 350 mL di acqua (equivalenti a 50 mm di pioggia) dal 06/06/2013 al 11/07/2013

I percolati sono stati raccolti, misurato il loro volume e analizzati per determinare NH_4^+ - NO_2^- - NO_3^-

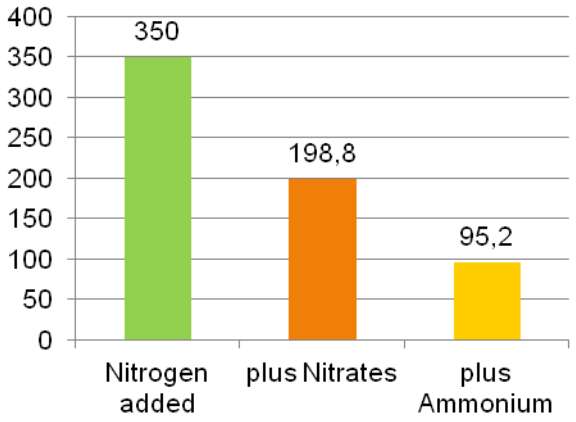
Conclusioni (I)

FOSSALON

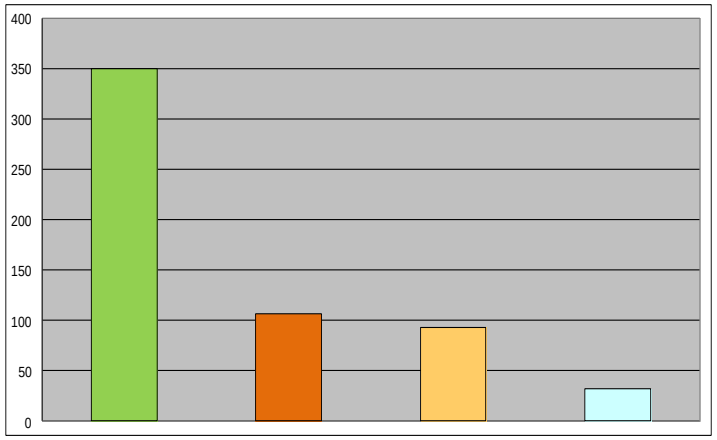
Azoto totale Kg N/ha



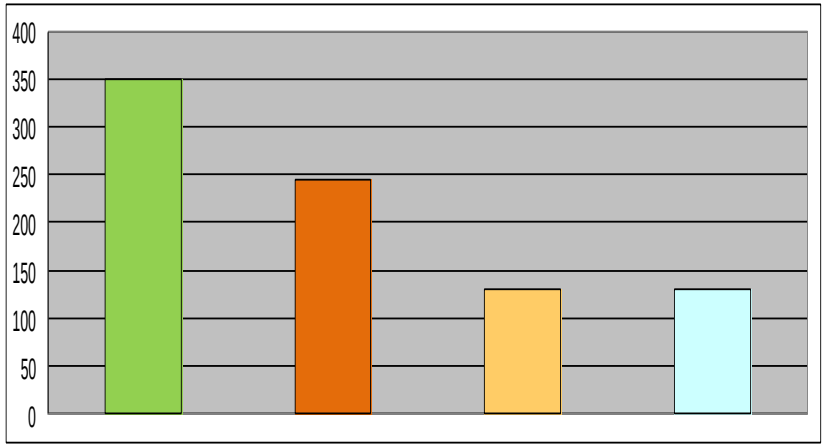
CERVIGNANO



ROCCA BERNARDA



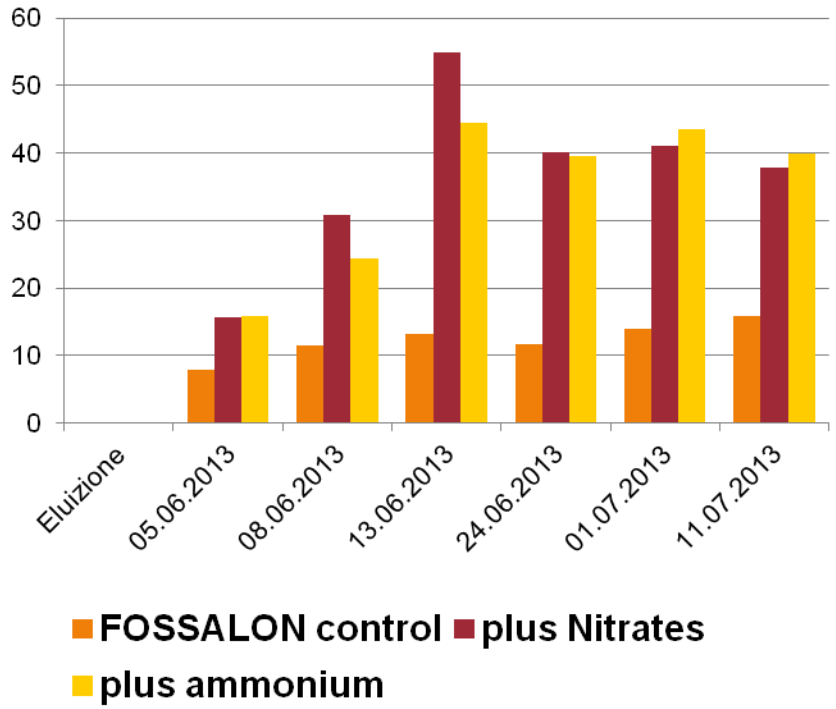
ORSARIA

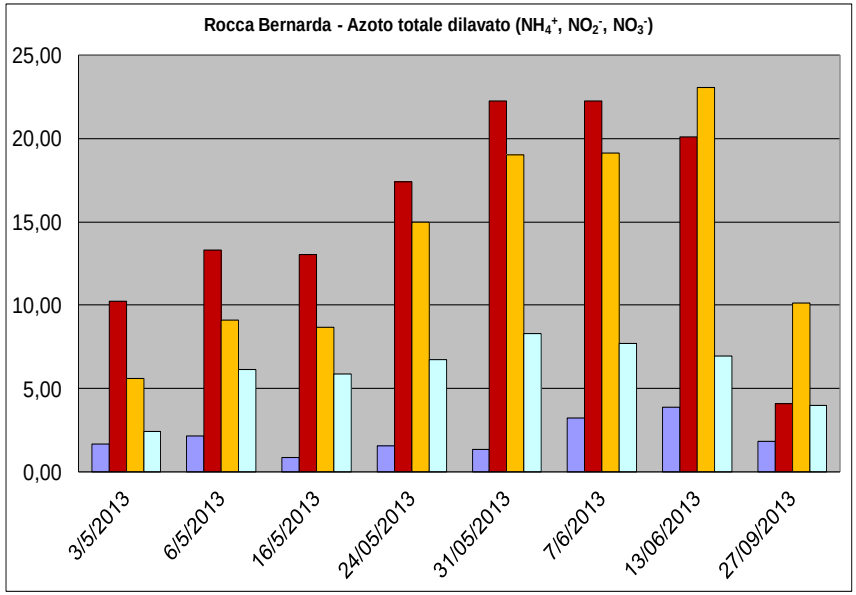


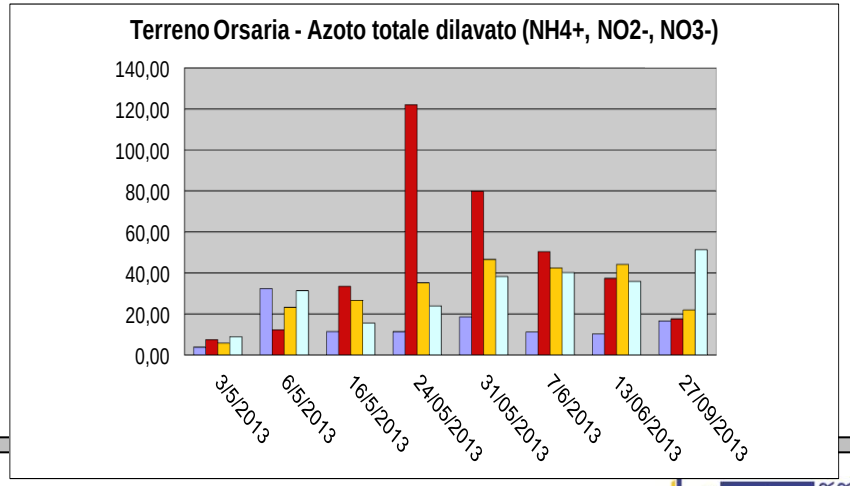
Conclusioni (II)

Suolo FOSSALON

Azoto totale Kg N/ha ($NH_4^+ + NO_2^- + NO_3^-$)



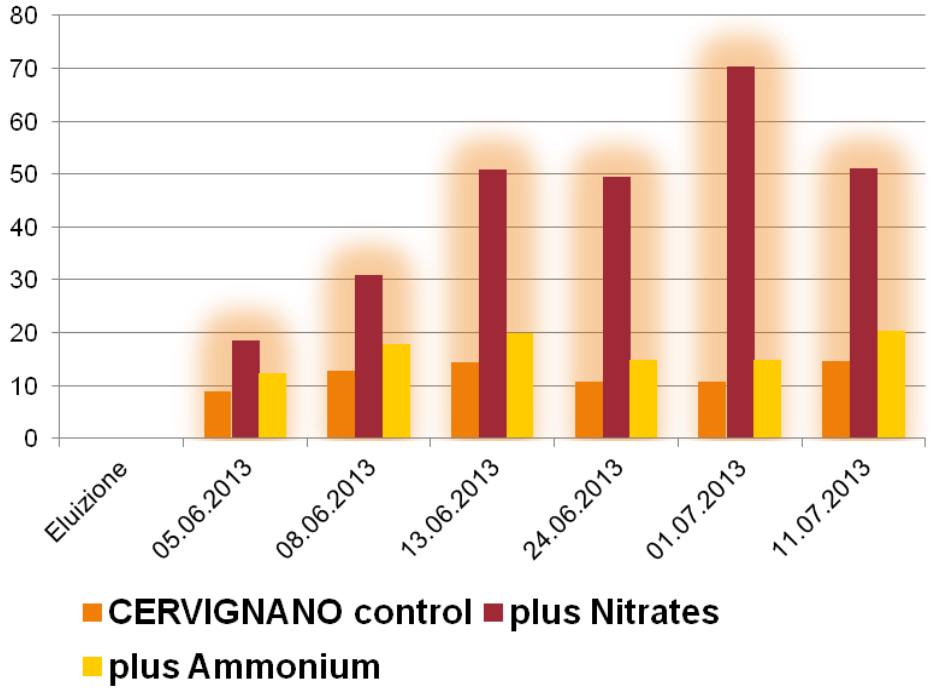


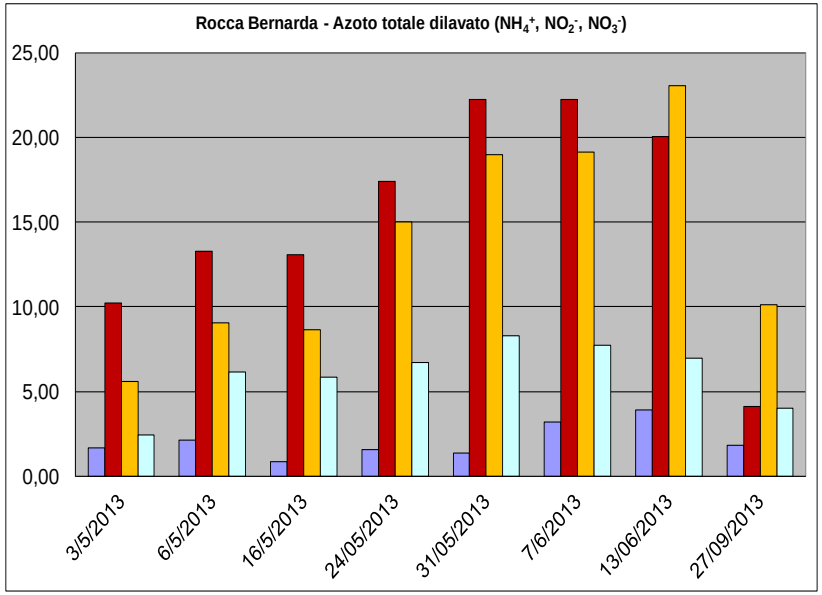


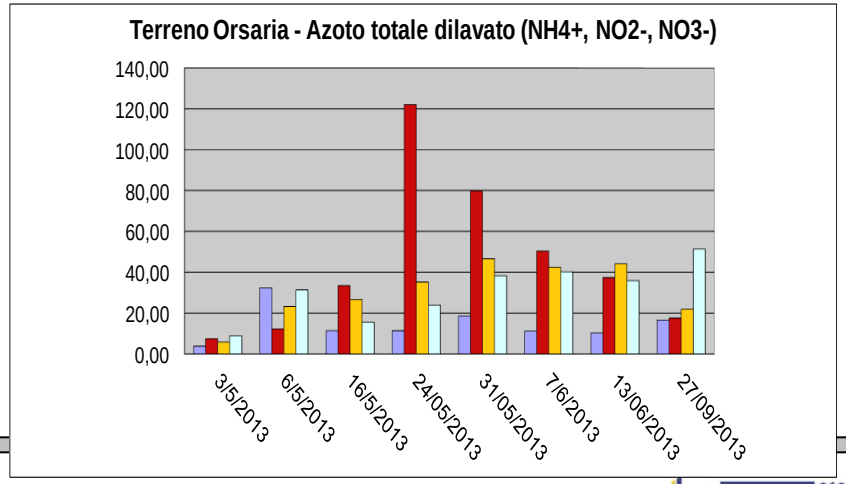
Conclusioni (III)

Suolo CERVIGNANO

Azoto totale Kg N/ha ($NH_4^+ + NO_2^- + NO_3^-$)







2. Comportamento del cromo nei suoli

- **Anno 2013 – Seconda parte**

- **Studio del comportamento del cromo nei suoli:**
  - aggiunto come sali di Cr(III) e Cr(VI)
  - aggiunto come scarti industriali utilizzati come fertilizzanti (ammendanti di conceria) – Cr(III)

- **Il diverso stato di ossidazione determina un diverso comportamento nel suolo:**
  Cr(III) è un catione Cr^{3+}
  Cr(VI) è un anione CrO_4^{2-}

Parte sperimentale – Stage estivo

Tesi 1: $Cr(NO_3)_3$

1600 mg/Kg di Cr(III)

Tesi 2: ammendante

1600 mg/Kg di Cr(III)

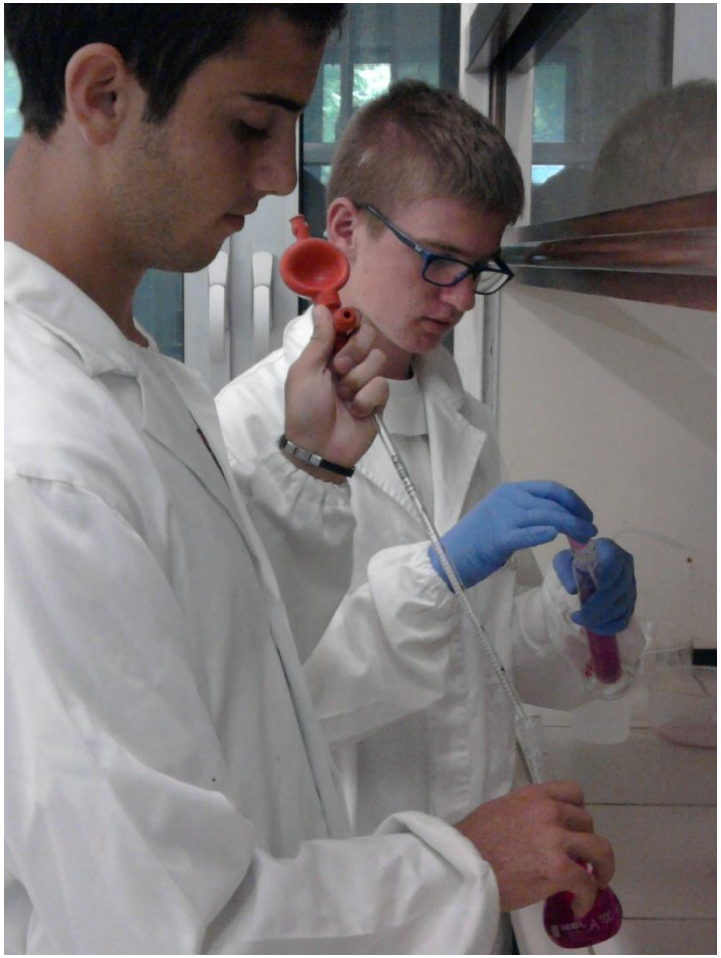
Tesi 3 - K_2CrO_4

500 mg/Kg di Cr(VI)

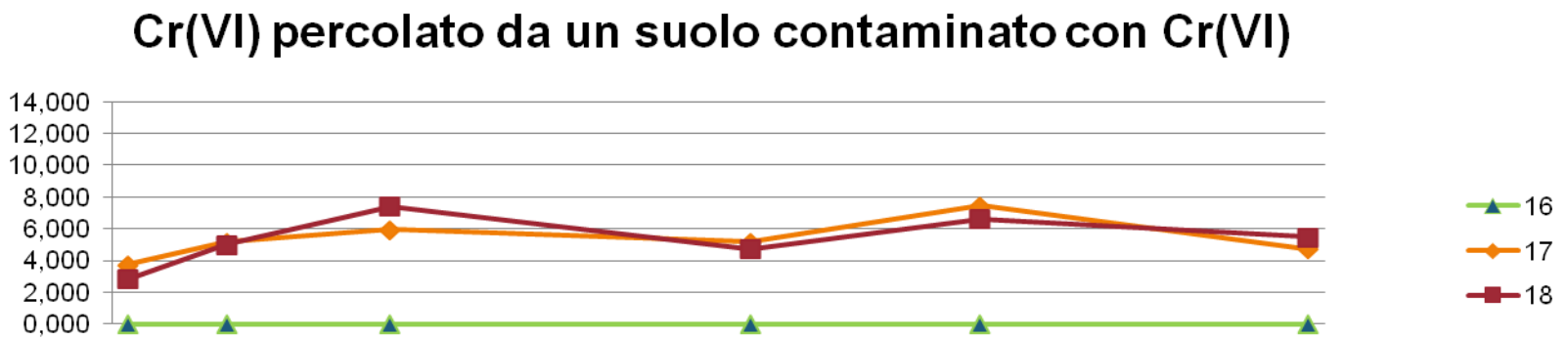
Tesi 4: controllo

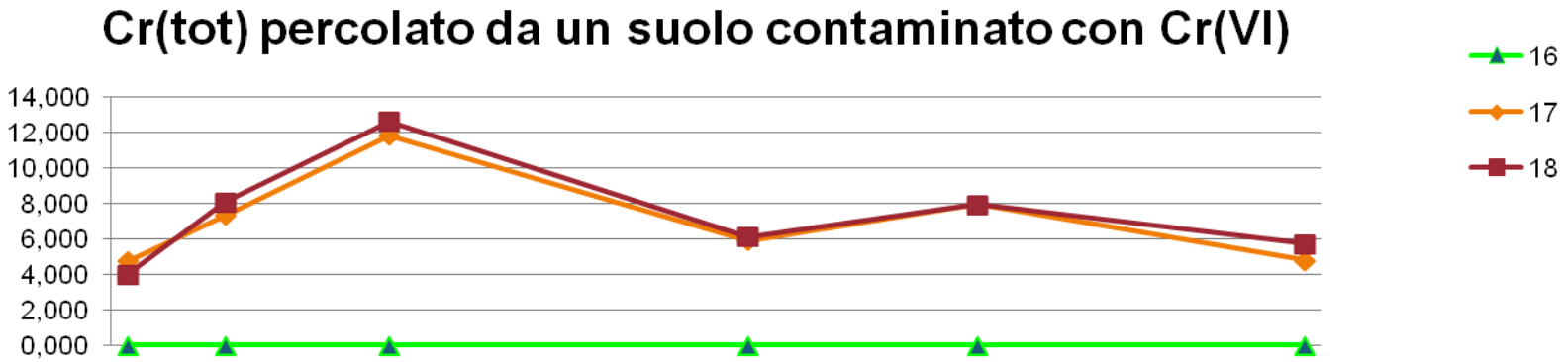
Effettuate sei eluizioni con 350 mL di acqua (equivalenti a 50 mm di pioggia) dal 06/06/2013 al 11/07/2013

Analisi effettuate



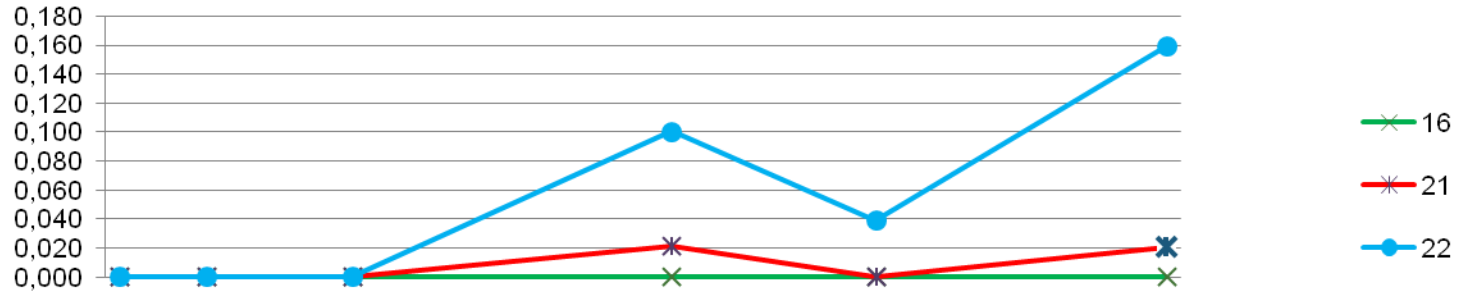
Primi risultati (I)



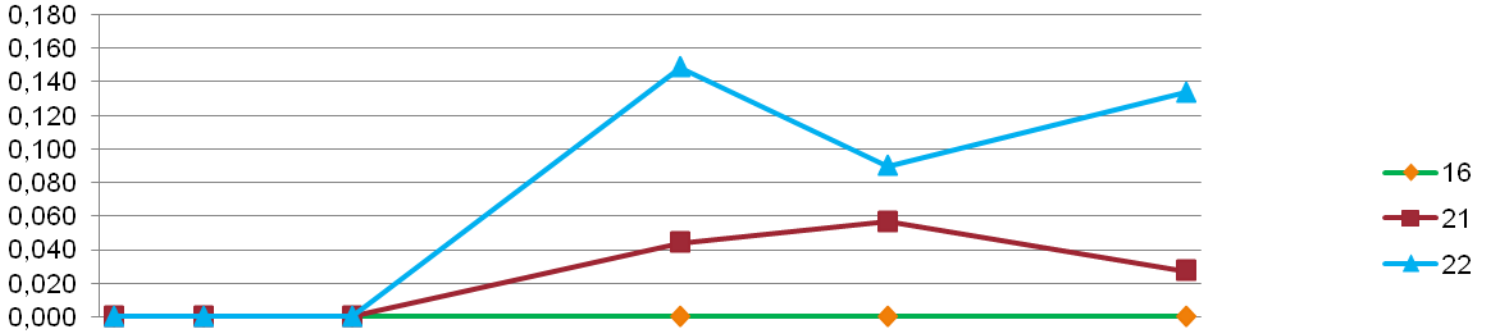


Primi risultati (II)

Cr(VI) percolato da un suolo con ammendante di conceria



Cr(tot) percolato da un suolo con ammendante di conceria



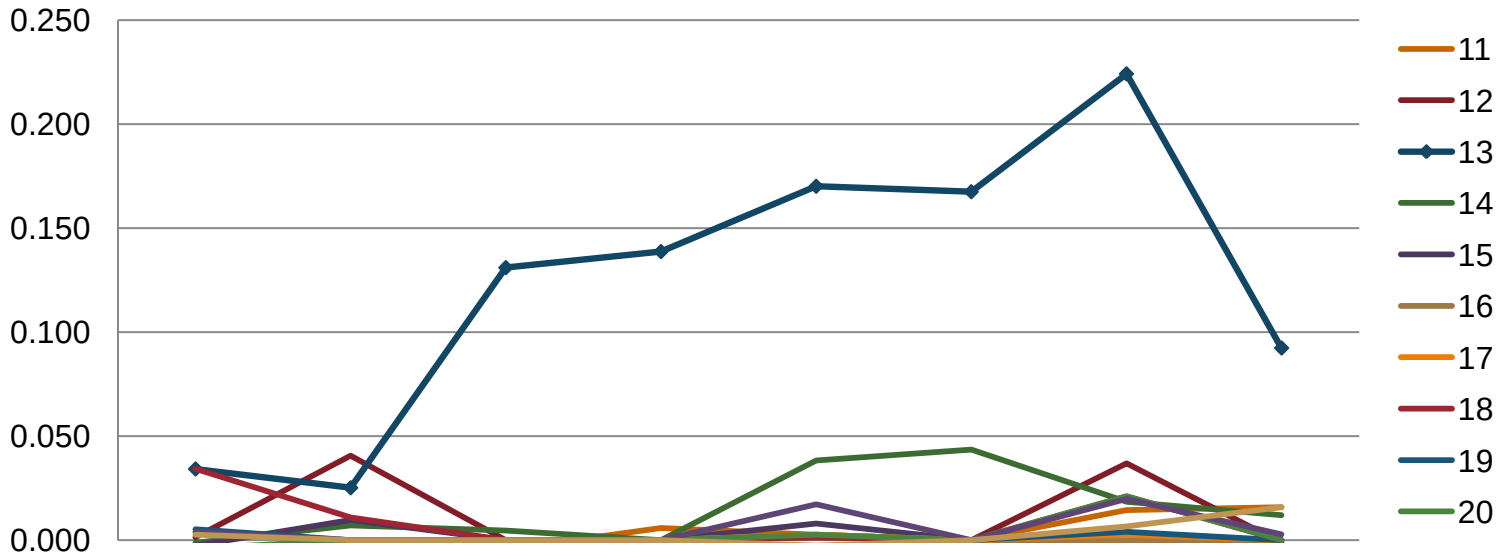
2. Comportamento del cromo nei suoli

- **Anno 2014 – Prosecuzione esperimenti sul comportamento del cromo**

- **Tesi 1: $Cr(NO_3)_3$** **1600 mg/Kg di Cr(III)**
- **Tesi 2: K_2CrO_4** **500 mg/Kg di Cr(VI)**
- **Tesi 3: ammendante** **1600 mg/Kg di Cr(III)**
- **Tesi 4: acidi umici** **5000 mg/Kg**
- **Tesi 5: glucosio** **5000 mg/Kg**

Primi risultati

- **Le colonne inquinate con Cr(VI) non hanno rilasciato Cr(VI): ridotto dalla sostanza organica**
- **Una colonna inquinata con Cr(III) e ammendante ha rilasciato Cr(VI)**



Conclusioni

- **Conferma dell'imprevedibilità e della specificità delle condizioni di ossidazione.**
- **È importante per l'agricoltore conoscere le caratteristiche specifiche del suolo: si evitano aggiunte e spese inutili.**
- **Gli ammendanti derivanti da scarti industriali potrebbero contenere metalli pesanti (cromo per le concerie): rappresentano una possibile fonte di danno ambientale in quanto le reazioni che avvengono in un suolo sono imprevedibili.**

- **BIOTEHNICAL SCHOOL NOVA GORICA**

THE PURPOSE OF THE RESEARCH

The purpose of the research was to see how susceptible the microorganisms are to penicillin. For this purpose we used antibiogram.

1.

- Making columns from plastic tubes, filling them with soil

2.

- Polluting the columns with penicillin and pouring rainwater over

3.

- Inoculating microorganisms from rainwater on a solid medium, counting colonies, analyzing all samples

4.

- Inoculating microorganisms from soil on a solid medium, counting colonies, analyzing all samples

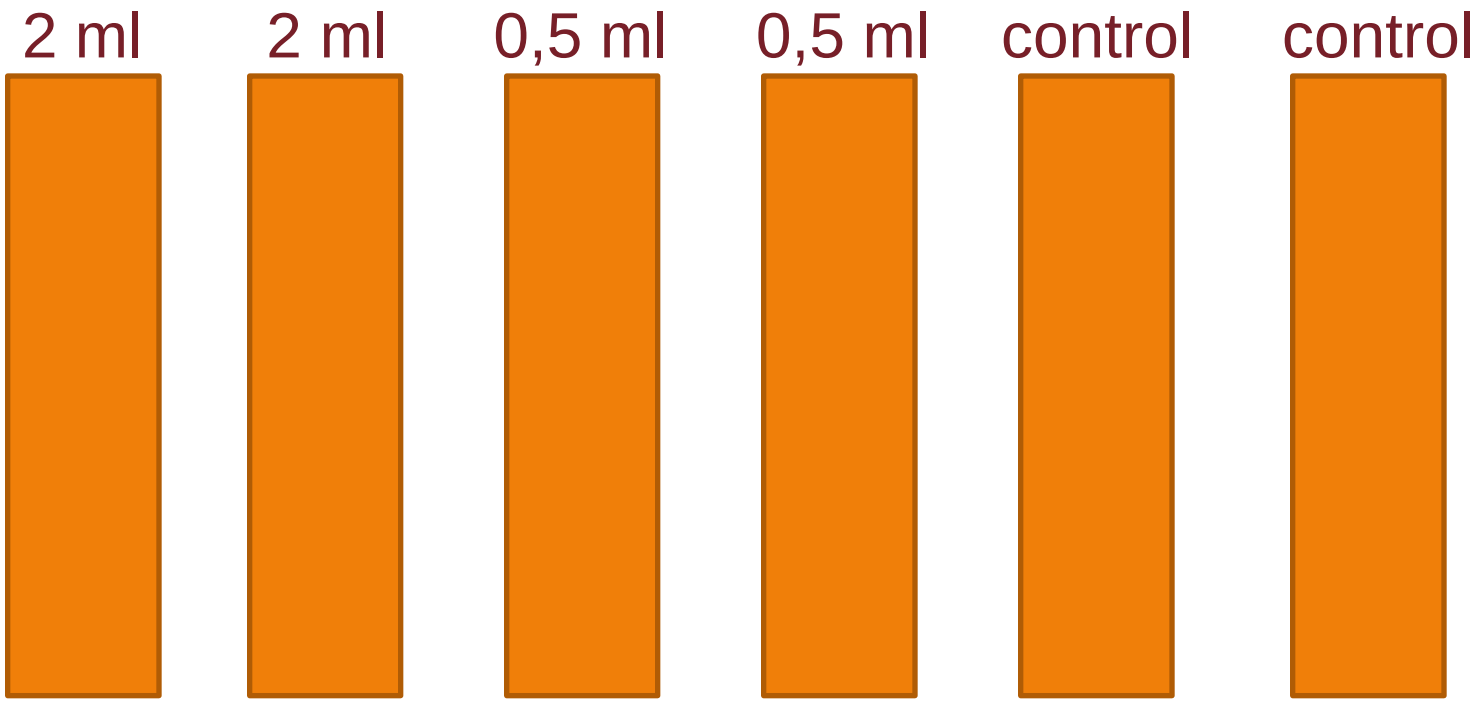
1. Making the columns

PROCEDURE

- We took six columns (plastic tubes): 10 cm in diameter, 3 mm thick and 50 cm high. All the columns had a cone shape on the bottom.

- At the bottom of the column, we place a piece of plastic net and pour Over 40 ml course sand. Then we add another piece of plastic net and cover it with 50 ml fine sand.

2. Polluting the columns with penicillin



3. Preparing water samples

- Into each column, we poured 400 ml rainwater. This rainwater went through the soil and slowly flowed out through the hose.

-We collected that water in a measuring cup. Then we analyzed it.

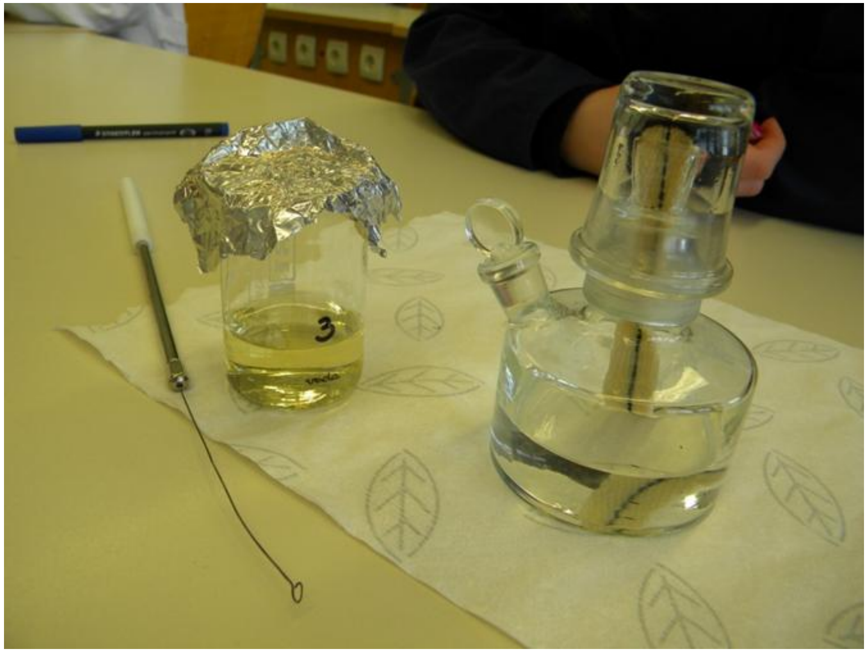
- We repeated the procedure 4 times.

4. Inoculating microorganisms on the medium

- We used the flame from a gas burner. We flame sterilized the inoculation loop and glassware.

- We regularly cleaned the worktop with disinfectants.

- We inoculated microorganisms from rainwater on both growth media, using a flame sanitized inoculation loop.



IV. RESULTS

NUMBER	DATE OF WATER ANALYSIS	DATE OF SOIL ANALYSIS
I.	18/4/2013	18/4/2013
II.	26/4/2013	
III.	23/5/2013	
IV.	28/5/2013	28/5/2013

	1ST COLUMN		2ND COULMN		3RD COULMN		4TH COULMN		5TH COULMN		6TH COULMN	
	PKE	KOLI	PKE	KOLI	PKE	KOLI	PKE	KOLI	PKE	KOLI	PKE	KOLI
I.	243	46	195	80	1O1	14	108	10	167	9	131	9
II.	200	uncountable	153	141	135	26	141	19	157	8	uncountable	8
III.	71	87	81	102	155	60	176	45	160	12	131	12
IV.	uncountable	174	uncountable	uncountable	uncountable	176	uncountable	uncountable	uncountable	22	uncountable	22

- UNIVERZA V NOVI GORICI - DIPLOMA WORK

STABILITY OF TWO ANTI BIOTICS IN THE SOIL:

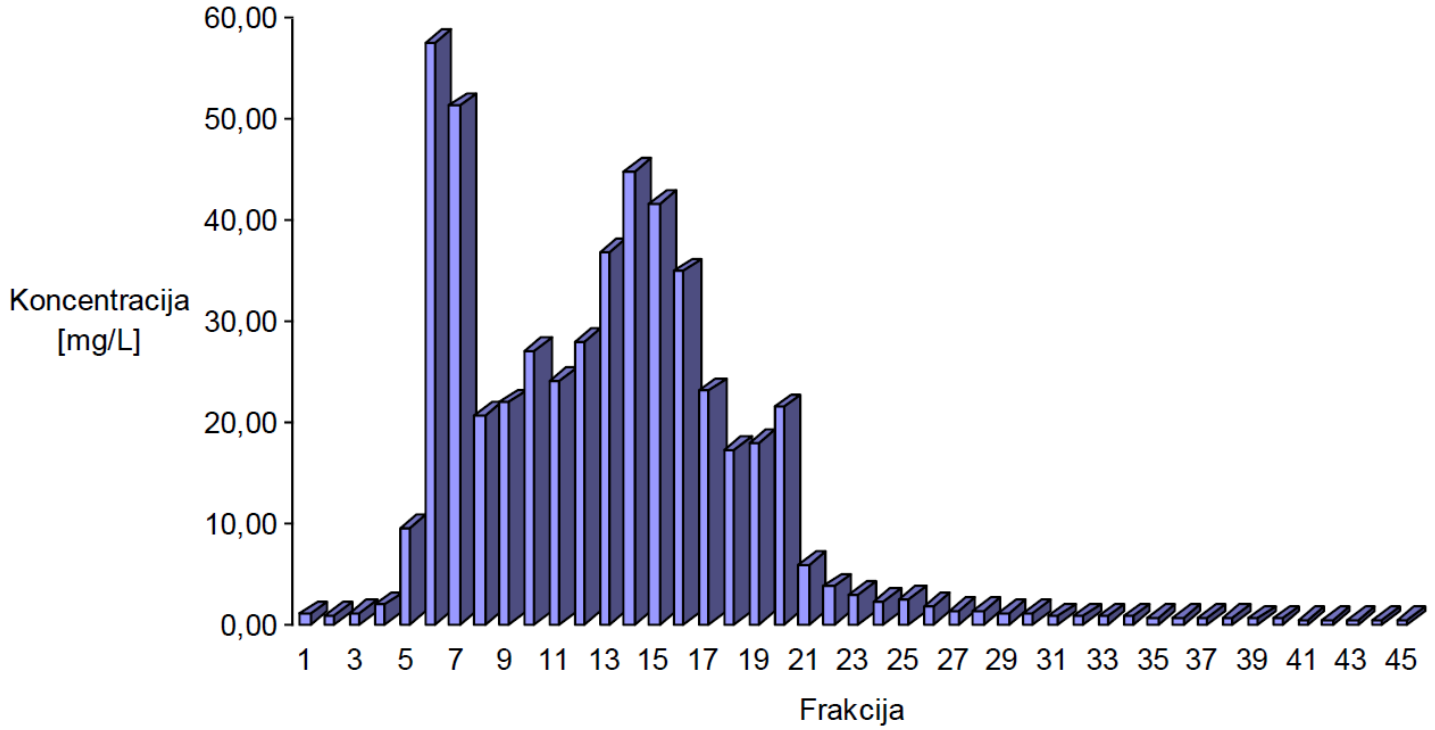
- Antibiotics are used to treat and prevent infectious diseases. They are used not only in human medicine, but also for the treatment of plants and animals.
- The focus of the thesis was to veterinary antibiotics that are used in food-producing animals. Since 1950 veterinary antibiotics in livestock are used for the treatment and prevention of infectious diseases, promote growth, to improve feed utilization and controlling parasites and non-communicable diseases
- Inappropriate and excessive use of antimicrobials in animals can cause significant environmental impacts
- Most of the antibiotics used in food-producing animals is poorly absorbed in the intestine, which means that most of our intake of antibiotics most commonly unchanged in the active form is excreted in faeces and urine.
- With the use of animal manure or slurry as organic fertilizer on agricultural land can be transferred antibiotics in the environment, either as the parent compound, its metabolites or degradation products

Sulfametoksazol in ciprofloksacin in the soil

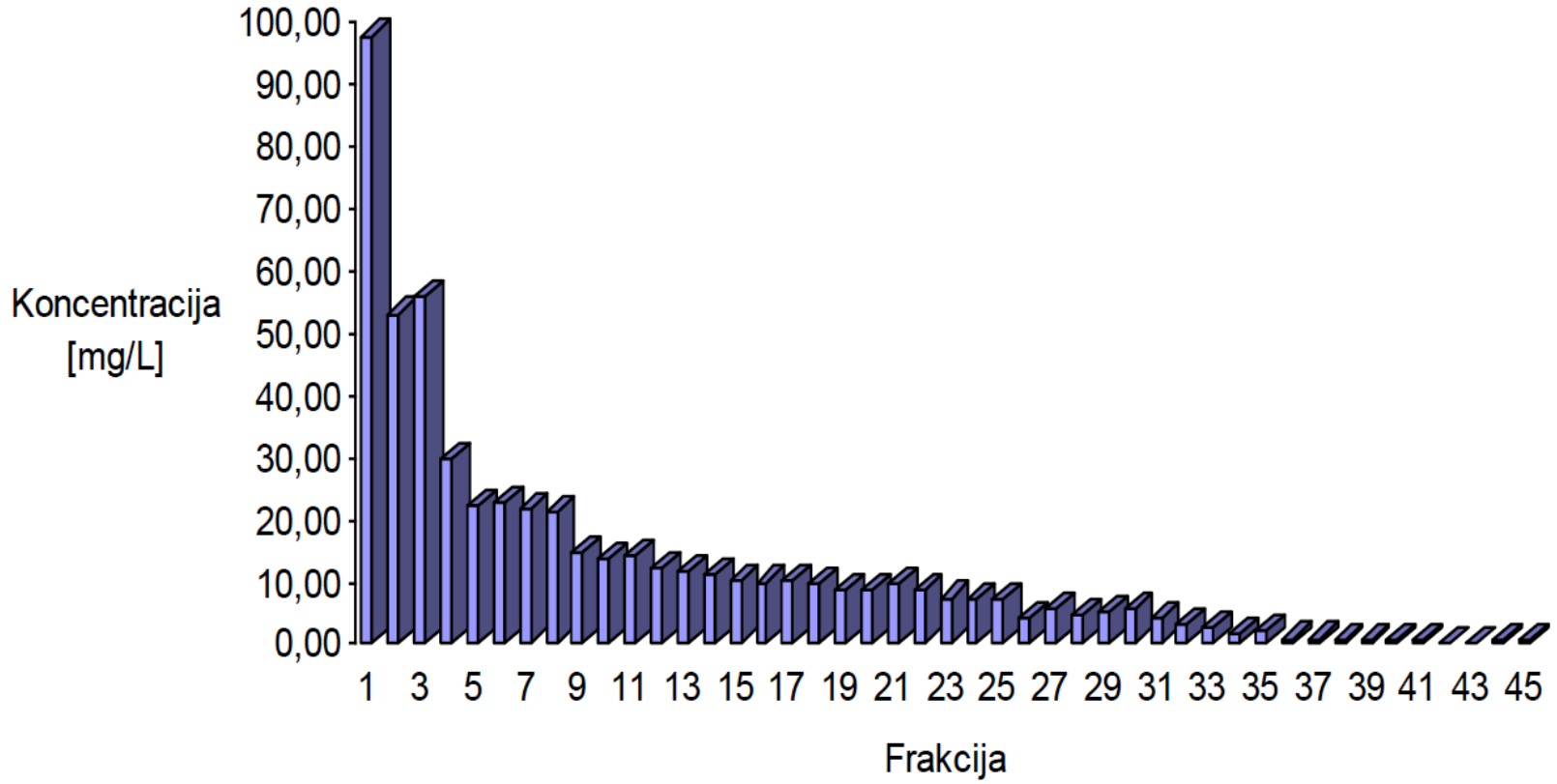
Concentration of sulfametoksazol is 200 mg/L

Concentration of Ciprofloksacin is 80 mg/L

Sulfametoksazol in the soil from Log pod Mangartom



Sulfametoksazol in the soil from Šempeter Nova Gorica



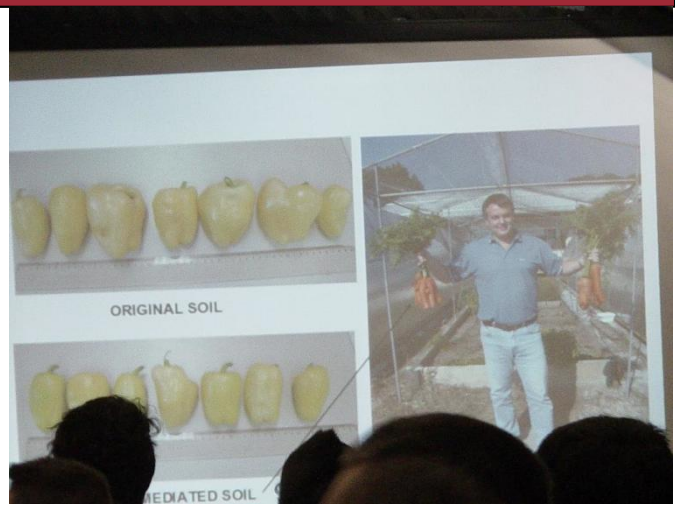
WATER POLLUTION WITH AMMONIA AS A RESULT OF AGRICULTURAL ACTIVITIES

WP3: Education

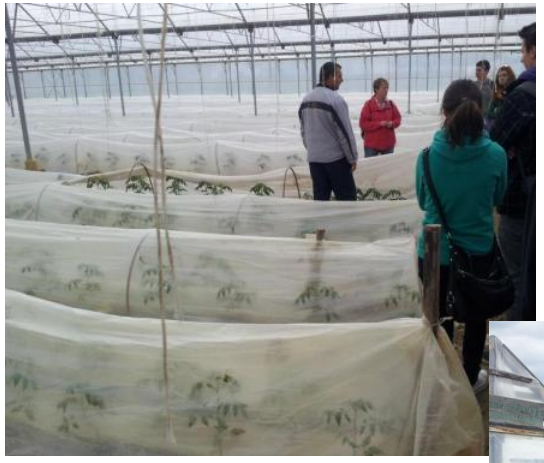
Regularly published reports on case examples of good agricultural practices between the partners.

- The organization of three workshops where the students will excharge and present obtained results from experimentation,

- Organization of technical days on which students exchange and present obtained results.



VISIT OF THREE OF EKOLOGIC FARMS



WP4: Information and dissemination

The organization of science days for primary schools,

Implementation of an Open Days event in secondary schools

Establishment of the Web page

Contributions in public (Goriška), Acta Chimica,

Posters and pamflets printing

Future activities

Organisation of Teacher training in Cividale, Summer school in Nova Gorica, Final conference in September

AGRI-KNOWS
Knowledge transfer in agriculture as an added value in protecting the environment

Hvala za vašo pozornost!
Grazie per l' attenzione!

Kristina Kalister

Website:
http://projects.ung.si/agriknows/index.html.

Projekt je sofinanciran v okviru Programa čezmejnega sodelovanja Slovenija-Italija 2007-2013 iz sredstev Evropskega sklada za regionalni razvoj in nacionalnih sredstev
Progetto finanziato nell'ambito del Programma per la Cooperazione Transfrontaliera Italia-Slovenia 2007-2013, dal Fondo europeo di sviluppo regionale e dai fondi nazional.

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSKI RAZVOJ IN TEHNOLOGIJO

Ministero dell'Economia e delle Finanze

2007-2013
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program čezmejnega sodelovanja
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Progetto cofinanziato dal Fondo europeo di sviluppo regionale

Projekt sofinancira Evropski sklad za regionalni razvoj