

Cooperation beyond borders.

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Project RoRS337 - ROmania Serbia NETwork for assessing and disseminating the impact of copper mining activities on water quality in the cross-border area (RoS-NET2)

PRELEVAREA PROBELOR

❖ Tipuri de probe care vor fi prelevate din fiecare locație:

> APĂ

- pentru testare fizico-chimică și chimică
- **pentru testare ecotoxicologică**
- pentru testare microbiologică
- **pentru remediere**

> SEDIMENT

- pentru testare fizico-chimică și chimică
- **pentru testare ecotoxicologică**
- pentru testare microbiologică
- **pentru remediere**

> SOL

- pentru testare fizico-chimică și chimică
- **pentru testare ecotoxicologică**
- pentru testare microbiologică
- **pentru remediere**



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- ❖ Număr total probe de ecotoxicologie: **25**
 - Probe de apă de suprafață → 6 RO + 4 SR = 10
 - Probe de apă din fântâni → 4 RO
 - Probe de sediment → 3 RO + 4 SR = 7
 - Probe de sol → 4 RO
- ❖ Număr total probe de remediere: **25**
 - Probe de apă de suprafață → 6 RO + 4 SR = 10
 - Probe de apă din fântâni → 4 RO
 - Probe de sediment → 3 RO + 4 SR = 7
 - Probe de sol → 4 RO

Project RoRS537 - Romania Serbia NETwork for assessing and disseminating the impact of copper mining activities on water quality in the cross-border area (RoS-NET2)

RORS337		FORM FOR WATER SAMPLE COLLECTION AND TESTING	
Sample collection			
Sampling location:		Sampling date:	
Sampling point identification:		Sample ID:	
GPS reading:	N <input type="text"/> E <input type="text"/>	Elev. (m asl) <input type="text"/>	
Water type:		<input type="checkbox"/> Surface water <input type="checkbox"/> Groundwater from well	
Depth: <input type="text"/>		Depth of well: <input type="text"/>	
Distance from the river bank: <input type="text"/>		Diameter of well: <input type="text"/>	
		Material of tube: <input type="text"/>	
Sample type:		<input type="checkbox"/> chemistry (-c) <input type="checkbox"/> ecotoxicity (-e) <input type="checkbox"/> microbiology (-m) <input type="checkbox"/> remediation (-r)	
Sampling method:		Sampling equipment:	
Time of sampling:		Name of sampler:	
Physicochemical parameters			
Color:		PARAMETRII FIZICO-CHIMICI ❖ SE COMPLETEAZĂ CONFORM PROBELOR DE CHIMIE	
Odor:			
Air temperature:			
Water temperature:			
pH:			
Dissolved oxygen:			
Redox potential:			
Electrical conductivity:			
Water flow rate:			
*Turbidity:			
Name of researcher responsible for physicochemical assessment of samples:			
Chemical parameters (metal concentration)			

Project RoRS337 - Romania Serbia NETwork for assessing and disseminating the impact of copper mining activities on water quality in the cross-border area (RoS-NET2)

Project RoRS 337- Romania **S**erbia **N**ETwork for assessing and disseminating the impact of copper mining activities on water quality in the cross-border area (RoS-NET2)

FORMULARE PENTRU PRELEVAREA ȘI TESTAREA PROBELOR

Formularul pentru probele de SEDIMENT

RORS337 FORM FOR SEDIMENT SAMPLE COLLECTION AND TESTING	
Sample collection	
Sampling location:	Sampling date:
Sampling point identification:	Sample ID:
GPS reading: N E Elev. (m asl)	
Sample type: <input type="checkbox"/> chemistry (-c) <input type="checkbox"/> ecotoxicity (-e) <input type="checkbox"/> microbiology (-m) <input type="checkbox"/> remediation (-r)	
Sampling method:	Sampling equipment:
Depth:	Distance from the river bank:
Time of sampling:	Name of sampler:
Physicochemical parameters	
Color:	
Odor:	
Air temperature:	
Sediment temperature:	
*pH:	
Redox potential:	
Conductivity:	
Dissolved Oxygen:	
Sediment characterization:	
Name of researcher responsible for physicochemical assessment of samples:	
Chemical parameters (metal concentration)	

PARAMETRII FIZICO-CHIMICI
❖ SE COMPLETEAZĂ CONFORM
PROBELOR DE CHIMIE

Chemical parameters (metal concentration)	
Element	Concentration
Fe	
Cu	
Mn	
Zn	
PARAMETRII CHIMICI	
*Toxicological parameters	
ECOTOXICITY	Testing organisms and test type: Results:
ACUT	
CHRONIC	
Remarks:	
Conclusion:	
Name of researcher that conducted the ecotoxicity assessment:	
PARAMETRII TOXICOLOGICI ECOTOXICITATE	
ECOTOXICITY	Testing organisms and test type: Results:
ACUT	
CHRONIC	
Remarks:	
Conclusion:	
Name of researcher that conducted the ecotoxicity assessment:	
PARAMETRII TOXICOLOGICI MICROBIOLOGIE	
ECOTOXICITY	Testing organisms and test type: Results:
ACUT	
CHRONIC	
Remarks:	
Conclusion:	
Name of researcher that conducted the ecotoxicity assessment:	
PARAMETRII TOXICOLOGICI TOXICITATE ASUPRA UNOR ENZIME	
*Identification of microorganisms that might be used in remediation	
Microorganism type	Microorganisms
Identification method	
IDENTIFICARE MICROORGANISME	
*Identification of inferior organisms that might be used in remediation	
Organism type	Organisms
Identification method	
IDENTIFICARE ORGANISME INFERIOARE	



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FORMULARE PENTRU PRELEVAREA ȘI TESTAREA PROBELOR

Formularul pentru probele de SOL

RORS337 FORM FOR SOIL SAMPLE COLLECTION AND TESTING	
Sample collection	
Sampling location:	Sampling date:
Sampling point identification:	Sample ID:
GPS reading: N E Elev. (m asl)	
Sample type: <input type="checkbox"/> chemistry (-c) <input type="checkbox"/> ecotoxicity (-e) <input type="checkbox"/> microbiology (-m) <input type="checkbox"/> remediation (-r)	
Sampling method:	Sampling equipment:
Depth:	Surface / Volume:
Time of sampling:	Name of sampler:
Physicochemical parameters	
Color:	
Odor:	
Air temperature:	
Soil temperature:	
Vegetation:	
*pH:	
Soil characterization:	
Name of researcher responsible for physicochemical assessment of samples:	
Chemical parameters (metal concentration)	

PARAMETRII FIZICO-CHIMICI
❖ SE COMPLETEAZĂ CONFORM
PROBELOR DE CHIMIE

Chemical parameters (metal concentration)	
Element	Concentration
Fe	
Cu	
Mn	
Zn	
PARAMETRII CHIMICI	
*Toxicological parameters	
ECOTOXICITY	Testing organisms and test type: Results:
ACUT	
CHRONIC	
Remarks:	
Conclusion:	
Name of researcher that conducted the ecotoxicity assessment:	
PARAMETRII TOXICOLOGICI ECOTOXICITATE	
ECOTOXICITY	Testing organisms and test type: Results:
ACUT	
CHRONIC	
Remarks:	
Conclusion:	
Name of researcher that conducted the ecotoxicity assessment:	
PARAMETRII TOXICOLOGICI MICROBIOLOGIE	
ECOTOXICITY	Testing organisms and test type: Results:
ACUT	
CHRONIC	
Remarks:	
Conclusion:	
Name of researcher that conducted the ecotoxicity assessment:	
PARAMETRII TOXICOLOGICI TOXICITATE ASUPRA UNOR ENZIME	
*Identification of microorganisms that might be used in remediation	
Microorganism type	Microorganisms
Identification method	
IDENTIFICARE MICROORGANISME	
*Identification of inferior organisms that might be used in remediation	
Organism type	Organisms
Identification method	
IDENTIFICARE ORGANISME INFERIOARE	



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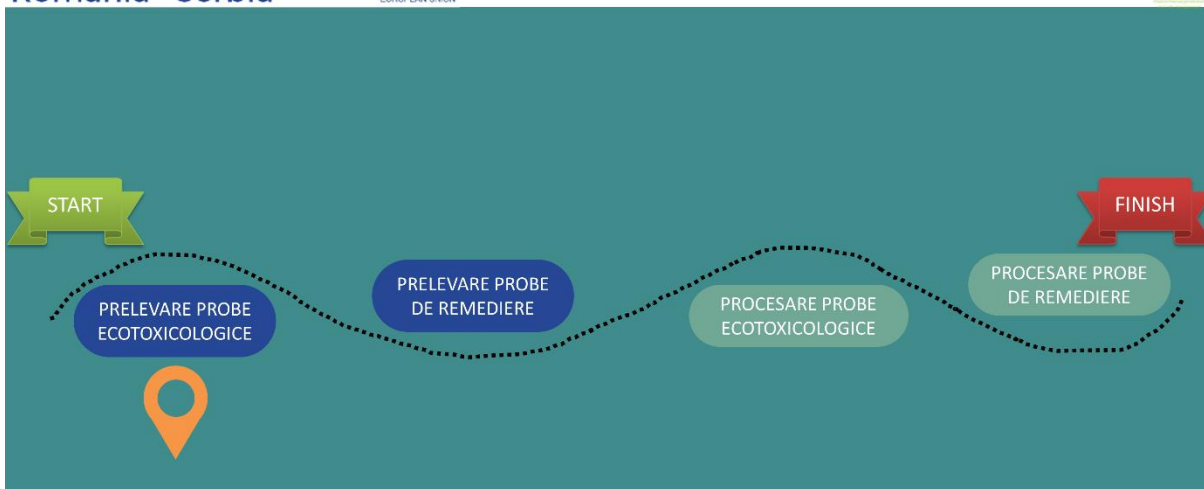
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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

PREGĂTIREA TRUSEI PENTRU PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

❖ Trusa se va pregăti în laborator înainte de deplasarea în teren

❖ Trusa va conține:

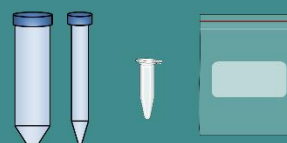
➢ Echipament de protecție:

- Mănuși de latex sau nitril
- Ochelari de protecție
- Cizme de cauciuc (opțional)
- Alte obiecte și consumabile necesare



➢ Recipiente pentru păstrarea probelor prelevate

- Recipiente de plastic cu volum minim de 15 mL pentru probele lichide
- Recipiente de plastic cu volum de 1.5-2 mL pentru probele de sediment și sol
- Saci de plastic (de dimensiuni reduse) resigilabili pentru probele de sol



➢ Etichete pentru recipientele de prelevare a probelor

➢ Echipamente de prelevare a probelor

- Recipiente de colectare a probelor specifice tipurilor de probe



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

PRECAUȚII PENTRU COLECTAREA PROBELOR

- ❖ Se va purta o pereche de mănuși curate noi, ne pudrate, de latex sau nitril de fiecare dată când se colectează o probă dintr-o locație diferită
- ❖ Mănușile nu ar trebui să intre în contact cu proba eșantionată.
- ❖ Dacă este posibil, un membru al echipei de prelevare a probelor ar trebui să înregistreze toate notele de teren, să colecteze date GPS etc., în timp ce ceilalți membri colectează probele
- ❖ Când se prelevează probe de apă de suprafață și sedimente din aceeași locație, proba de apă trebuie colectată întotdeauna înainte de recoltarea probei de sedimente



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

- ❖ Număr voluntari necesari pentru recoltare probe: 4 (V1-V4)
- ❖ Probele vor fi colectate
 - Manual – în locurile accesibile
 - Utilizând un dispozitiv telescopic de colectare – în zonele inaccesibile



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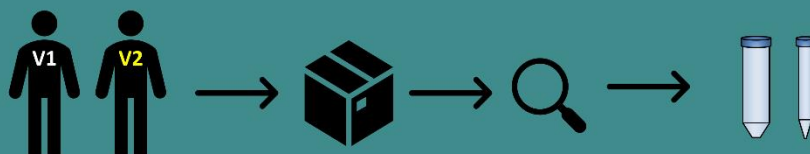
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

❖ Etapele colectării:

1. Voluntarii V1 și V2

- ❖ identifică recipientul de colectare potrivit tipului de probă (apă)



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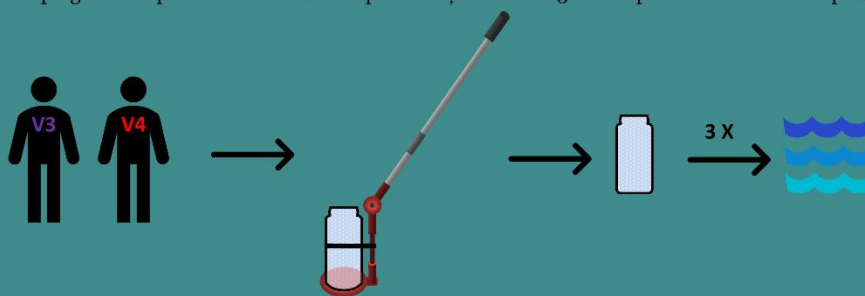
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

❖ Etapele colectării:

2. Voluntarii V3 și V4

- ❖ pregătesc dispozitivul de colectare a probelor și clătesc de 3 ori recipientul de colectare a probelor



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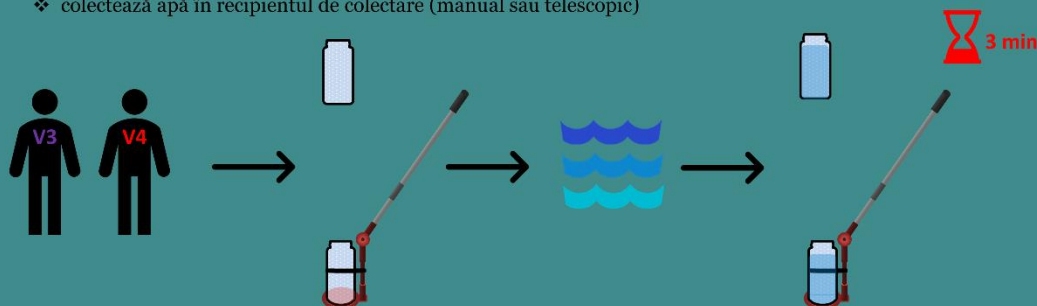
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

❖ Etapele colectării:

3. Voluntarii V3 și V4

- ❖ colectează apă în recipientul de colectare (manual sau telescopic)



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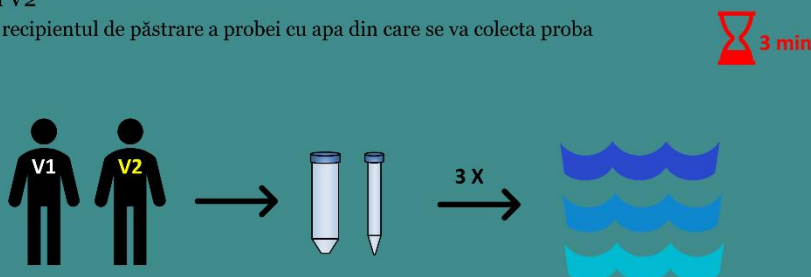
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

❖ Etapele colectării:

4. Voluntarii V1 și V2

- ❖ clătesc de 3 ori recipientul de păstrare a probei cu apa din care se va colecta proba



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

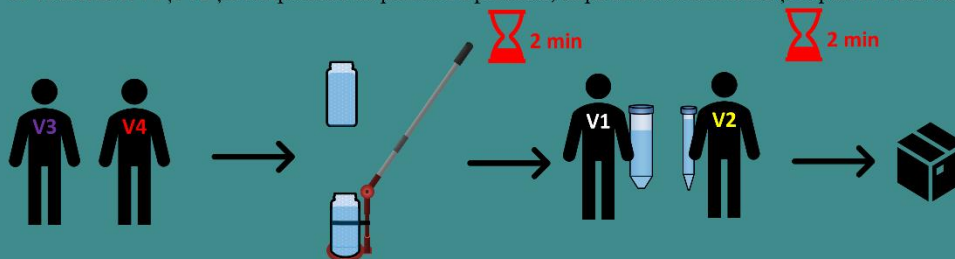
METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

❖ Etapele colectării:

5. Voluntarii V3 și V4

- ❖ toarnă în recipientul de păstrare

6. Voluntarii V1 și V2 țin recipientele de păstrare a probelor, după care le etichetează și le pun în trusa de teren



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

❖ Exemplu video pentru metoda de prelevare a probelor de apă de suprafață:

- How to Collect Water Samples (<https://www.youtube.com/watch?v=61cGILD06PA>)



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DE SUPRAFAȚĂ

- ❖ Exemplu video pentru metoda de prelevare a probelor de apă de suprafață:
 - WPLMN - sampling with a telescoping rod (<https://www.youtube.com/watch?v=6oDez3aWi-o>)



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DIN FÂNTÂNĂ

- ❖ Număr voluntari necesari pentru recoltare probe: 4 (V1-V4)
- ❖ Probele vor fi colectate
 - Manual – cu ajutorul unei găleți



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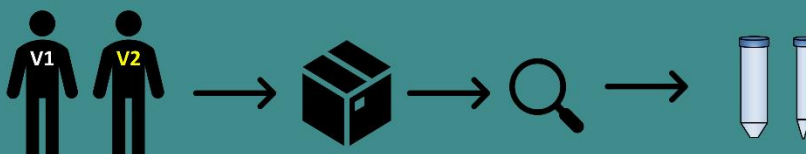
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DIN FÂNTÂNĂ

❖ Etapele colectării:

1. Voluntarii V1 și V2

- ❖ identifică recipientul de colectare potrivit tipului de probă (apă)



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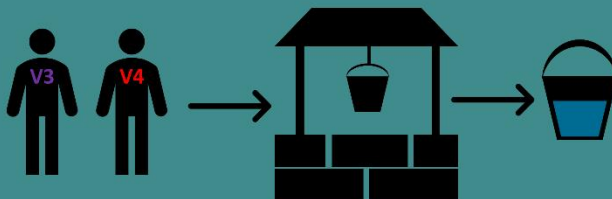
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DIN FÂNTÂNĂ

❖ Etapele colectării:

2. Voluntarii V3 și V4

- ❖ iau apă din fântână într-o găleată clătită înainte de 3 ori cu apa din fântână



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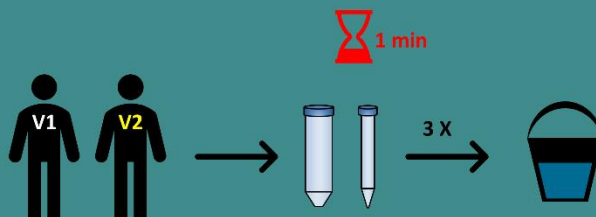
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE APĂ DIN FÂNTÂNĂ

❖ Etapele colectării:

3. Voluntarii V1 și V2

- ❖ clătesc de 3 ori recipientul de păstrare a probei cu apa din care se va colecta proba (din găleată)



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

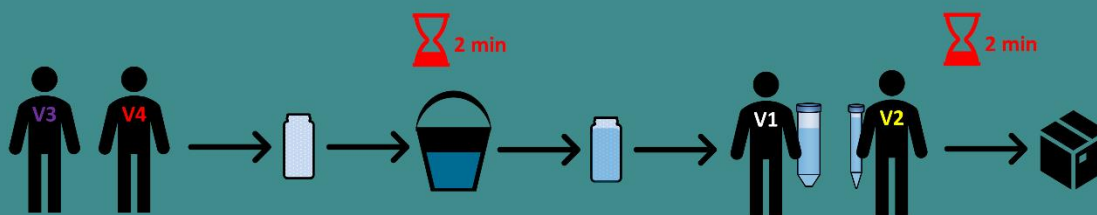
METODA DE PRELEVARE A PROBELOR DE APĂ DIN FÂNTÂNĂ

❖ Etapele colectării:

4. Voluntarii V3 și V4

- ❖ colectează probe de apă din găleată și le toarnă în recipientele de păstrare a probelor

5. Voluntarii V1 și V2 țin recipientele de păstrare a probelor, după care le etichetează și le pun în trusa de teren



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SEDIMENT

❖ Număr voluntari necesari pentru recoltare probe: 4 (V5-V8)

❖ Probele vor fi colectate

➢ Manual – în tuburi de 1,5 mL



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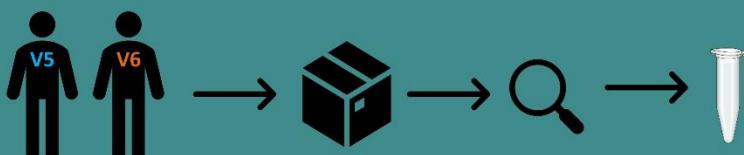
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SEDIMENT

❖ Etapele colectării:

1. Voluntarii V5 și V6

❖ identifică recipientul de colectare potrivit tipului de probă (sediment)



Cooperation beyond borders.

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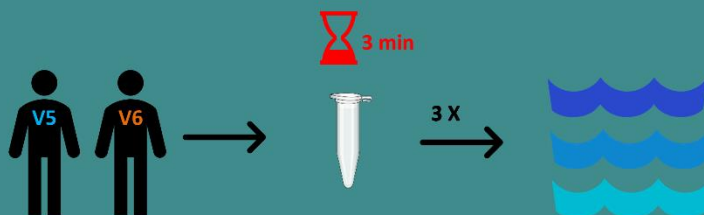
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SEDIMENT

❖ Etapele colectării:

2. Voluntarii V5 și V6

- ❖ clătesc de 3 ori recipientul de păstrare a probei cu apa din zona în care se va colecta proba de sediment



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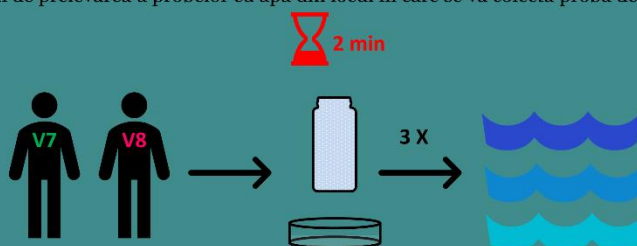
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SEDIMENT

❖ Etapele colectării:

3. Voluntarii V7 și V8

- ❖ pregătesc vasul de prelevare a probelor (un recipient de plastic cu gura largă sau o cutie Petri de plastic)
- ❖ clătesc de 3 ori vasul de prelevare a probelor cu apa din locul în care se va colecta proba de sediment



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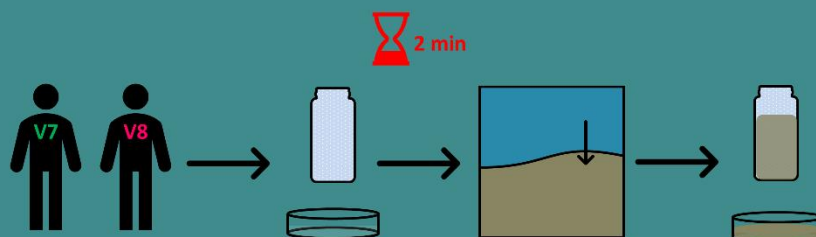
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SEDIMENT

❖ Etapele colectării:

5. Voluntarii V7 și V8

- ❖ colectează probă de sediment în recipientul de colectare a probelor de la suprafața sedimentului



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

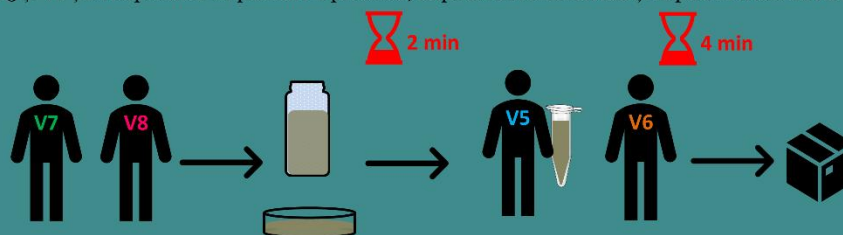
METODA DE PRELEVARE A PROBELOR DE SEDIMENT

❖ Etapele colectării:

6. Voluntarii V7 și V8

- ❖ pun probele de sediment în recipientele de păstrare a probelor

7. Voluntarii V5 și V6 țin recipientele de păstrare a probelor, după care le etichetează și le pun în trusa de teren



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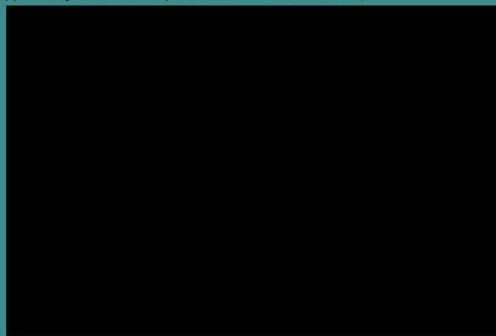
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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SEDIMENT

❖ Exemplu video pentru metoda de prelevare a probelor de sediment:

➤ Bed Sediment Sampling (https://www.youtube.com/watch?v=KklCJ_DuHeE)



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SOL

❖ Număr voluntari necesari pentru recoltare probe: 4 (V5-V8)

❖ Probele vor fi colectate

➤ Manual – în tuburi de 1.5 mL sau în saci de colectare a probelor solide



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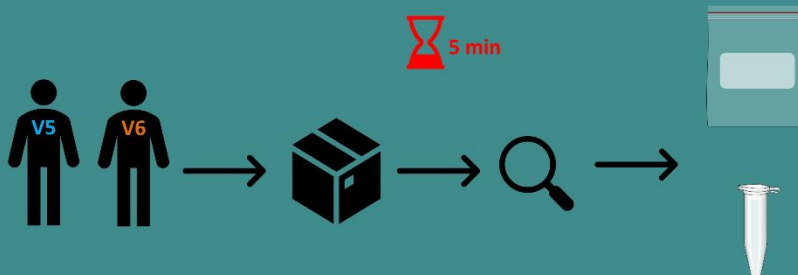
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SOL

❖ Etapele colectării:

1. Voluntarii V5 și V6

- ❖ identifică și pregătesc recipientul de colectare potrivit tipului de probă (sol)



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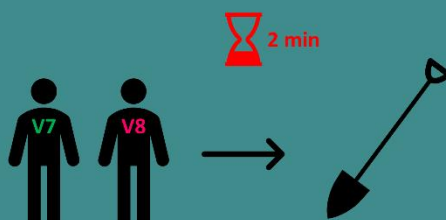
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SOL

❖ Etapele colectării:

2. Voluntarii V7 și V8

- ❖ pregătesc lopata care va fi utilizată pentru colectarea probelor de sol



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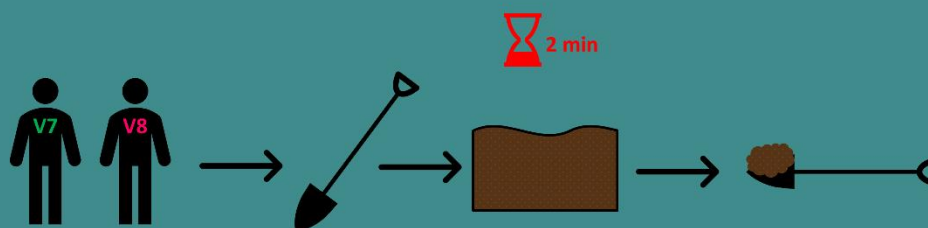
PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SOL

❖ Etapele colectării:

3. Voluntarii V7 și V8

- ❖ colectează proba de sol cu lopata pregătită anterior



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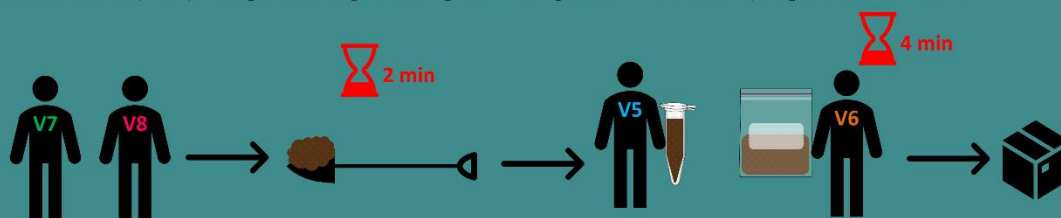
METODA DE PRELEVARE A PROBELOR DE SOL

❖ Etapele colectării:

4. Voluntarii V7 și V8

- ❖ pun probele de sol în recipiente de păstrare a probelor

7. Voluntarii V5 și V6 țin recipientele de păstrare a probelor, după care le etichetează și le pun în trusa de teren



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

METODA DE PRELEVARE A PROBELOR DE SOL

- ❖ Exemplu video pentru metoda de prelevare a probelor de sol:
 - How to take a Soil Sample on your farm, by the Agricultural Research Council of South Africa (<https://www.youtube.com/watch?v=4uPcc9oR7lQ>)



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PRELEVAREA PROBELOR DE ECOTOXICOLOGIE

PĂSTRAREA PROBELOR PRELEVATE

- ❖ Toate probele vor fi păstrate astfel:
 - La maxim 10°C
 - Protejate de lumină
 - Trebuie transportate în laborator în maxim 72 ore de la colectare
 - Dacă probele de ecotoxicologie nu pot fi prelucrate pe loc, acestea se vor congela la -20°C



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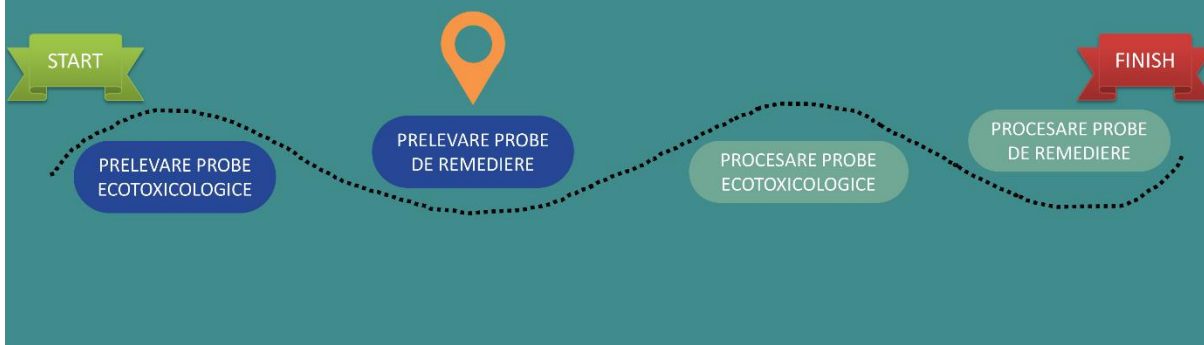
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PRELEVAREA PROBELOR DE REMEDIERE



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PRELEVAREA PROBELOR DE REMEDIERE

PREGĂTIREA TRUSEI PENTRU PRELEVAREA PROBELOR DE REMEDIERE

❖ Trusa se va pregăti în laborator înainte de deplasarea în teren

❖ Trusa va conține:

➢ Echipament de protecție:

- Mănuși de latex sau nitril
- Ochelari de protecție
- Cizme de cauciuc (opțional)
- Alte obiecte și consumabile necesare



➢ Recipiente pentru păstrarea probelor prelevate

- Recipiente de plastic cu volum minim de 15 mL pentru probele lichide
- Recipiente de plastic cu volum de 1.5-2 mL pentru probele de sediment și sol
- Saci de plastic (de dimensiuni reduse) resigilabile pentru probele de sol
- Cutii Petri pentru probele care se vor lua pe mediu de cultură solid

➢ Medii de cultură lichide

➢ Plăci Petri cu medii de cultură solide

➢ Etichete pentru recipientele de prelevare a probelor

➢ Echipamente de prelevare a probelor

- Recipiente de colectare a probelor specifice tipurilor de probe



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PRELEVAREA PROBELOR DE REMEDIERE MEDII DE CULTURĂ

- ❖ Se vor prepara următoarele medii de cultură lichide și solide:
 - mediu de cultură pentru cianobacterii (Mediu BG 11)
 - mediu de cultură pentru alge verzi (Mediu OECD TG 201)
 - mediu de cultură pentru protozoare (Mediu Chalkley pentru Protiste)
 - mediu de cultură pentru nematode (Mediu NGM)
- ❖ Mediile lichide se vor păstra în recipiente de 0.5-1 L și se vor turna în recipiente de plastic adecvate la locul de prelevare a probelor
- ❖ Mediile de cultură solide se vor turna în plăci Petri și se vor transporta astfel la locul de prelevare a probelor



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PRELEVAREA PROBELOR DE REMEDIERE

PRECAUȚII PENTRU COLECTAREA PROBELOR

- ❖ Se va purta o pereche de mănuși curate noi, ne pudrate, de latex sau nitril de fiecare dată când se colectează o probă dintr-o locație diferită
- ❖ Mănușile nu ar trebui să intre în contact cu proba eșantionată.
- ❖ Dacă este posibil, un membru al echipei de prelevare a probelor ar trebui să înregistreze toate notele de teren, să colecteze date GPS etc., în timp ce ceilalți membri colectează probele
- ❖ Când se prelevează probe de apă de suprafață și sedimente din aceeași locație, proba de apă trebuie colectată întotdeauna înainte de recoltarea probei de sedimente



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PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR

- ❖ Metoda de prelevare a probelor „pure” (fără mediu de cultură) este identică cu metoda de prelevare a probelor de ecotoxicologie
- ❖ Probele în mediu de cultură se vor colecta doar acolo unde se observă existența unor organisme în locurile de prelevare a probelor „pure”
- ❖ Număr voluntari necesari: 8 voluntari



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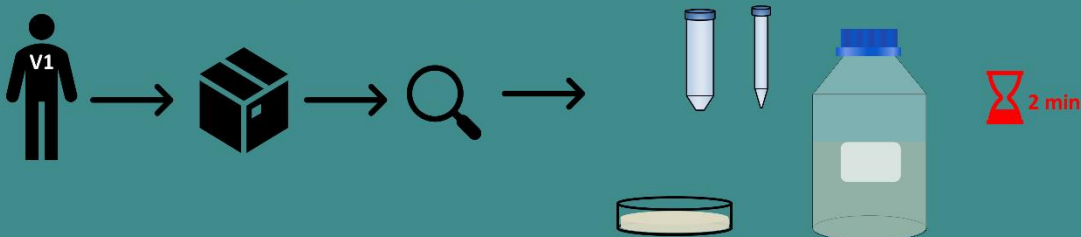
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PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de apă

- ❖ Etapele colectării:
 1. Voluntarul V1
 - ❖ identifică recipientul de colectare potrivit tipului de probă (apă) în care se va turna mediul lichid
 - ❖ identifică mediul de cultură lichid și/sau solid necesar (se va stabili la fața locului)



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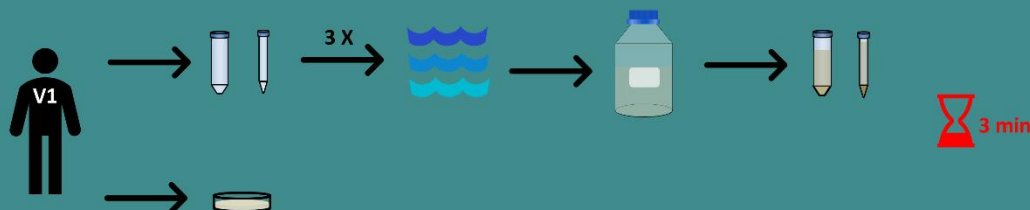
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de apă

❖ Etapele colectării:

2. Voluntarul V1

- ❖ pregătește vasele goale prin clătirea de 3 ori a probelor cu proba de apă (în cazul probelor de apă și sediment)
- ❖ toarnă mediile lichide de cultură potrivite în tuburi goale dacă este cazul
- ❖ pregătește mediile solide de cultură potrivite dacă este cazul



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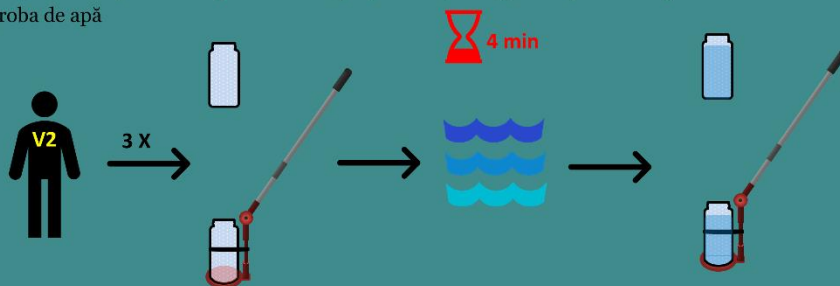
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de apă

❖ Etapele colectării:

3. Voluntarul V2

- ❖ pregătește recipientul de prelevare a probelor de apă și îl clătește de 3 ori cu proba de apă
- ❖ colectează proba de apă



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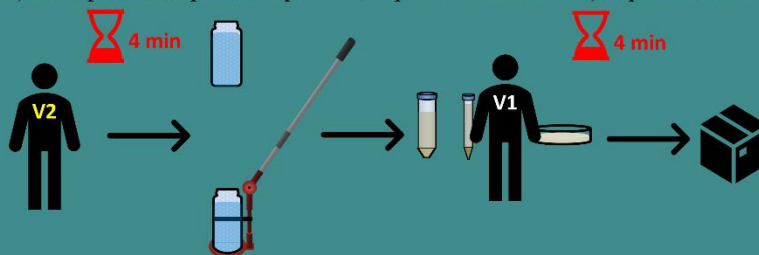
METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de apă

❖ Etapele colectării:

4. Voluntarul V2

- ❖ pune câte 1-5 mL probă de apă în recipientele cu mediu de cultură lichid și solid (stabilit anterior)

5. Voluntarul V1 ține recipientele de păstrare a probelor, după care le etichetează și le pun în trusa de teren



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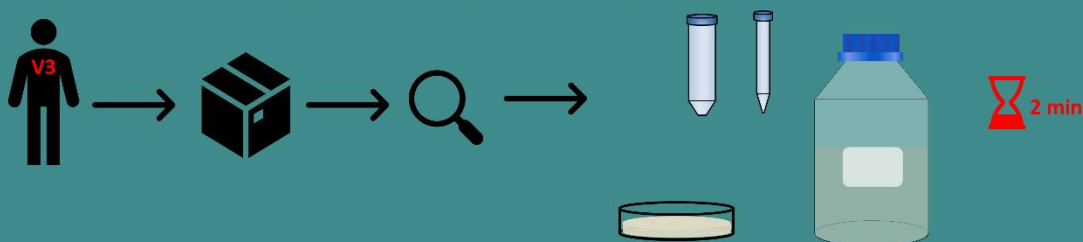
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sediment

❖ Etapele colectării:

1. Voluntarul V3

- ❖ identifică recipientul de colectare potrivit tipului de probă (sediment) în care se va turna mediul lichid
- ❖ identifică mediul de cultură lichid și/sau solid necesar (se va stabili la fața locului)



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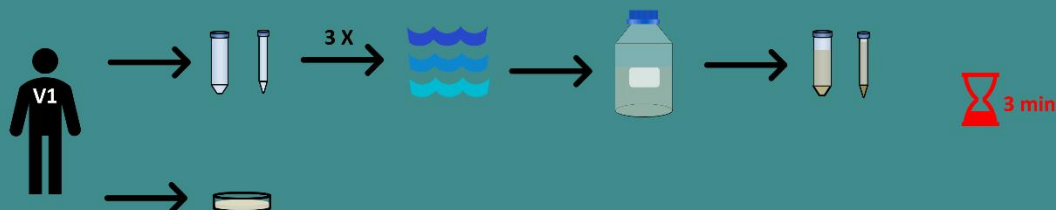
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sediment

❖ Etapele colectării:

2. Voluntarul V3

- ❖ pregătește vasele goale prin clătirea de 3 ori a probelor cu proba de apă (în cazul probelor de apă și sediment)
- ❖ toarnă mediile lichide de cultură potrivite în tuburi goale dacă este cazul
- ❖ pregătește mediile solide de cultură potrivite dacă este cazul



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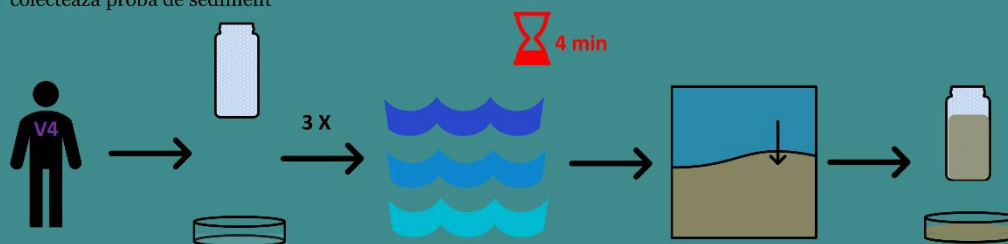
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sediment

❖ Etapele colectării:

3. Voluntarul V4

- ❖ pregătește recipientul de prelevare a probelor de sediment și îl clătește de 3 ori cu proba de apă
- ❖ colectează proba de sediment



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PRELEVAREA PROBELOR DE REMEDIERE

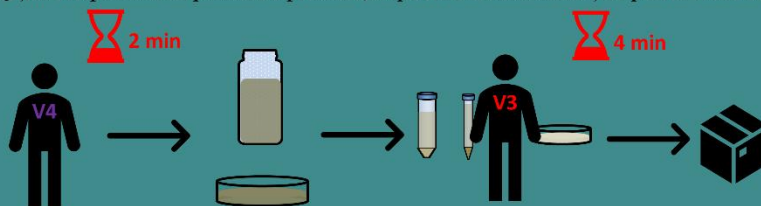
METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sediment

❖ Etapele colectării:

4. Voluntarul V4

- ❖ pune o cantitate mică de probă de sediment în recipientele cu mediu de cultură lichid și solid (stabilit anterior)

5. Voluntarul V3 ține recipientele de păstrare a probelor, după care le etichetează și le pun în trusa de teren



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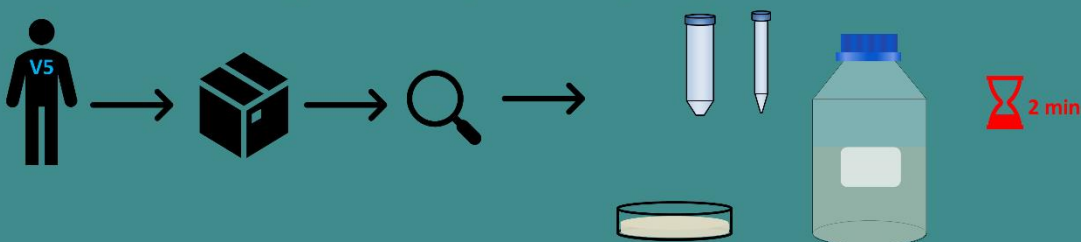
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sol

❖ Etapele colectării:

1. Voluntarul V5

- ❖ identifică recipientul de colectare potrivit tipului de probă (sol) în care se va turna mediul lichid
- ❖ identifică mediul de cultură lichid și/sau solid necesar (se va stabili la fața locului)



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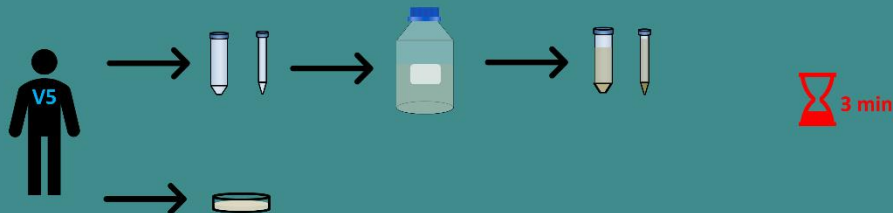
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sol

❖ Etapele colectării:

2. Voluntarul V5

- ❖ pregătește vasele goale
- ❖ toarnă mediile lichide de cultură potrivite în tuburi goale dacă este cazul
- ❖ pregătește mediile solide de cultură potrivite dacă este cazul



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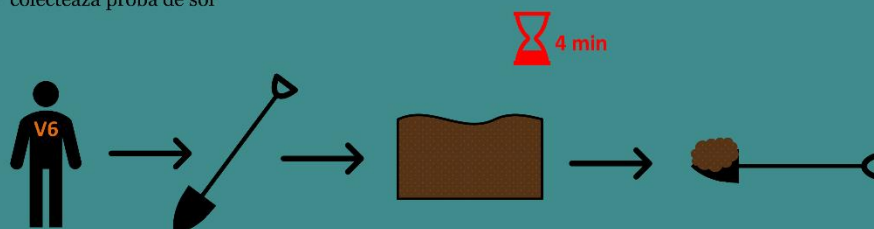
PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sol

❖ Etapele colectării:

3. Voluntarul V6

- ❖ pregătește lopata
- ❖ colectează proba de sol



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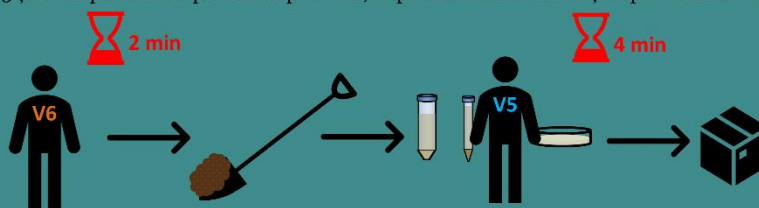
METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – probe de sol

❖ Etapele colectării:

4. Voluntarul V6

- ❖ pune o cantitate mică de probă de sol în recipientele cu mediu de cultură lichid și solid (stabilit anterior)

5. Voluntarul V5 ține recipientele de păstrare a probelor, după care le etichetează și le pun în trusa de teren



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PRELEVAREA PROBELOR DE REMEDIERE

METODA DE PRELEVARE A PROBELOR ÎN MEDIU DE CULTURĂ – alte tipuri de probe

- ❖ În cazul în care se identifică puncte suplimentare unde există organisme adaptate condițiilor extreme rezultate în urma activităților miniere, voluntarii V6 și V7 vor colecta probele urmând pașii:

1. Voluntarul V6 – identifică tipul de probă și vasele cu mediile de cultură necesare
2. Voluntarul V6 – pregătește vasele identificate ca fiind necesare pentru probe
3. Voluntarul V7 – pregătește uneltele de colectare a probelor necesare
4. Voluntarul V7 – colectează probe din punctele stabilite
5. Voluntarul V7 – adaugă 1-5 mL de probă în fiecare recipient și mediu de cultură stabilit ca fiind necesar
6. Voluntarul V6 - ține vasele pentru a fi umplute cu probe și le pune apoi în trusa de teren, după etichetarea corespunzătoare



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PRELEVAREA PROBELOR

FOTO-DOCUMENTAREA ACTIVITĂȚILOR DE COLECTARE A PROBELOR

❖ Voluntarul V8:

- va pregăti aparatul de fotografiat sau telefonul mobil
- va fotografia toate activitățile de colectare a probelor de remediere și ecotoxicitate
- va fotografia toate zonele afectate de activități miniere unde ar putea exista organisme adaptate acestor condiții extreme
- va nota pe caiet / foaie locația exactă a fiecărei fotografii realizate



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PRELEVAREA PROBELOR DE REMEDIERE

PĂSTRAREA PROBELOR PRELEVATE

❖ Toate probele vor fi păstrate astfel:

- La maxim 10°C
- Protejate de lumină
- Trebuie transportate în laborator în maxim 72 ore de la colectare
- Probele trebuie procesate cât mai repede posibil pentru a preveni moartea posibilelor organisme colectate



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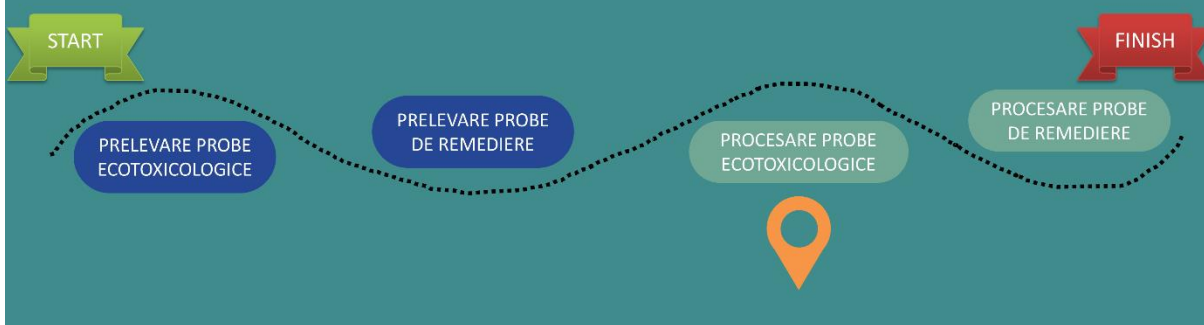
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PROCESAREA PROBELOR DE ECOTOXICOLOGIE



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PROCESAREA PROBELOR DE ECOTOXICOLOGIE

❖ Probele de ecotoxicologie vor fi procesate:

- Proaspete – imediat după ce sunt aduse în laborator
- Decongelate – după ce sunt aduse în laborator sunt congelate, iar înainte de testare vor fi decongelate

❖ Exemple de testele ecotoxice la care pot fi supuse probele:

- Testul de inhibare a creșterii a unor cianobacterii sau micro alge verzi
- Testul de inhibare a creșterii lintitei
- Testul de imobilizare acută a dafniilor



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PROCESAREA PROBELOR DE ECOTOXICOLOGIE

- ❖ Probele de apă vor fi testate prin realizarea unor diluții ale probei inițiale cu mediul de cultură specific
- ❖ Probele de sediment și sol vor fi dizolvate în mediul de cultură specific testului și testat sub formă de diluții
- ❖ Se determină ce diluție a probelor determină un efect inhibitor pentru jumătatea populației testate
- ❖ Pe baza rezultatelor chimice primite de la partenerii din Serbia se va determina concentrația de metale a diluției care determină un efect inhibitor pentru jumătatea populației testate
- ❖ Astfel se compară probele din diferitele locații de unde acestea s-au colectat



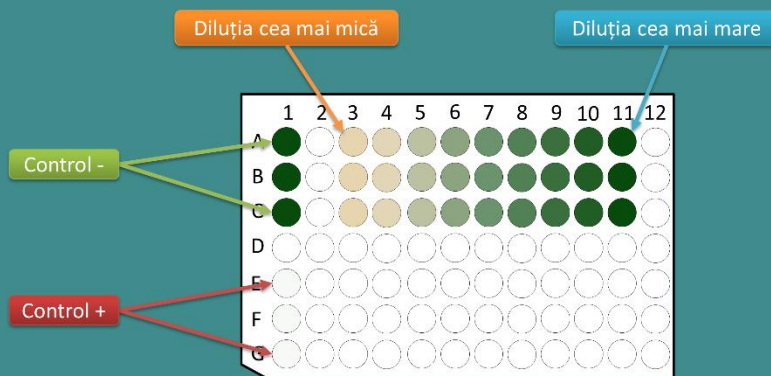
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PROCESAREA PROBELOR DE ECOTOXICOLOGIE

TESTUL DE INHIBARE A CREȘTERII CIANOBACTERIILOR ȘI MICRO ALGELOR VERZI



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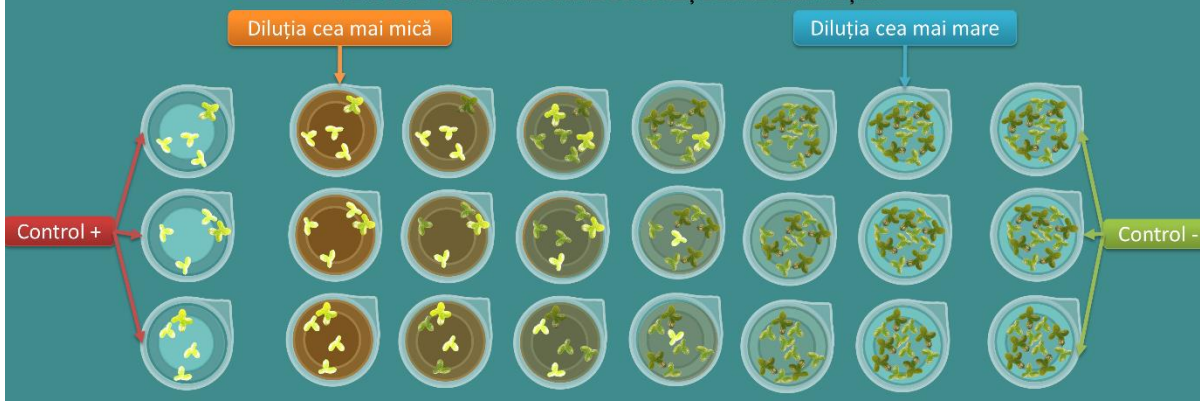
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PROCESAREA PROBELOR DE ECOTOXICOLOGIE

TESTUL DE INHIBARE A CREȘTERII LINTIȚEI



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PROCESAREA PROBELOR DE ECOTOXICOLOGIE

TESTUL DE IMOBILIZARE ACUTĂ A DAFNIIOR



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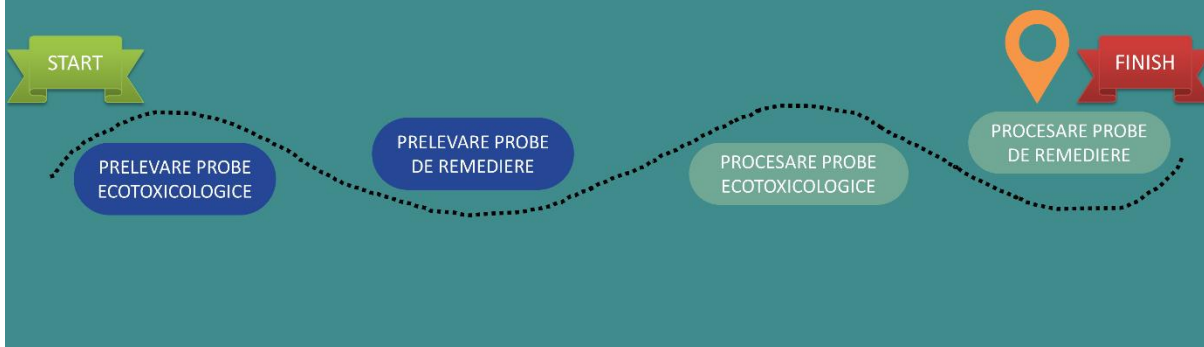
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PROCESAREA PROBELOR DE REMEDIERE



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PROCESAREA PROBELOR DE REMEDIERE

- ❖ Probele de remediere trebuie procesate imediat ce ajung în laborator pentru a preveni moartea organismelor care ar putea exista în probele colectate
- ❖ Toate probele sunt observate la microscopul optic și se notează și fotografiază toate organismele observate în probe
- ❖ Organismele observate se identifică cât mai detaliat posibil
- ❖ Organismele care reprezintă un potențial în remedierea apelor sunt cultivate în continuare
- ❖ Probele care nu prezintă organisme sau prezintă organisme care nu sunt utile în remedierea apelor uzate datorită activităților miniere sunt congelate și păstrate cât este necesar



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PROCESAREA PROBELOR DE REMEDIERE

- ❖ Organismele care reprezintă un interes în remediere sunt cele care:
 - supraviețuiesc în condițiile extreme ale drenajelor miniere acide
 - acumulează metale precum cele aflate în reziduurile miniere
- ❖ Exemple de organisme de interes care acumulează metale și care pot fi găsite în drenaje miniere acide:
 - Cianobacterii
 - *Spirulina* sp.
 - *Oscillatoria* sp.
 - Alge verzi
 - *Microspora* sp.
 - *Chlamydomonas* sp.
 - *Chlorella* sp.
 - Diatomee
 - *Navicula* sp.
 - Protozoare
 - *Euglena* sp.
 - *Amoeba* sp.
 - *Paramecium* sp.
 - Nematode din familiile:
 - Cephalobidae
 - Aphelenchoididae



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bianca.boros91@e-uvr.ro



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