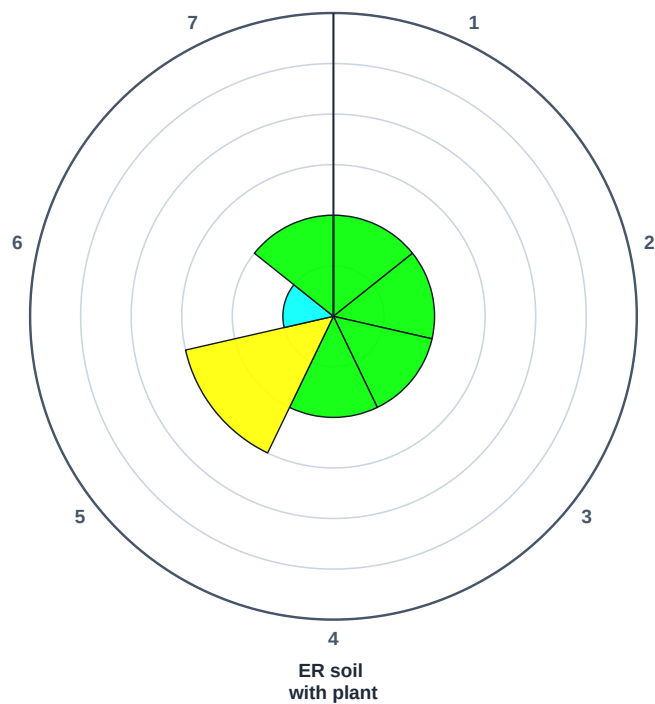


# Ecotoxicology Analysis

After Remediation

Locality: Ferrara, Italy, ER-site  
Method: Rhizodegradation (sunflower)  
Bioremediation methods: After Bioremediation  
Sample type: soil  
Collection date: 2026-04-14



## ORGANISMS

- 1. *A. fischeri* kinetic 15
- 2. *A. fischeri* kinetic 30
- 3. *A. fischeri* 15
- 4. *A. fischeri* 30
- 5. *Daphnids*
- 6. *Algae*
- 7. *Lettuce aquatic*

## CATEGORIES

- A Non-toxic
- B Low toxicity
- C Medium toxicity
- D High toxicity
- E Very high toxicity
- F Extreme toxicity

## Category Distribution (% of organism readings)

A: 14%

B: 72%

C: 14%

Resulting category: C Medium toxicity

## Test Organisms by Type

|            |                                                                                       |
|------------|---------------------------------------------------------------------------------------|
| Consumers: | <i>Daphnids</i>                                                                       |
| Producers: | <i>Algae, Lettuce aquatic</i>                                                         |
| Destruent: | <i>A. fischeri kinetic 15, A. fischeri kinetic 30, A. fischeri 15, A. fischeri 30</i> |

**Most sensitive organism:** Daphnids

### Active ecotoxicity management recommended

Samples fall into category C. Inhibition in the undiluted sample is 51–90% for at least one test organism and a clear toxic effect is present.

- It is recommended to consider continuing environmental remediation or repeat environmental sampling or tests.

## Ecotoxicity Assessment Criteria

| CATEGORY | DESCRIPTION        | CRITERIA (ACTIVE RULES)                                                                      |
|----------|--------------------|----------------------------------------------------------------------------------------------|
| <b>A</b> | Non-toxic          | Undiluted sample: inhibition / stimulation -19.99% – 19.99%                                  |
| <b>B</b> | Low toxicity       | Undiluted sample: stimulation 20% – 50%, or<br>Undiluted sample: inhibition 20% – 50%        |
| <b>C</b> | Medium toxicity    | Undiluted sample: stimulation 51% – 90%, or<br>Undiluted sample: inhibition 51% – 90%        |
| <b>D</b> | High toxicity      | At 10% sample concentration: inhibition / stimulation -50.99% – 50.99%, or<br>EC50 10% – 50% |
| <b>E</b> | Very high toxicity | At 10% sample concentration: inhibition 51% – 100%, or<br>EC50 1% – 10%                      |
| <b>F</b> | Extreme toxicity   | At 1% sample concentration: inhibition 10.01% – 100%, or<br>EC50 0% – 0.99%                  |

**Notes:** A sample's category is the worst (most toxic) grade reached by any single test organism. Determination of EC50 takes precedence over the inhibition value. In a luminescence bacterial test, an undiluted sample corresponds to a sample concentration of 500 mL/L.

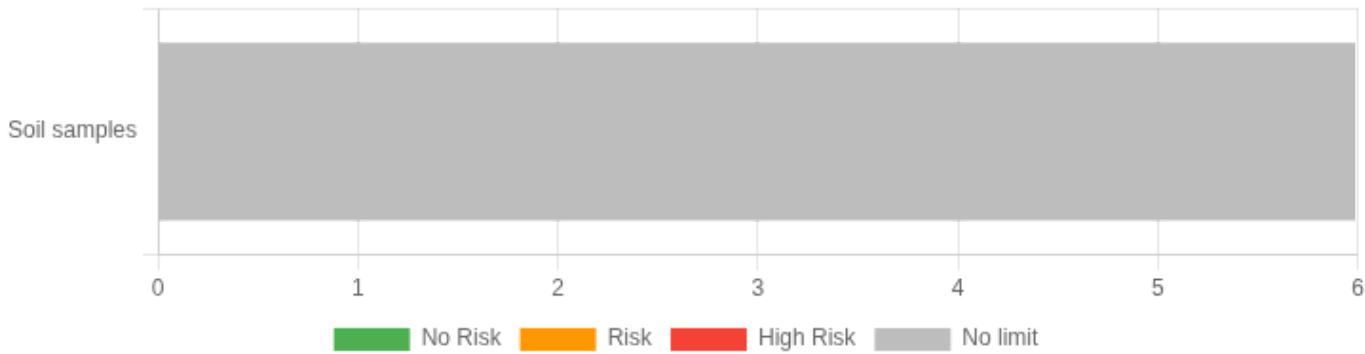
# Chemical Risk Assessment

After Remediation

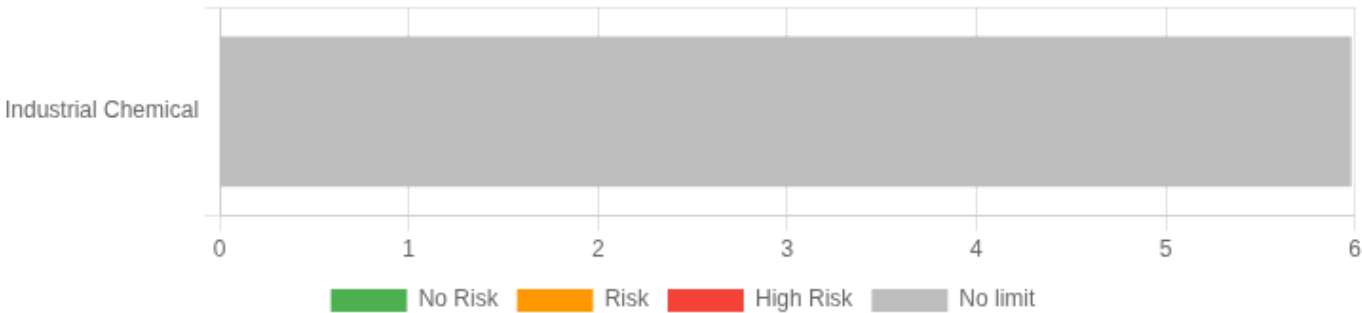
|                         |                              |
|-------------------------|------------------------------|
| Locality:               | Ferrara, Italy, ER-site      |
| Method:                 | Rhizodegradation (sunflower) |
| Bioremediation methods: | After Bioremediation         |
| Sample type:            | soil                         |
| Collection date:        | 2026-04-14                   |

- No Risk — at/below threshold limit
- Risk — over threshold limit (up to 50%)
- High Risk — more than 50% over threshold limit
- No threshold limit — not defined

## Risk distribution by sample type



## Soil samples



No risk 0%

Risk 0%

High risk 0%

No threshold limit 100%

| CLASS               | NUMBER | OVER THRESHOLD LIMIT | SUM CONCENTRATION |  |
|---------------------|--------|----------------------|-------------------|--|
| Industrial Chemical | 6      | 0                    | 6125.7 mg/kg DW   |  |

| SAMPLE             | COMPOUND / ELEMENT | CLASS               | MEASURED | UNIT     |
|--------------------|--------------------|---------------------|----------|----------|
| ER soil with plant | C10 - C12 Fraction | Industrial Chemical | 5.7      | mg/kg DW |
| ER soil with plant | C12 - C16 Fraction | Industrial Chemical | 171      | mg/kg DW |
| ER soil with plant | C16 - C35 Fraction | Industrial Chemical | 1668     | mg/kg DW |
| ER soil with plant | C35 - C40 Fraction | Industrial Chemical | 297      | mg/kg DW |
| ER soil with plant | C5 - C35 Fraction  | Industrial Chemical | 1844     | mg/kg DW |
| ER soil with plant | C5 - C40 Fraction  | Industrial Chemical | 2140     | mg/kg DW |

### Threshold limit standards applied

- Soil samples — Italy – Soil (industrial / commercial) · D.Lgs. 152/2006 – Allegato 5, Parte IV, Tabella 1

# Supportive Methods

After Remediation

Locality: Ferrara, Italy, ER-site  
Method: Rhizodegradation (sunflower)  
Bioremediation methods: After Bioremediation

## Per-sample evaluation

| Sample             | Type | Diversity — Shannon (H') | Diversity — Simpson (1-D) | Nitrification                                                                           | Respiration | Conformity    |
|--------------------|------|--------------------------|---------------------------|-----------------------------------------------------------------------------------------|-------------|---------------|
| ER soil with plant | Soil | —<br>expected: High      | —<br>expected: High       | 26.3%<br>Exceeds ±20% — significant effect on the nitrifying community<br>Nonconforming |             | Nonconforming |

**Diversity (Shannon / Simpson):** read as a trend across the before / during / after phases (rising = recovery), compared with the expected level per phase. **Respiration:** QR ≤ 0.5 acceptable; above that the AHB count is checked (≥ 1000 CFU/g = not suitable, below = not suitable without microbial augmentation). **Nitrification:** inhibition / stimulation within ±20%.