

Ecotoxicology Analysis

After Remediation

Locality: Ferrara, Italy, ER-site
Method: Rhizodegradation (sunflower + bacteria 2)
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: 29%

B: 57%

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)
A	Non-toxic	Undiluted sample: inhibition / stimulation -19.99% – 19.99%
B	Low toxicity	Undiluted sample: stimulation 20% – 50%, or Undiluted sample: inhibition 20% – 50%
C	Medium toxicity	Undiluted sample: stimulation 51% – 90%, or Undiluted sample: inhibition 51% – 90%
D	High toxicity	At 10% sample concentration: inhibition / stimulation -50.99% – 50.99%, or EC50 10% – 50%
E	Very high toxicity	At 10% sample concentration: inhibition 51% – 100%, or EC50 1% – 10%
F	Extreme toxicity	At 1% sample concentration: inhibition 10.01% – 100%, or 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.

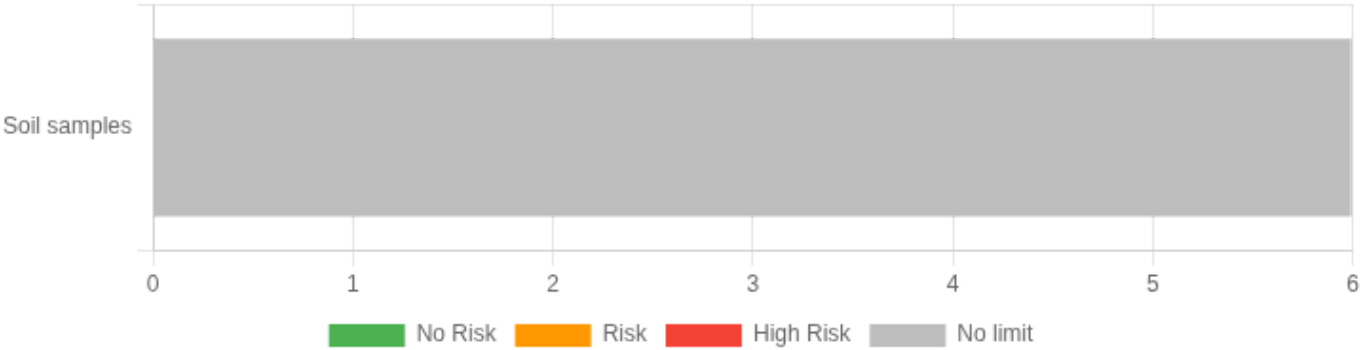
Chemical Risk Assessment

After Remediation

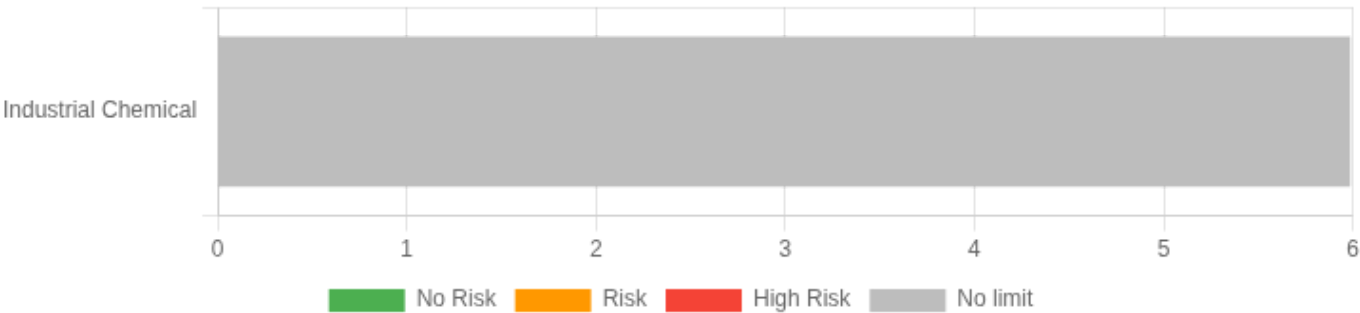
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- No Risk — at/below threshold limit
- Risk — over threshold limit (up to 50%)
- High Risk — more than 50% over threshold limit
- No threshold limit — not defined

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	5976.05 mg/kg DW

SAMPLE	COMPOUND / ELEMENT	CLASS	MEASURED	UNIT
ER soil with plant + bacteria 2	C10 - C12 Fraction	Industrial Chemical	6.65	mg/kg DW
ER soil with plant + bacteria 2	C12 - C16 Fraction	Industrial Chemical	192.4	mg/kg DW
ER soil with plant + bacteria 2	C16 - C35 Fraction	Industrial Chemical	1606	mg/kg DW
ER soil with plant + bacteria 2	C35 - C40 Fraction	Industrial Chemical	279	mg/kg DW
ER soil with plant + bacteria 2	C5 - C35 Fraction	Industrial Chemical	1808	mg/kg DW
ER soil with plant + bacteria 2	C5 - C40 Fraction	Industrial Chemical	2084	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

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Per-sample evaluation

Sample	Type	Diversity — Shannon (H')	Diversity — Simpson (1-D)	Nitrification	Respiration	Conformity
ER soil with plant + bacteria 2	Soil	— expected: High	— expected: High	50.6% Exceeds ±20% — significant effect on the nitrifying community 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%.