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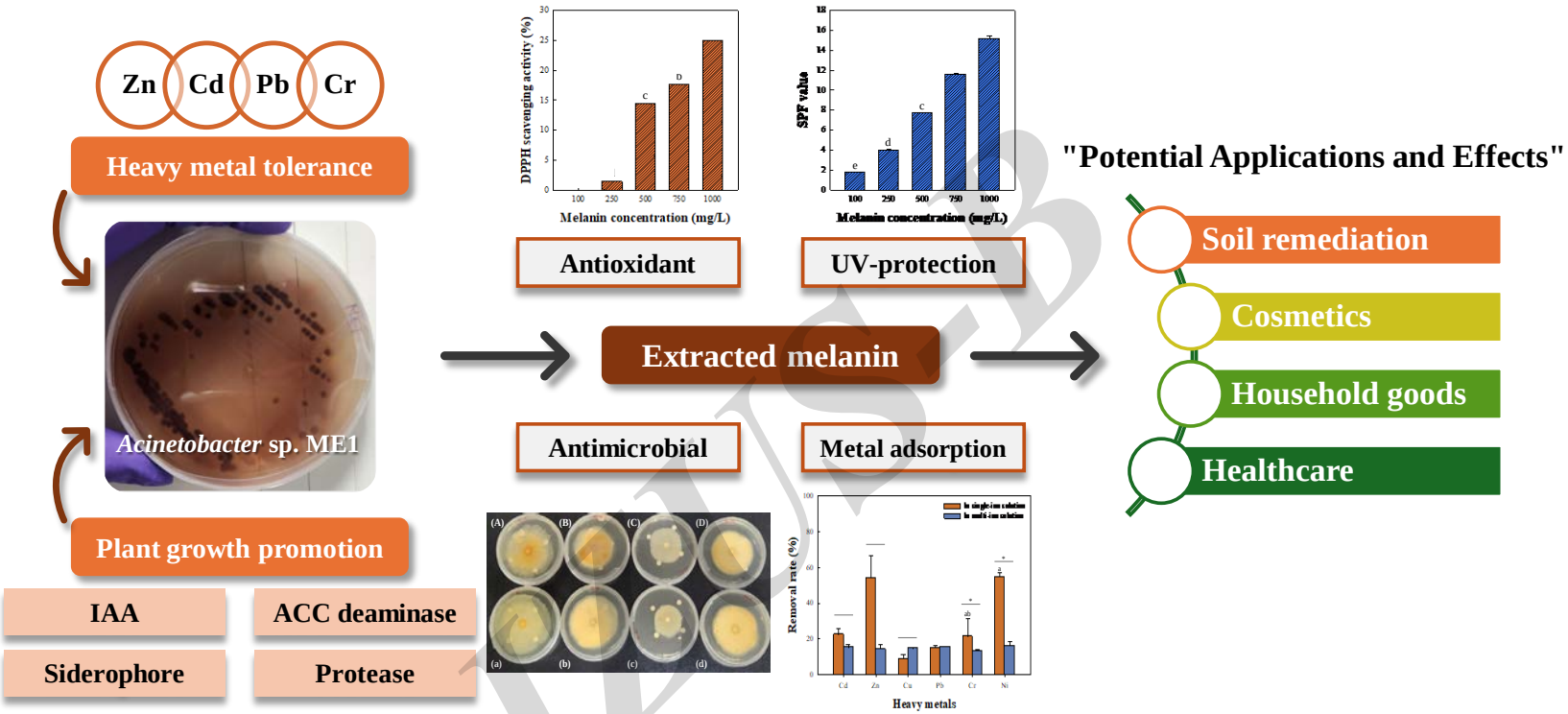
Acinetobacter sp. ME1: a multifunctional bacterium for phytoremediation utilizing melanin production, heavy metal tolerance, and plant growth promotion

Key words: *Acinetobacter*; Melanin; Heavy metal tolerance; Plant growth promotion; Multi-function

Research Summary



- Melanin-producing *Acinetobacter* sp. ME1 was isolated.
- ME1 showed resilience to high concentrations of Zn, Cd, and Pb.
- ME1 had various traits for plant growth and antioxidant properties.
- ME1-extracted melanin showed significant adsorption capacity for Zn and Ni.
- *Acinetobacter* sp. ME1 is a promising candidate for phytoremediation.

Innovation points

Characterization

- **Introduction:**

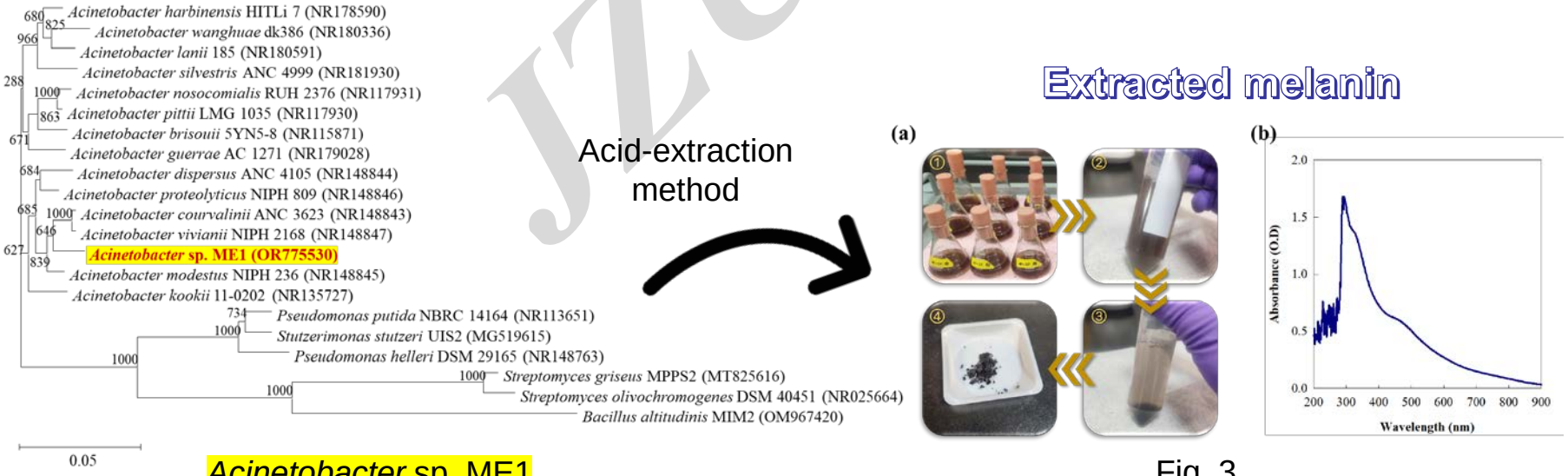
The study explores multifunctional bacteria for phytoremediation, focusing on *Acinetobacter* sp. ME1, a melanin-producing bacterium with heavy metal tolerance and plant growth-promoting traits.

- **Summary:**

Acinetobacter sp. ME1 exhibited excellent heavy metal resistance, plant growth-promoting properties, and its melanin showed UV-blocking, antioxidant, heavy metal adsorption, and antimicrobial properties.

- **Emphasis:**

ME1 demonstrated multifunctional capabilities, its extracted melanin showed potential applications in various industries, and further research is needed on ME1's genes and field trials for phytoremediation validation.



Acinetobacter sp. ME1

Fig. 3

Innovation points

Application

Comprehensive table and figure were generated to summarize the phytoremediation potential of on *Acinetobacter* sp. ME1.

Removal efficiency (%) of Cr, Zn, Cd and Pb by *Acinetobacter* sp. ME1 in the hydroponics cultivation

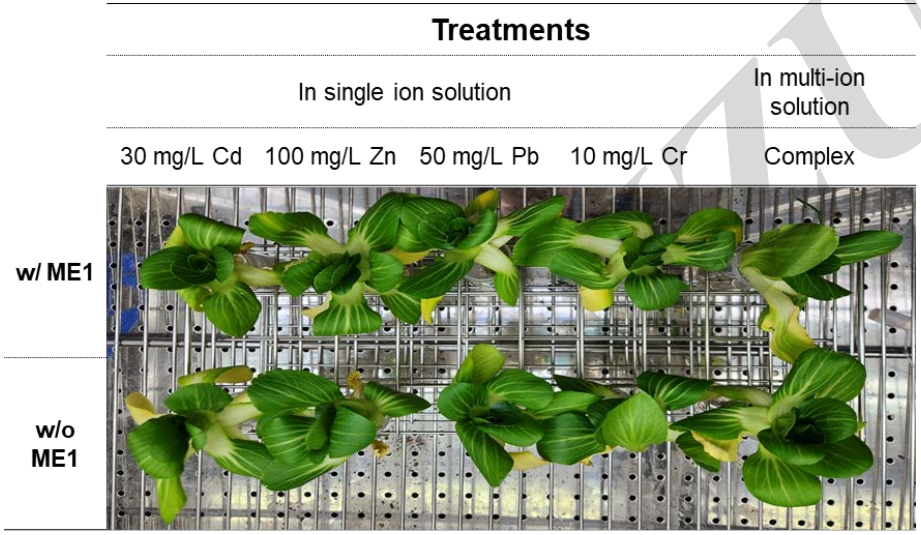


Fig. S5c

Table 4

Heavy metal		Treatments	
		w/ ME1[a]	w/o ME1
In single ion solution	Cd	83.7±0.5[a*]	78.9±0.3[b]
	Zn	40.6±1.0[a]	14.6±1.0[b]
	Pb	95.2±0.1[a]	85.0±0.2[b]
	Cr	56.8±0.5[a]	45.3±0.2[b]
In multi-ion solution	Cd	32.2±2.4[a]	21.4±1.6[b]
	Zn	28.5±0.3[a]	14.3±1.4[b]
	Pb	94.9±0.1[a]	88.6±0.2[b]
	Cr	60.8±0.8[a]	32.3±1.2[b]