Effects of T-Consciousness Fields on Heavy Metal Uptake by Saccharomyces Cerevisiae under Altered Gravity

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Introduction

Environmental pollution with heavy metals is a critical issue, with significant impacts on health and ecosystems. *Saccharomyces cerevisiae*, known for its biosorption capabilities, presents a cost-effective method for heavy metal removal. This study investigates the potential enhancement of these capabilities through Taheri Consciousness Fields (TCFs) under different gravity conditions, offering a novel approach to bioremediation and insights into biological processes in space (1).

Methods (cont.)

TCFs Application: In this study, Three Types of TCFs proposed by Mohammad Ali Taheri were applied to *Saccharomyces cerevisiae* cultures undergoing clinostat rotation for 24 hours to evaluate heavy metal uptake. The experiment used a double-blind method and involved TCF application under both microgravity (MG) and Earth's gravity (1G) conditions. A two-dimensional clinostat device simulated MG at 15 rpm (2).

Methods (cont.)

Saccharomyces cerevisiae cultures were prepared and exposed to arsenic (As), cadmium (Cd), lead (Pb), and mercury (Hg). Four groups were established: MG + TCFs, MG control, 1G + TCFs, and 1G control. Heavy metal content was measured using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) (2).

Results

Table 1.Residual heavy metal concentrations (ppb) and percentage change relative to the standard for different experimental conditions. Comparison between control and TCF-treated groups under 1G and MG (2).

	Residual heavy metal concentration (ppb)				%Change relative to standard			
Sample	As	Cd	Pb	Hg	As	Cd	Pb	Hg
Standard	97.35±0.35	31.20±1.11	28.40±1.18	42.40±1.35	-	-	-	-
Control-MG	94.95±0.78	14.03±0.70	5.13±0.23	2.07±0.12	-2.47 (ns)	-55.03	-81.94	-95.12
TCFs-MG	91.75±0.21	14.00±1.10	5.20±0.28	2.07±0.06	-5.75	-55.13	-81.69	-95.12
Control-1G	95.20±0.99	16.30±0.36	7.90±0.20	5.50±0.28	-2.21 (ns)	-47.76	-72.18	-87.03
TCFs-1G	96.54±0.62	19.50±0.71	9.67±0.15	6.10±0.15	-0.83 (ns)	-37.50	-65.96	-85.61

Results (cont.)

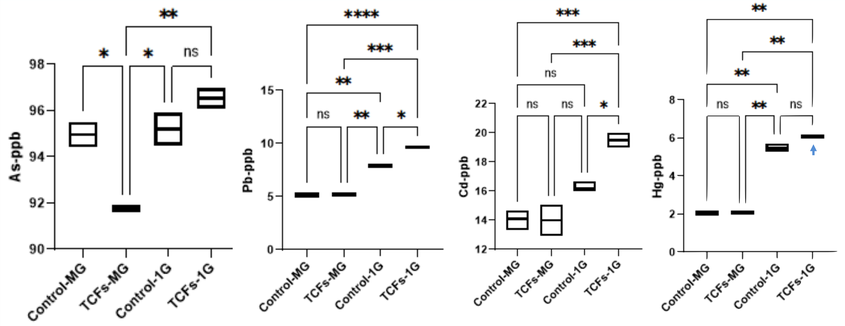

Figure 3. showcases box plots of ANOVA test, displaying the influence of Taheri Consciousness Fields (TCFs) on the residual amounts of arsenic (As), cadmium (Cd), lead (Pb), and mercury (Hg) in conditions simulating microgravity (MG) and Earth's gravity (1G), in reference to baseline measures. Statistical significance markers *, **, ***, and **** correspond to p-values less than 0.05, 0.01, 0.0002, and 0.0001, respectively (2).

Results (cont.)

The study examined the uptake of arsenic (As), cadmium (Cd), lead (Pb), and mercury (Hg) by S. cerevisiae. Hg showed the highest uptake (95%), while As exhibited the lowest (1-5%). In microgravity (MG), Pb and Hg uptake increased by up to 13.5% and 9.3%, respectively, compared to earth's gravity (1G). TCFs treatment significantly enhanced As biosorption by up to 133% in MG. Conversely, under 1G, TCFs resulted in higher residual metal concentrations, particularly for Cd and Pb. As and Hg uptake declined by approximately 62% and 1.6%, respectively, under TCFs in 1G conditions (2).

Conclusion

The study reveals that TCFs have a varying impact on heavy metal uptake by *Saccharomyces cerevisiae*, with notable enhancements under MG conditions. These findings suggest potential applications in environmental bioremediation and space biology, warranting further investigation into TCF mechanisms and their broader implications (2).

References

1. Mirmahdi, R. S., Mofid, V., Zoghi, A., Khosravi Darani, K., & Mortazavian, A. M. (2022). Risk of low stability Saccharomyces cerevisiae ATCC 9763-heavy metals complex in gastrointestinal simulated conditions. Heliyon, 8(5), e09452. Available at: https://doi.org/10.1016/j.heliyon.2022.e09452
2. Semsarha, F., Taheri, M. A., Hajebrahimi, Z., & Torabi, S. (2023). Effects of Taheri Consciousness Fields on Cell Cycle Progression and ATP Production in Raji and HEK-293 Cell Lines under Microgravity and Earth's Gravity Conditions.

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