



Article

# Honey Enriched with Additives Alleviates Behavioral, Oxidative Stress, and Brain Alterations Induced by Heavy Metals and Imidacloprid in Zebrafish

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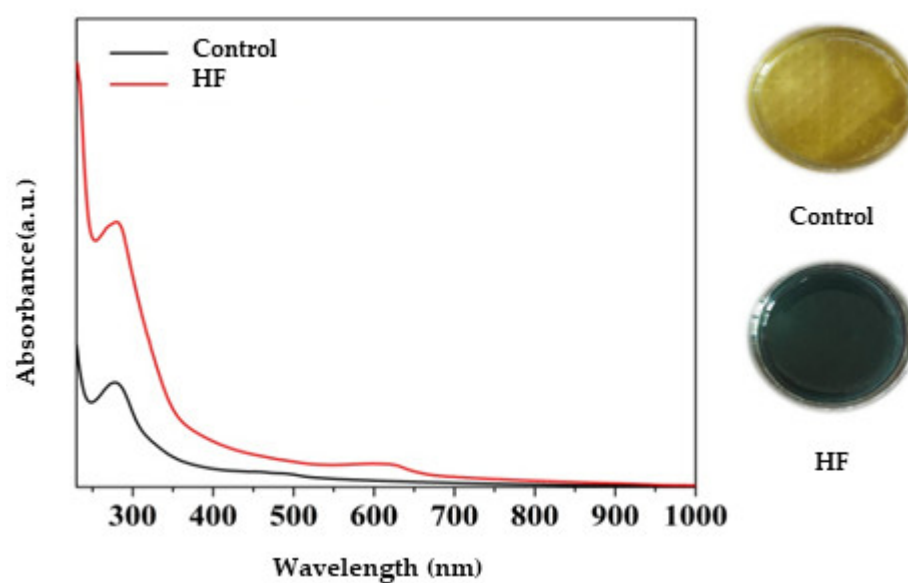
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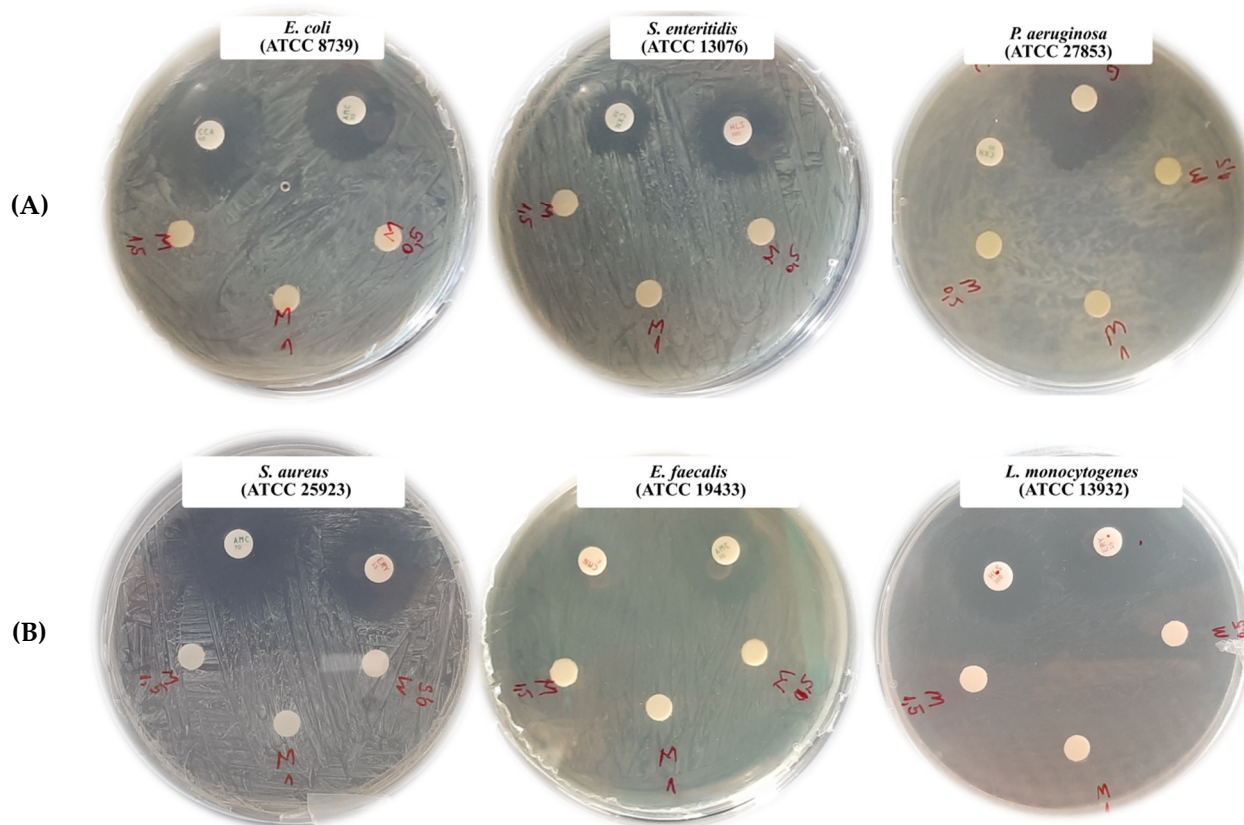
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**Figure S1.** UV-Vis absorption spectra of honey samples and their appearance.

**Table S1.** The antibiotics used in the experiment.

Bacterial strain	Antibiotic	Concentration
<i>Escherichia coli</i> ATCC 8735	amoxicillin/clavulanic acid (AMC)	30 µg (20/10)
	ceftazidime/clavulanic acid (CXN)	40 µg (30/10)
<i>Salmonella enteritidis</i> ATCC 13076	streptomycin (HLS)	300 µg
	cefalexin (CXN)	30 µg
<i>Pseudomonas aeruginosa</i> ATCC 27853	gentamycin (G)	40mg·mL <sup>-1</sup>
	cefalexin (CXN)	30 µg
<i>Staphylococcus aureus</i> ATCC 25923	amoxicillin/clavulanic acid (AMC)	30 µg (20/10)
<i>Enterococcus faecalis</i> ATCC 19433	clindamycin	2 µg
<i>Listeria monocytogenes</i> ATCC 13932	erythromycin (ERY)	15 µg
	streptomycin (HLS)	300 µg



**Figure S2.** The images obtained by disk diffusion method of the HF and antibiotics against several Gram-negative (A) and Gram-positive bacteria (B).

**Table S2.** Lesion score and IHC positivity in optic tectum for the control and exposed groups.

Lesions and IHC score	Control	HF	Hg+Cd	IMI	Hg+Cd+IMI	Mixture
Severe spongiosis in the neural layer	-	-	+	+++	+++	++
Edema	-	-	++	+++	+++	++
Vacuolization of the neuropil with multiple areas of extravasated erythrocytes	-	-	++	+++	++	+
Degenerative changes in neurons	-	-	++	+++	+++	++
Focal aggregation of microglial cells	-	-	++	+++	+++	++
Lesion score	-	-	++	+++	+++	++
GFAP score	-	+	+	++	++	+++
S100B score	+	+	++	++	++	+++
PCNA score	++	++	+++	+	++	++

Note: (-) = no lesions; (+) = up to 10%; (++) = between 10 and 50%; (+++) = > 50%.

**Table S3.** Lesion score and IHC positivity in cerebellum for the control and exposed groups.

Lesions and IHC score	Control	HF	Hg+Cd	IMI	Hg+Cd +IMI	Mixture
Degeneration of neurons	-	-	++	+++	+++	++
Spongiosis in the neuronal layer	-	-	+	+++	+++	++
Vacuolation of gray and white matter with focal aggregation of glial cells	-	-	++	+++	+++	++
Damage to granular neurons	-	-	++	+++	++	+
Lesion score	-	-	++	+++	++	++
GFAP score	+	++	++	++	++	+++
S100B score	+	+	++	++	++	+++
PCNA score	++	++	+++	+	+	++

Note: (-) = no lesions; (+) = up to 10%; (++) = between 10 and 50%; (+++) = > 50%.

**Table S4.** Lesion score and IHC positivity in spinal cord for the control and exposed groups.

Lesions and IHC score	Control	HF	Hg+Cd	IMI	Hg+Cd +IMI	Mixture
Degeneration of neurons	-	-	++	+++	++	+++
Spongiosis in the neuronal layer	-	-	++	+++	+	+++
Vacuolation of gray and white matter with focal aggregation of glial cells	-	-	++	+++	++	+++
Damage to granular neurons	-	-	++	+++	++	++
Lesion score	-	-	++	+++	++	++
GFAP score	-	++	+++	++	++	++
S100B score	-	+	+++	++	++	++
PCNA score	++	++	++	+	+++	+

Note: (-) = no lesions; (+) = up to 10%; (++) = between 10 and 50%; (+++) = > 50%.