Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Supplementary Information

Dietary Exposure to Silver Nitrate Compared to Two Forms of Silver Nanoparticles in Rainbow Trout: Bioaccumulation Potential with Minimal Physiological Effects.

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Table S1. Plasma Na^+ and K^+ concentrations over the six week experiment.

Treatment	Week 2	Week 4	Week 6
Na^+ (mmol L^{-1})			
Control	155.4 ± 2.4^{Aa}	148.0 ± 14.2^{ABa}	127.6 ± 12.2^{Aa}
$AgNO_3$	148.4 ± 6.0^{Aa}	122.3 ± 16.3^{Aa}	132.5 ± 4.1^{Aa}
Ag NPs	163.6 ± 3.0^{Aa}	142.1 ± 11.1^{ABa}	145.1 ± 4.4^{Aa}
Ag_2S NPs	154.9 ± 2.7^{Aa}	161.1 ± 5.6^{Ba}	140.3 ± 1.3^{Aa}
K^+ (mmol L^{-1})			
Control	1.2 ± 0.2^{Aa}	1.3 ± 0.2^{Aa}	0.8 ± 0.4^{Aa}
$AgNO_3$	3.3 ± 0.4^{Ba}	2.4 ± 0.3^{ABab}	1.6 ± 0.2^{Ab}
Ag NPs	2.7 ± 0.4^{BCa}	1.8 ± 0.3^{ABb}	0.9 ± 0.1^{Ab}
Ag_2S NPs	1.9 ± 0.4^{ACab}	2.8 ± 0.5^{Ba}	1.6 ± 0.2^{Ab}

Data are means ± S.E.M., n = 5/6. Data were analysed by a two-way ANOVA. Upper case denotes significant difference between treatments (columns). Lower case denotes statistical difference over time (rows). Vertical dashed line represents the end of exposure at week 4 where all treatments were placed on the control diet for a further two weeks. Note, the normal ranges reported in the literature for plasma Na^+ and K^+ in rainbow trout are typically 127-164 and 1.9-6.0 mmol L^{-1} (*Hille, 1982), although these are also greatly influenced by dietary salt normally present in the food.

* Citation: Hille, S., 1982. A literature review of the blood chemistry of rainbow trout, *Salmo gairdneri* Rich. Journal of Fish Biology, 20, 535-569.

Table S2. Tissue concentrations of sodium, potassium, calcium, zinc, manganese and copper at week 4.

Tissue	Na^+ (mg/g)	K^+ (mg/g)	Ca^{2+} (mg/g)	Zn^{2+} (mg/g)	Mn^{2+} (µg/g)	Cu^{2+} (µg/g)
Mid						
Control	4.07 ± 0.26	13.73 ± 1.74	0.64 ± 0.03	2.00 ± 0.74	3.3 ± 0.5	3.81 ± 0.38
$AgNO_3$	2.97 ± 0.42	9.83 ± 0.57	0.50 ± 0.11	1.46 ± 0.46	2.9 ± 0.7	4.72 ± 0.35
Ag NPs	3.46 ± 0.31	10.29 ± 1.02	0.49 ± 0.08	1.86 ± 0.55	2.7 ± 0.7	5.87 ± 0.81
Ag_2S NPs	3.52 ± 0.19	10.98 ± 1.12	0.68 ± 0.08	2.07 ± 0.52	4.4 ± 1.0	5.64 ± 0.43
Hind						
Control	3.13 ± 0.23^{A}	13.05 ± 0.56	0.39 ± 0.06	1.89 ± 0.69	6.2 ± 2.2	7.37 ± 1.74
$AgNO_3$	1.83 ± 0.27^{B}	7.41 ± 0.48	0.16 ± 0.07	0.56 ± 0.27	2.8 ± 1.1	9.92 ± 1.12
Ag NPs	3.59 ± 0.39^{A}	10.98 ± 1.14	0.42 ± 0.12	1.42 ± 0.36	1.9 ± 0.6	8.38 ± 1.40
Ag_2S NPs	2.99 ± 0.20^{A}	11.48 ± 0.72	0.44 ± 0.07	1.43 ± 0.30	4.0 ± 1.0	7.57 ± 0.97
Liver						
Control	3.18 ± 0.13	12.68 ± 0.53	0.23 ± 0.03	0.09 ± 0.00	5.3 ± 0.3	127.39 ± 8.24
$AgNO_3$	2.91 ± 0.12	11.59 ± 0.35	0.22 ± 0.03	0.09 ± 0.00	5.2 ± 0.4	93.08 ± 9.23
Ag NPs	2.84 ± 0.11	12.11 ± 0.52	0.26 ± 0.06	0.10 ± 0.01	5.2 ± 0.2	93.37 ± 15.52
Ag_2S NPs	2.70 ± 0.12	10.92 ± 0.43	0.20 ± 0.02	0.08 ± 0.00	4.7 ± 0.2	159.00 ± 11.78
Gallbladder						
Control	22.67 ± 2.77	7.99 ± 0.97	1.20 ± 0.15	0.09 ± 0.02	1.6 ± 0.6	23.36 ± 7.07^{A}
$AgNO_3$	20.76 ± 3.70	6.27 ± 0.99	0.82 ± 0.28	0.07 ± 0.02	0.7 ± 0.3	11.98 ± 1.64^{B}
Ag NPs	24.51 ± 6.12	8.14 ± 1.16	1.18 ± 0.41	0.08 ± 0.02	2.5 ± 0.9	17.70 ± 5.7^{AB}
Ag_2S NPs	19.29 ± 2.55	4.99 ± 1.20	0.95 ± 0.12	0.04 ± 0.02	1.3 ± 0.3	15.82 ± 4.16^{AB}
Kidney						
Control	4.76 ± 0.29	9.53 ± 0.55^{A}	0.71 ± 0.23	0.12 ± 0.01	2.7 ± 0.2	4.31 ± 0.57^{A}
$AgNO_3$	5.94 ± 0.55	12.51 ± 0.95^{AB}	1.06 ± 0.32	0.15 ± 0.01	3.5 ± 0.4	7.01 ± 0.45^{B}
Ag NPs	6.51 ± 0.22	12.71 ± 0.63^{B}	2.08 ± 0.34	0.14 ± 0.02	3.3 ± 0.4	5.62 ± 0.72^{AB}
Ag_2S NPs	6.79 ± 3.79	12.77 ± 0.92^{B}	1.51 ± 0.67	0.17 ± 0.05	3.9 ± 0.3	6.61 ± 0.47^{B}
Spleen						
Control	2.16 ± 0.19	16.42 ± 1.38	0.14 ± 0.03	0.15 ± 0.02	2.7 ± 0.2	2.10 ± 0.74
$AgNO_3$	2.19 ± 0.15	16.62 ± 0.97	0.09 ± 0.02	0.17 ± 0.03	2.6 ± 0.2	3.62 ± 0.29
Ag NPs	2.29 ± 0.18	16.94 ± 1.52	0.07 ± 0.02	0.19 ± 0.03	2.2 ± 0.2	4.39 ± 0.38
Ag_2S NPs	2.10 ± 0.18	16.79 ± 2.14	0.07 ± 0.03	0.20 ± 0.03	2.2 ± 0.2	3.89 ± 0.35

Gill						
Control	7.37 ± 0.33	17.15 ± 0.56	5.19 ± 1.77	1.16 ± 0.26	6.8 ± 1.0	3.51 ± 0.29
$AgNO_3$	6.71 ± 0.80	14.84 ± 1.36	5.38 ± 1.82	1.30 ± 0.16	6.1 ± 0.5	3.27 ± 0.12
Ag NPs	7.70 ± 0.60	14.74 ± 1.09	6.13 ± 1.03	1.32 ± 0.26	7.1 ± 1.1	3.51 ± 0.17
Ag_2S NPs	6.82 ± 1.40	13.79 ± 2.78	2.99 ± 0.80	1.10 ± 0.19	6.7 ± 0.5	3.68 ± 0.10
Brain						
Control	8.55 ± 0.94	15.68 ± 1.53	16.96 ± 8.04	0.10 ± 0.01	2.6 ± 0.1	5.89 ± 0.43
$AgNO_3$	9.01 ± 0.74	18.99 ± 1.36	12.38 ± 10.25	0.08 ± 0.01	2.7 ± 0.3	5.58 ± 0.17
Ag NPs	9.45 ± 0.60	16.56 ± 1.68	24.25 ± 14.56	0.09 ± 0.01	2.7 ± 0.2	5.58 ± 0.42
Ag_2S NPs	9.55 ± 1.25	16.24 ± 0.88	18.85 ± 10.93	0.09 ± 0.01	2.5 ± 0.3	6.64 ± 0.77
Carcass						
Control	2.22 ± 0.10	8.68 ± 0.16	11.57 ± 0.99	2.77 ± 0.12	4.03 ± 0.43	1.61 ± 0.05
$AgNO_3$	2.28 ± 0.11	8.34 ± 0.21	12.00 ± 1.53	3.02 ± 0.20	4.57 ± 0.57	1.94 ± 0.16
Ag NPs	2.24 ± 0.06	8.46 ± 0.16	12.39 ± 0.47	3.06 ± 0.12	4.17 ± 0.42	1.63 ± 0.13
Ag_2S NPs	2.23 ± 0.11	8.36 ± 0.46	12.22 ± 0.90	2.82 ± 0.10	3.81 ± 0.22	1.67 ± 0.09

Data are mean ± S.E.M., n = 5/6. Data were analysed by one-way ANOVA. Different upper case letters within columns denote statistical differences between treatments (columns). Data points with no letters indicate no statistically significant effect in that organ.