

## Supplementary material



Figure S 1: Different fish from the Tennessee River 1 mile upstream from the Suck Sreek



Figure S 2: Extraction of the digestive tracts of blue gills (A); stomach and intestines of blue gill (B). Stored collection of the fresh fish guts (caught 03/10/ 2020) in the freezer (C).

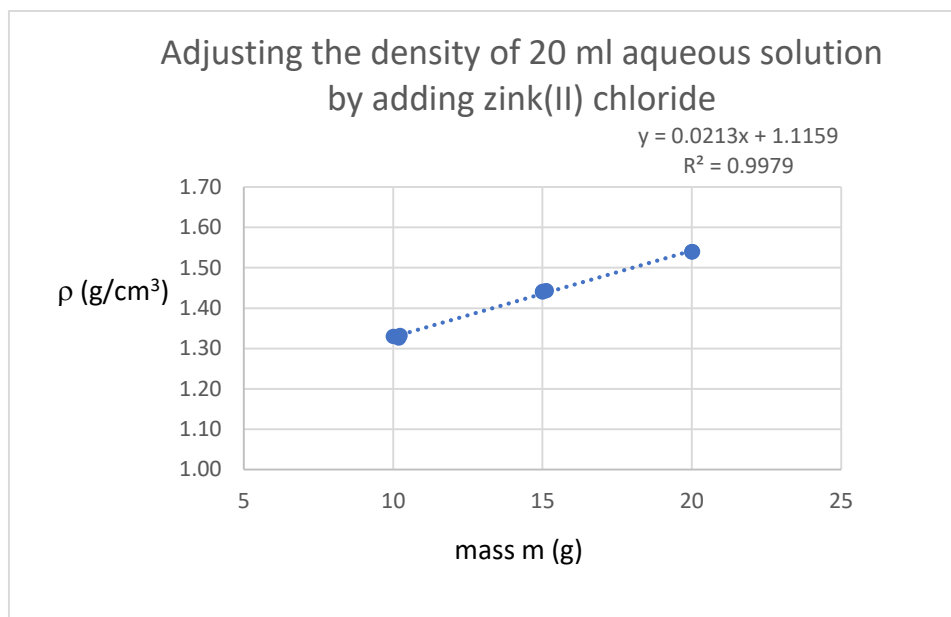


Figure S 3: Adjustment of the targeted density for MP separation.

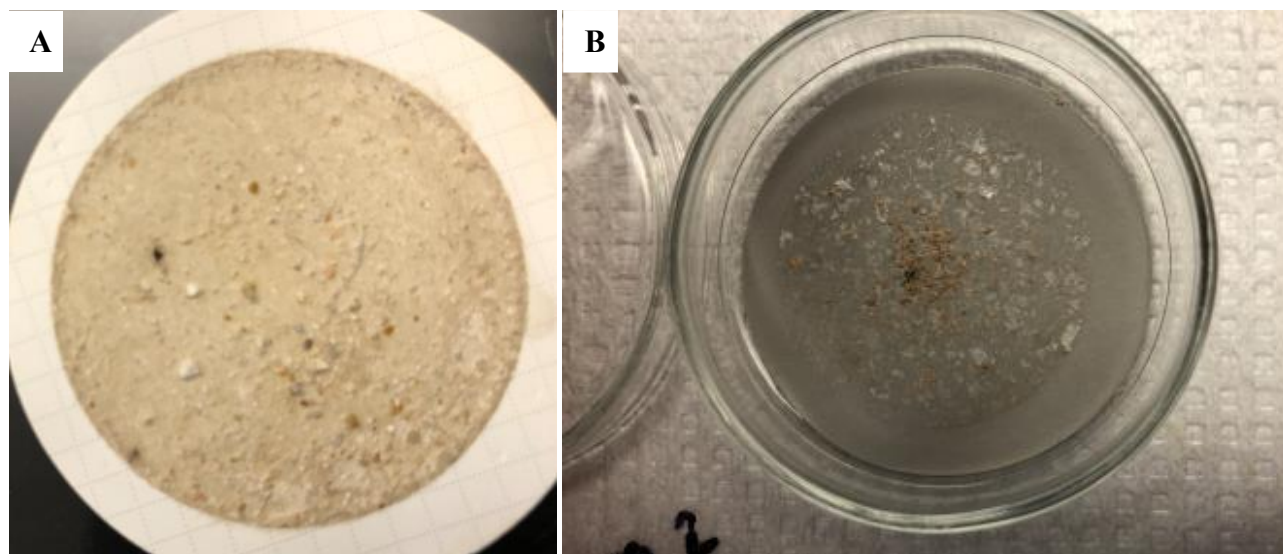


Figure S 4: (A) shows chemical digestion remainings of hog sucker intestines particles on gridded cellulose nitrate filter, 0.45  $\mu\text{m}$  pore size, 47 mm diameter; (B) shows remainings of flathead carp intestines on steel filter, 10  $\mu\text{m}$  pore-size and 47 mm diameter, after chemical digestion with sand in brown and chitin in white.

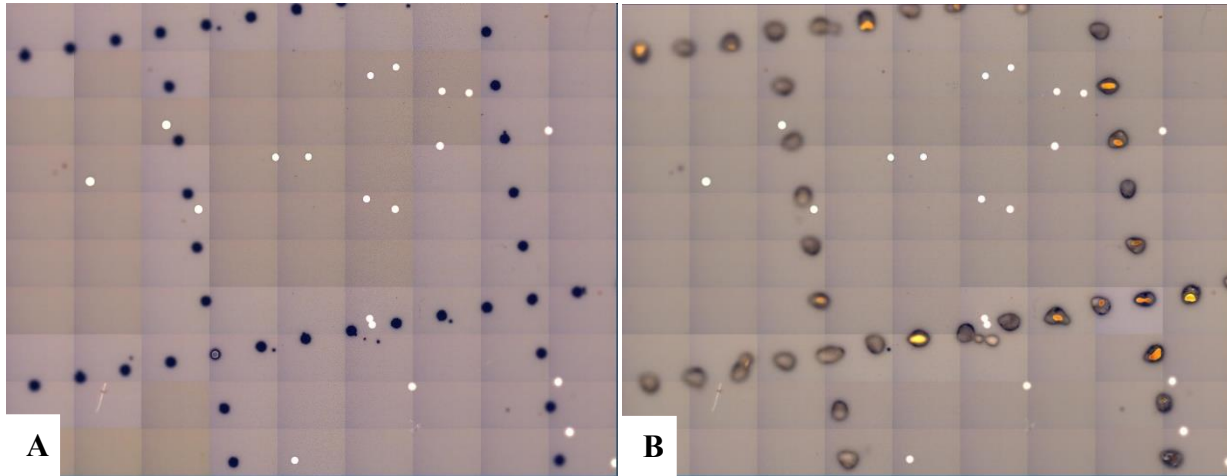


Figure S 5: Microscopic measurement of the defined PMMA particles. (A) 60  $\mu\text{m}$  PMMA sphere on gridded cellulose nitrate filter before. (B) 60  $\mu\text{m}$  PMMA sphere on gridded cellulose nitrate filter after Raman analysis

1  
2  
3  
4  
5

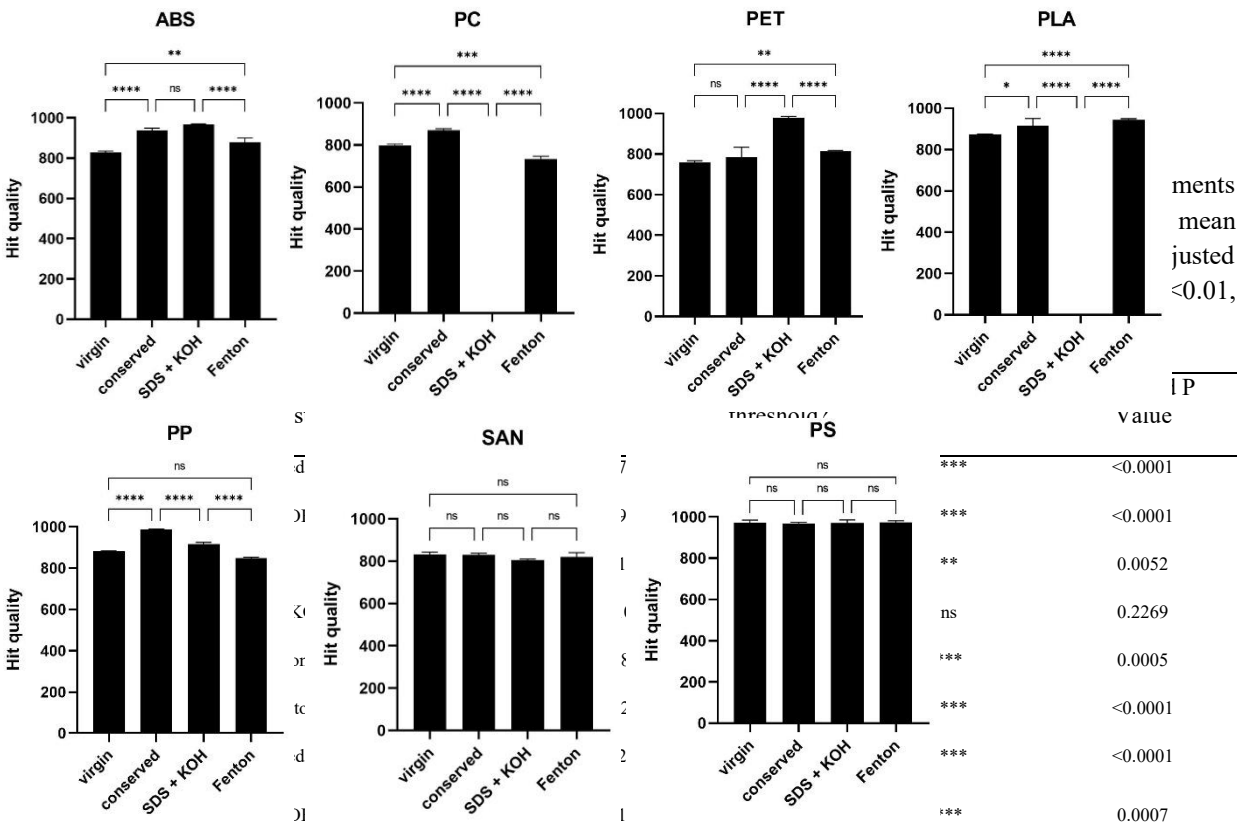


Figure S 6: Raman Hit quality analysis of MP samples (triplicates) of all treatments (virgin, conserved, SDS+KOH and Fenton) showing the mean and standard deviation. Significance of results using one-way ANOVA with Prism 9.4.0 is presented as: NS: not significant, \*:  $p < 0.05$ , \*\*:  $p < 0.01$ , \*\*\*:  $p < 0.001$  and \*\*\*\*:  $p < 0.0001$ .

	conserved vs. SDS + KOH	268.3	230.2 to 306.5	Yes	****	<0.0001
	conserved vs. Fenton	237.7	199.5 to 275.8	Yes	****	<0.0001
	SDS + KOH vs. Fenton	-30.67	-68.78 to 7.450	No	ns	0.1597
PA	virgin vs. conserved	-94.67	-132.8 to -56.55	Yes	****	<0.0001
	virgin vs. SDS + KOH	-157.0	-195.1 to -118.9	Yes	****	<0.0001
	virgin vs. Fenton	-191.3	-229.5 to -153.2	Yes	****	<0.0001
	conserved vs. SDS + KOH	-62.33	-100.5 to -24.22	Yes	***	0.0003
	conserved vs. Fenton	-96.67	-134.8 to -58.55	Yes	****	<0.0001
	SDS + KOH vs. Fenton	-34.33	-72.45 to 3.784	No	ns	0.0931
PC	virgin vs. conserved	-71.33	-109.5 to -33.22	Yes	****	<0.0001
	virgin vs. SDS + KOH	799.0	760.9 to 837.1	Yes	****	<0.0001
	virgin vs. Fenton	65.67	27.55 to 103.8	Yes	***	0.0001
	conserved vs. SDS + KOH	870.3	832.2 to 908.5	Yes	****	<0.0001
	conserved vs. Fenton	137.0	98.88 to 175.1	Yes	****	<0.0001
	SDS + KOH vs. Fenton	-733.3	-771.5 to -695.2	Yes	****	<0.0001
PE	virgin vs. conserved	133.0	94.88 to 171.1	Yes	****	<0.0001
	virgin vs. SDS + KOH	126.0	87.88 to 164.1	Yes	****	<0.0001
	virgin vs. Fenton	88.00	49.88 to 126.1	Yes	****	<0.0001
	conserved vs. SDS + KOH	-7.000	-45.12 to 31.12	No	ns	0.9635
	conserved vs. Fenton	-45.00	-83.12 to -6.883	Yes	*	0.0138
	SDS + KOH vs. Fenton	-38.00	-76.12 to 0.1171	No	ns	0.0510
PET	virgin vs. conserved	-26.33	-64.45 to 11.78	No	ns	0.2774
	virgin vs. SDS + KOH	-219.7	-257.8 to -181.5	Yes	****	<0.0001
	virgin vs. Fenton	-53.67	-91.78 to -15.55	Yes	**	0.0021
	conserved vs. SDS + KOH	-193.3	-231.5 to -155.2	Yes	****	<0.0001
	conserved vs. Fenton	-27.33	-65.45 to 10.78	No	ns	0.2463
	SDS + KOH vs. Fenton	166.0	127.9 to 204.1	Yes	****	<0.0001
PLA	virgin vs. conserved	-43.33	-81.45 to -5.216	Yes	*	0.0192
	virgin vs. SDS + KOH	874.0	835.9 to 912.1	Yes	****	<0.0001

	virgin vs. Fenton	-68.67	-106.8 to -30.55	Yes	****	<0.0001
	conserved vs. SDS + KOH	917.3	879.2 to 955.5	Yes	****	<0.0001
	conserved vs. Fenton	-25.33	-63.45 to 12.78	No	ns	0.3108
	SDS + KOH vs. Fenton	-942.7	-980.8 to -904.5	Yes	****	<0.0001
PMMA	virgin vs. conserved	156.3	118.2 to 194.5	Yes	****	<0.0001
	virgin vs. SDS + KOH	50.00	11.88 to 88.12	Yes	**	0.0048
	virgin vs. Fenton	106.0	67.88 to 144.1	Yes	****	<0.0001
	conserved vs. SDS + KOH	-106.3	-144.5 to -68.22	Yes	****	<0.0001
	conserved vs. Fenton	-50.33	-88.45 to -12.22	Yes	**	0.0045
	SDS + KOH vs. Fenton	56.00	17.88 to 94.12	Yes	**	0.0012
PP	virgin vs. conserved	-105.0	-143.1 to -66.88	Yes	****	<0.0001
	virgin vs. SDS + KOH	-35.00	-73.12 to 3.117	No	ns	0.0838
	virgin vs. Fenton	32.67	-5.450 to 70.78	No	ns	0.1199
	conserved vs. SDS + KOH	70.00	31.88 to 108.1	Yes	****	<0.0001
	conserved vs. Fenton	137.7	99.55 to 175.8	Yes	****	<0.0001
	SDS + KOH vs. Fenton	67.67	29.55 to 105.8	Yes	****	<0.0001
PS	virgin vs. conserved	2.000	-36.12 to 40.12	No	ns	0.9991
	virgin vs. SDS + KOH	1.333	-36.78 to 39.45	No	ns	0.9997
	virgin vs. Fenton	-1.667	-39.78 to 36.45	No	ns	0.9995
	conserved vs. SDS + KOH	-0.6667	-38.78 to 37.45	No	ns	>0.9999
	conserved vs. Fenton	-3.667	-41.78 to 34.45	No	ns	0.9944
	SDS + KOH vs. Fenton	-3.000	-41.12 to 35.12	No	ns	0.9969
PVC h	virgin vs. conserved	210.7	172.5 to 248.8	Yes	****	<0.0001
	virgin vs. SDS + KOH	267.3	229.2 to 305.5	Yes	****	<0.0001
	virgin vs. Fenton	228.0	189.9 to 266.1	Yes	****	<0.0001
	conserved vs. SDS + KOH	56.67	18.55 to 94.78	Yes	**	0.0010
	conserved vs. Fenton	17.33	-20.78 to 55.45	No	ns	0.6362
	SDS + KOH vs. Fenton	-39.33	-77.45 to -1.216	Yes	*	0.0404
PVC s	virgin vs. conserved	14.00	-24.12 to 52.12	No	ns	0.7729

---

	virgin vs. SDS + KOH	86.33	48.22 to 124.5	Yes	****	<0.0001
	virgin vs. Fenton	112.0	73.88 to 150.1	Yes	****	<0.0001
	conserved vs. SDS + KOH	72.33	34.22 to 110.5	Yes	****	<0.0001
	conserved vs. Fenton	98.00	59.88 to 136.1	Yes	****	<0.0001
	SDS + KOH vs. Fenton	25.67	-12.45 to 63.78	No	ns	0.2994
SAN	virgin vs. conserved	1.333	-36.78 to 39.45	No	ns	0.9997
	virgin vs. SDS + KOH	27.00	-11.12 to 65.12	No	ns	0.2564
	virgin vs. Fenton	11.00	-27.12 to 49.12	No	ns	0.8750
	conserved vs. SDS + KOH	25.67	-12.45 to 63.78	No	ns	0.2994
	conserved vs. Fenton	9.667	-28.45 to 47.78	No	ns	0.9110
	SDS + KOH vs. Fenton	-16.00	-54.12 to 22.12	No	ns	0.6928

---

6

7