

Drosophila melanogaster, AN IN VIVO MODEL TO PROPOSE AND EVALUATE BIOREMEDIATION STRATEGIES



The contamination of water bodies requires the design and evaluation of strategies for their bioremediation.

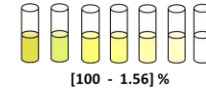
Aim: In this project we use the survival of *Drosophila melanogaster* as a toxicity global biomarker to discriminate the hazard potential of three complex samples prey water (Z1, Z2 and Z3).



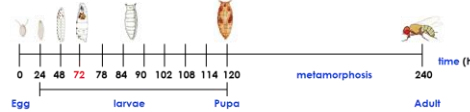
Figure 1. Zimapan dam. Localization water samples: Z1, Z2, Z3.

Experimental design:

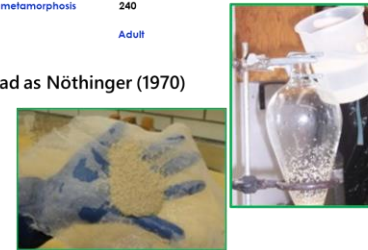
1. Water samples codify as Z1, Z2 and Z3 were assayed double-blind. Successive dilutions were prepared with distilled water (negative control).



2. Egg collection of wild type (WT) flies by 8 h



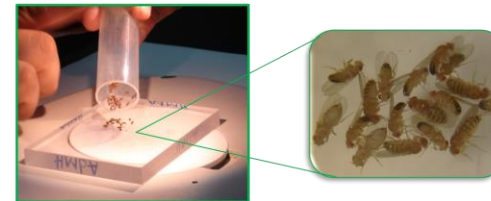
3. Three days after larvae were collected as Nöthinger (1970)



4. Semichronic treatment: Groups of ca. 100 3rd instar larvae fed during 48h with food enriched with distilled water or water samples at 100% or diluted.



5. Flies recovered were count and classified by sex.



Results:

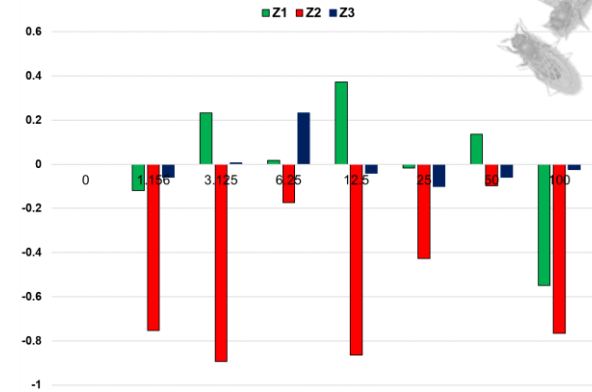


Figure 2. Fly Survival corrected from water samples assayed. Survival corrected: (Control or Experimental average/Control average) - 1.

Toxicity: Z2 > Z1 > Z3

The contents of ammonium, phosphates, total carbon, and dissolved oxygen are related to organic matter and domestic, agricultural, and industrial pollutants. Z1 and Z2 are samples associated with domestic and agricultural uses, but Z3, comes from an open water body, where the flow is constant and is away from wastewater discharges from nearby towns.

Table 1. Summary of the results obtained in the treatments in WT flies

	Z1			Z2			Z3		
	N	Average ± se	Female Sex ratio	N	Average ± se	Female Sex ratio	N	Average ± se	Female Sex ratio
dH2O	228	76.00 ± 14.09	0.43	56.3	23.76 ± 9.92	0.48	168	56.00 ± 4.52	0.51
1.56	201	67.00 ± 13.55	0.51	72.7	5.86 ± 4.55	0.59	158	52.67 ± 3.56	0.51
3.13	281	93.67 ± 3.53	0.45	79.3	2.52 ± 1.29	0.51	169	56.33 ± 6.18	0.48
6.25	232	77.33 ± 6.07	0.56	61.7	19.63 ± 11.18	0.52	207	69.00 ± 11.12	0.49
12.50	313	104.33 ± 7.49	0.52	42.7	3.21 ± 2.17	0.56	161	53.67 ± 3.55	0.51
25.00	224	74.67 ± 10.22	0.53	58.3	13.61 ± 8.56	0.52	151	50.33 ± 3.06	0.40
50.00	259	86.33 ± 16.73	0.53	71.3	21.46 ± 12.17	0.51	158	52.67 ± 1.21	0.47
100.00	103	34.33 ± 7.31	0.47	78	5.57 ± 2.84	0.51	164	54.67 ± 9.29	0.47

WT = Wild type flies; N = number of organisms recovered; se = standard error.

Conclusions:

The *D. melanogaster* survival biomarker efficiently identified the sample with the least toxicity, so it could be an *in vivo* and short-lived tool to propose and monitor bioremediation strategies.

Water body remediation strategies require sensitive, economical, and short-term strategies that provide comprehensive information on the efficiency of the measures adopted to mitigate pollution and facilitate monitoring of the different stages of the water body cleanup process.

Table 2. Physicochemical parameters of evaluated samples

Parameter	Z1	Z2	Z3
Transparency (m)	2.6	2.5	6.1
Temp. (°C)	21.2	22.6	21.5
dissolved oxygen (mg/L)	5.9	4.1	2.9
pH	8.3	8.9	8.6
Tot. Sol. (g/L)	0.7	0.8	0.8
Pot Redox (uV/cm)	691.0	627.0	646.0
Amonium (mg/L)	0.4	ND	0.2
Nitrites (mg/L)	0.0	ND	0.0
Phosphates (mg/L)	17.3	ND	6.4
Tot Carbon (mg/L)	44.3	ND	27.8

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