

This document contains additional information regarding the analyses performed in the article. It presents the results of statistical tests, calculations of growth, and mortality, and the nutritional composition of the diets for each treatment.

Quantity (g)	Ingredients	Nutritional value
Treatment 1		
60	Portion koi Vibrance	31% Crude Protein, 5% Ether Extract, 1% Calcium and 0.9% Phosphorus. At most, it has 2% Fiber, 7% Moisture and 7% Minerals, in addition to 100mg/kg of Vitamin C.
Treatment 2		
60	<i>Brassica oleracea</i> *	36.6 kcal Energy (Atware General Factor), 29.8 kcal Energy (Atware Specific Factor), 76% Water, 0.39% Nitrogen, 2.48% Protein, 1.27% Lipids, 3.76% Carbohydrates, 3.48% Dietary fiber, 0.34% Glucose, 0.34% Fructose, 0.21% Calcium, 0.00136% Iron, 0.0278% Magnesium, 0.0468% Phosphorus, 0.296% Potassium, 0.0450% Sodium, 0.000332% Zinc, 0.000045% Copper, 0.000782% Manganese, 0.0794% Vitamin C, 0.000096% Thiamin (B1), 0.000295% Riboflavin (B2), 0.00100% Niacin (B3), 0.000315% Pantothenic acid, 0.000125% Vitamin B6, 0.0000527% Folate, 0.000205% Vitamin A (RAE), 0.00244% β -carotene, 0.000023% β -Cryptoxanthin, 0.00532% Lutein + Zeaxanthin, 0.000561% Vitamin E (α -tocopherol), 0.000119% γ -Tocopherol, 0.000332% Vitamin K (phylloquinone)
Treatment 3		
60	<i>Brassica oleracea</i> *	36.6 kcal Energy (Atware General Factor), 29.8 kcal Energy (Atware Specific Factor), 76% Water, 0.39% Nitrogen, 2.48% Protein, 1.27% Lipids, 3.76% Carbohydrates, 3.48% Dietary fiber, 0.34% Glucose, 0.34% Fructose, 0.21% Calcium, 0.00136% Iron, 0.0278% Magnesium, 0.0468% Phosphorus, 0.296% Potassium, 0.0450% Sodium, 0.000332% Zinc, 0.000045% Copper, 0.000782% Manganese, 0.0794% Vitamin C, 0.000096% Thiamin (B1), 0.000295% Riboflavin (B2), 0.00100% Niacin (B3), 0.000315% Pantothenic acid, 0.000125% Vitamin B6, 0.0000527% Folate, 0.000205% Vitamin A (RAE), 0.00244% β -carotene, 0.000023% β -Cryptoxanthin, 0.00532% Lutein + Zeaxanthin, 0.000561% Vitamin E (α -tocopherol), 0.000119% γ -Tocopherol, 0.000332% Vitamin K (phylloquinone)
60	Portion koi Vibrance	31% Crude Protein, 5% Ether Extract, 1% Calcium and 0.9% Phosphorus. At most, it has 2% Fiber, 7% Moisture and 7% Minerals, in addition to 100mg/kg of Vitamin C.
Treatment 4		
60	Portion koi Vibrance	31% Crude Protein, 5% Ether Extract, 1% Calcium and 0.9% Phosphorus. At most, it has 2% Fiber, 7% Moisture and 7% Minerals, in addition to 100mg/kg of Vitamin C.
60	Ground eggshell	98% Calcium carbonate (CaCO_3)
12	Ágar ágar	0%
120	Distilled water	0%

Table S1 Nutritional composition of the feed prepared in the laboratory for treatment 4. This table contains the quantity (in grams) for one serving, the ingredients, and their nutritional value. *Nutritional information for *Brassica oleracea* is obtained at: <https://fdc.nal.usda.gov/food-details/323505/nutrients>

Ammonia control for <i>P. figulina</i>					
Date	Treatment and bottle	pH	Temperature °C	Ammonia (ppm)	NH ₄ ⁺ content
4/4/2025	TR1_G3	8.2	23.5	0.25	0.014
	TR2_G3	8.4	22.7	0.50	0.042
	TR3_G3	7.3	22.5	0.25	0.002
	TR4_G3	7.7	22.4	0.50	0.009
4/11/2025	TR1_G1	8.4	23.6	0.50	0.043
	TR2_G1	8.5	23.5	0.50	0.064
	TR3_G1	7.3	22.9	1.00	0.007
	TR4_G1	8.2	22.5	0.25	0.014
4/18/2025	TR1_G2	8.1	22	2	0.111
	TR2_G2	8.1	22	0.5	0.028
	TR3_G2	7.5	21	3.5	0.062
	TR4_G2	8.1	22	0.25	0.014

4/25/2025	TR1_G4	8.4	23.7	0.25	0.032
	TR2_G4	8.3	23.2	0.25	0.022
	TR3_G4	7.3	23.1	0.5	0.006
	TR4_G4	8.4	23.3	0.25	0.032
5/2/2025	TR1_G4	8.4	23.3	0.25	0.032
	TR2_G4	8.3	23.5	0.25	0.022
	TR3_G4	7.3	22.9	0.5	0.006
	TR4_G4	8.4	23.2	0.25	0.032

Table S2 Physicochemical parameters measured across treatments TR1 to TR4 within bottles G1, G2, G3, and G4. The table reports pH, temperature (°C), experimental concentration (units according to methodological specification), and the corresponding rate values obtained for each treatment. Each row represents an independent experimental treatment conducted under standardized environmental and methodological conditions, allowing for comparative assessment across groups and concentration levels

Mortality % from Total				
Weeks	Treatment 1	Treatment 2	Treatment 3	Treatment 4
0	0	0	0	0
1	3.3%	0.0%	13.3%	0.0%
2	36.7%	0.0%	13.3%	10.0%
3	3.3%	10.0%	10.0%	3.3%
4	6.7%	13.3%	6.7%	3.3%

Mortality % from Total				
5	3.3%	36.7%	0.0%	3.3%
6	0.0%	10.0%	6.7%	6.7%
7	0.0%	13.3%	3.3%	10.0%
8	0.0%	10.0%	10.0%	0.0%
9	0.0%	0.0%	0.0%	0.0%
10	0.0%	0.0%	0.0%	0.0%
TOTAL	53.3%	93.3%	63.3%	36.7%

Table S3 Weekly mortality percentages of individuals in Treatments 1, 2, 3, and 4 during the 10-week experimental period. Values represent the percentage of individuals that died each week relative to the initial total (n = 30 per treatment). The final row presents the cumulative mortality percentage for each treatment across the entire experiment.

Treatment	Final survival (%)	95% CI	p - value
TR1	46.7	32.0–68.0	< 0.001
TR2	6.7	1.7–25.0	
TR3	36.7	23.0–59.0	
TR4	63.3	48.0–83.0	

Table S4 Kaplan–Meier survival estimates of *Pomacea figulina* maintained under four experimental dietary treatments during the 10-week experimental period. Final survival probabilities are expressed as percentages with 95% confidence intervals (95% CI). Differences among treatments were assessed using the log-rank test ($P < 0.001$)

Treatments	N total	N missing	Mean	Standard Deviation	SE of mean	Minimum	Median	Maximum
TR1	91	19	1.82671	2.09352	0.21946	0.01093	0.9349	8.1096
TR2	68	42	0.24879	0.31094	0.03771	0.01	0.1247	1.4108
TR3	86	24	1.90917	2.19539	0.23674	0.00957	0.94793	8.2558
TR4	110	0	0.89466	0.81798	0.07799	0.00963	0.65985	3.0059

Table S5 Descriptive statistics of the weight of individuals in treatments TR1, TR2, TR3, and TR4. The table presents, for each treatment, the total number of observations, the mean, the standard deviation, the minimum body mass, the median, and the maximum body mass recorded. N refers to aquarium-week observations (up to 10 aquaria $\times$ 11 weekly time points per treatment). N missing corresponds to aquarium-week combinations with no surviving animals at that time point. These descriptors summarize the distribution characteristics of each treatment group used in the linear mixed-effects model analyses.

Treatments	N total	N missing	Mean	Standard Deviation	SE of mean	Minimum	Median	Maximum
TR1	91	19	14.77074	8.75761	0.93891	2.524	14.39	33.79
TR2	68	42	8.44759	4.37344	0.54246	0	7.675	18
TR3	86	24	15.30266	9.0688	0.99543	2.344	15.18333	33.345
TR4	110	0	13.0022	5.78247	0.55134	2.402	13.44333	23.44

Table S6 Descriptive statistics of the size of individuals in treatments TR1, TR2, TR3, and TR4. The table presents, for each treatment, the total number of observations, the mean, the standard deviation, the minimum shell length, the median, and the maximum shell length recorded. N refers to aquarium-week observations (up to 10 aquaria $\times$ 11 weekly time points per treatment). N missing corresponds to aquarium-week combinations with no surviving animals at that time point. These descriptors summarize the distribution characteristics of each treatment group used in the linear mixed-effects model analyses.

Treatments	Initial biomass (g)	Final biomass (g)	Weekly growth rate (WGR, %/week)
TR1	0.0138	5.4019	59.70
TR2	0.0128	0.6892	39.86
TR3	0.0131	5.9056	61.11
TR4	0.0154	2.2323	49.76

Table S7a. Weekly growth performance of individuals in treatments TR1, TR2, TR3, and TR4. The table presents the initial and final average body mass, the weekly absolute growth rate, and the weekly percentage growth rate for each treatment, summarizing the growth dynamics observed throughout the experimental period.

Treatments	Initial length (mm)	Final length (mm)	Absolute growth rate (AWG, mm/week)	Percentage growth rate (GGR, %/week)
TR1	2.80	26.90	2.41	86.00
TR2	2.80	13.70	1.09	39.00
TR3	2.78	29.18	2.64	95.00
TR4	2.72	20.42	1.77	65.00

Table S7b. Weekly growth performance of *Pomacea figulina* measured by shell length. The table reports the mean initial and final shell length (mm), alongside the weekly absolute growth rate (mm/week) and the weekly percentage growth rate (GGR, %/week) for all treatments throughout the 10-week study period.

Variable	Effect	F	df	p - value
Body mass	Treatment	53.1	3; 40.7	<0.001
	Week	149.5	10; 238.2	<0.001
	Treatment x Week	20.2	30; 237.2	<0.001
Shell length	Treatment	68.5	3; 40.7	<0.001
	Week	315.7	9; 238.2	<0.001
	Treatment x Week	15.6	27; 237.2	<0.001

Table S8 Summary of the linear mixed-effects model (LMMs) evaluating the effects of dietary treatment, experimental week, and their interaction on the body mass and shell length of *Pomacea figulina*. Dietary treatment, week, and the treatment x week interaction were included as fixed effects, while the aquarium was included as a random intercept to account for repeated measurements obtained from the same experimental unit over the 10-week experimental period. Test statistic (F), numerator and denominator degrees of freedom (df), and associated p-values are presented.

Treatments	P tukey	
	Body mass	Shell length
TR1 × TR2	<0.001	<0.001
TR1 × TR3	0.769 (ns)	0.534 (ns)
TR1 × TR4	<0.001	<0.001
TR2 × TR3	<0.001	<0.001
TR2 × TR4	0.01	<0.001

Table S9 Pairwise comparisons of estimated marginal means (EMMeans) for body mass and shell length among dietary treatments obtained from the linear mixed-effects models. Multiple comparisons were performed using Turkey's adjustment for family-wise error. Significant differences were considered at $p < 0.05$

Week	F	p	Result
0	0	1	ns
1	0	1	ns
2	0.03	0.999	ns
3	0.19	0.944	ns
4	1.2	0.32	ns
5	3.69	0.013	Difference between treatments
6	9.81	<0.001	Difference between treatments
7	20.35	<0.001	Difference between treatments
8	36.14	<0.001	Difference between treatments
9	39.57	<0.001	Difference between treatments
10	48.26	<0.001	Difference between treatments

Table S10 Simple-effects analysis of dietary treatment within each experimental week for body mass based on the linear mixed-effects models. For each week, F statistics and corresponding p-values (< 0.05) are presented to identify the time points at which dietary treatments differed significantly. These analyses were conducted because the treatment x week interaction was significant in the overall mixed-effects model

Week	F	p	Result
0	0.2	0.895	ns
1	1.05	0.385	ns
2	2.16	0.11	ns
3	1.9	0.147	ns
4	6.72	<0.001	Difference between treatments
5	11.83	<0.001	Difference between treatments
6	20.62	<0.001	Difference between treatments
7	28.94	<0.001	Difference between treatments
8	37.16	<0.001	Difference between treatments
9	44.58	<0.001	Difference between treatments
10	55.24	<0.001	Difference between treatments

Table S11 Simple-effects analysis of dietary treatment within each experimental week for shell-length based on the linear mixed-effects models. For each week, F statistics and corresponding p-values (< 0.05) are presented to identify the time points at which dietary treatments differed significantly. These analyses were conducted because the treatment x week interaction was significant in the overall mixed-effects model

Alives				
Weeks	Treatment 1	Treatment 2	Treatment 3	Treatment 4
0	30	30	30	30
1	29	30	26	30
2	18	30	22	27
3	17	27	19	26
4	15	23	17	25
5	14	12	17	24
6	14	9	15	22
7	14	5	14	19
8	14	2	11	19
9	14	2	11	19
10	14	2	11	19

Table S12 Weekly survival of individuals in Treatments 1, 2, 3, and 4 throughout the 10-week experimental period. The table reports the number of living individuals recorded at the beginning of the experiment (week 0) and at each subsequent week, enabling comparative assessment of survival dynamics among treatments.