ToxGenie Point Estimation Report

Report Date: 2026-06-28 12:18:34

Study Title:	Daphnia magna Reproduction Test
Analysis Method:	Linear and Nonlinear Regression Method (Mean Cystocarp Count)

Study No.:	Sample-123	**Test Material:**	Test Chemical
Test Species:	Daphnia magna	**Test Medium:**	Elendt M4

Table 1. Data Summary for Mean Cystocarp Count

(Unit: %)

Dose	1	2	3
Control	17.6000	17.2000	19.2000
0.8	12.0000	9.4000	10.2000
1.3	4.4000	5.2000	4.0000
2.2	2.4000	7.0000	1.4000
3.6	1.8000	3.8000	2.2000
6	0.2000	0.8000	2.2000
10	0.0000	0.2000	0.6000

Table 2. Model Comparison result: Fitted Models to the Dose-Mean Cystocarp Count

Model Name	R2	MSE	Res. SD	AIC	Norm. P
Exponential	0.9293	2.52976	1.56278	121.09	0.952
Gompertz	0.9280	2.57913	1.57314	121.49	0.971
Logistic	0.9293	2.53105	1.56293	121.10	0.953
Log-Logistic	0.9430	2.04089	1.42584	116.58	0.452
Weibull	0.9332	2.39039	1.54198	119.90	0.756
Linear	0.5138	17.40658	4.17212	161.59	0.209
Logistic with Hormesis	0.9377	2.23082	1.49359	118.45	0.003

Best Model: Log-Logistic (AIC = 116.58, R2 = 0.9430)

MSE: Mean Squared Error, Res. SD: Residual Standard Deviation, AIC: Akaike Information Criterion

Norm. P (Normality Test P-value)): Shapiro-Wilk Test P-value (P > 0.05 indicates normal residuals)

Table 3. Point Estimates

(Unit: %)

Level	Estimates	95% Lower Confidence Limit	95% Upper Confidence Limit
IC10	0.2168	0.0465	0.3870
IC20	0.3606	0.1825	0.5386
IC25	0.4319	0.2498	0.6140
IC30	0.5057	0.3211	0.6904
IC40	0.6673	0.4819	0.8527
IC50	0.8607	0.6771	1.0442
IC60	1.1101	0.9157	1.3044
IC70	1.4648	1.1983	1.7314
IC75	1.7151	1.3589	2.0713
IC80	2.0544	1.5416	2.5673
IC90	3.4175	2.0464	4.7887

Note: Estimates based on the Best Model (Log-Logistic, R2 = 0.9430).

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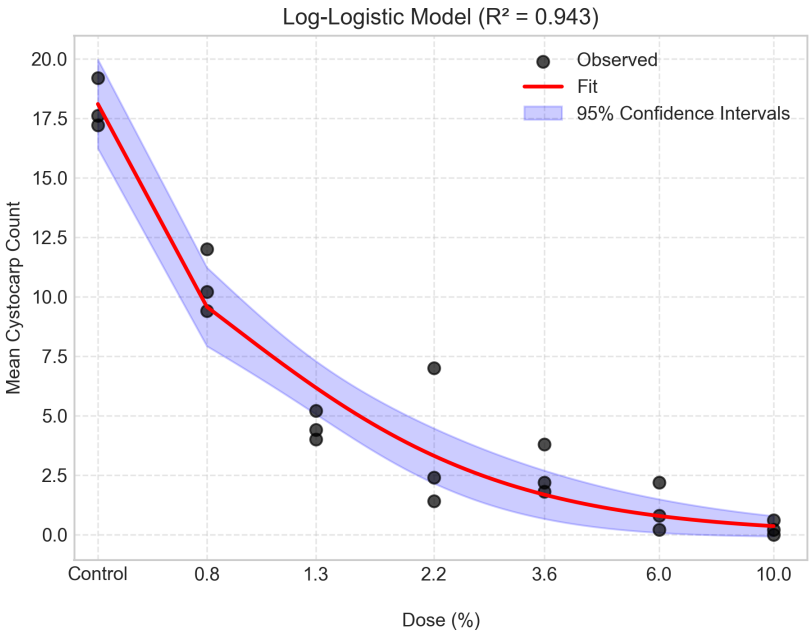

Figure 1. Log-Logistic Model for estimation of IC values and 95% Confidence Intervals.

Table 4. Mean Cystocarp Count: Quality Assurance (QA/QC) Summary

Parameter	Value / Status
Control Replicates (N)	3
Control CV (%)	5.88
Validity Flag	Pass

Methodology & Interpretation Guide

1. Statistical Parameters:

- *Sample Size (N): 21 (Total number of observed data points).*
- *Degrees of Freedom (DoF): 18 (Calculated as N - Number of Model Parameters [3]).*
- *Higher DoF generally increases the statistical power.*

2. Best Model Selection Criteria:

- *Best Model selected based on AIC (Akaike Information Criterion).*
- *Lowest AIC indicates best balance between goodness-of-fit and complexity.*
- *Secondary criterion: R-squared (R2) >= 0.9.*
- *Consequently, the selected model 'Log-Logistic' was chosen as it showed the best statistical fit (lowest AIC: 116.58) and satisfied accuracy (R2 >= 0.9).*

3. 95% Confidence Interval (CI) Calculation:

- *Method used: Delta Method (Jacobian matrix).*
- *The 95% CI provides a range likely to contain the true parameter value.*

Analyst: ToxGenie