Data Evaluation Report on the acute toxicity of Penoxsulam metabolite (BSTCA) to aquatic vascular plants *Lemna gibba*

PMRA Submission #:{.....} EPA MRID#: 45831106

Data Requirement:

PMRA Data Code:	{.....}
EPA DP Barcode:	D288160
OECD Data Point:	{.....}
EPA MRID:	45831106
EPA Guideline:	123-2

Test material: Penoxsulam metabolite Purity: 100%
Common name: BSTCA
Chemical name: IUPAC: Not reported
CAS name: Not reported
CAS No.: Not reported
Synonyms: Not reported

Primary Reviewer: Rebecca Bryan
Staff Scientist, Dynamac Corporation
Signature: Rebecca Bryan
Date: 11/21/03

QC Reviewer: Dana Worcester
Staff Scientist, Dynamac Corporation
Signature: Dana Worcester
Date: 11/21/03

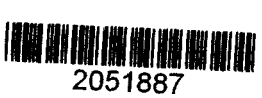
Primary Reviewer: ~~Bill Erickson~~
{EPA/OECD/PMRA} J. GOODYEAR
Date: {.....} Goodyear

Secondary Reviewer(s): {.....}
{EPA/OECD/PMRA}
Date: {.....}

Company Code {.....} [For PMRA]
Active Code {.....} [For PMRA]
EPA PC Code ~~119~~031 119031

Date Evaluation Completed: {dd-mmm-yyyy}

CITATION: Hoberg, J.R. 2002. XDE-638 Metabolite (BSTCA) - Toxicity to Duckweed, *Lemna gibba*. Unpublished study performed by Springborn Laboratories, Inc., Wareham, Massachusetts. Laboratory Project Identification No. 12550.6175/Project No. 011240. Study submitted by The Dow Chemical Company for Dow AgroSciences, LLC Midland, Michigan. Experimental start date January 9, 2001 and experimental termination date January 28, 2002. The final report issued February 19, 2002.



EXECUTIVE SUMMARY:

In a 14-day acute toxicity study, freshwater aquatic vascular plants Duckweed, *Lemna gibba* G3, were exposed to Penoxsulam metabolite (BSTCA) at mean measured concentrations <0.027 (<LOQ, negative and solvent controls), 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L under static conditions. Nominal concentrations were 0 (negative and solvent controls), 0.10, 0.26, 0.64, 1.6, 4.0, and 10 mg a.i./L. After 14 days, the mean frond number percent inhibitions compared to the pooled controls were 1, 4, 4, 2, 1, and 1% in the 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L treatment groups, respectively. The mean growth rate percent inhibitions compared to the pooled controls were 0, 5, 2, 2, 2, and -2% in the 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L treatment groups, respectively. The mean dry weight percent inhibitions compared to the pooled controls were 4, -28, -8, 6, -2, and -31% in the 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L treatment groups, respectively. The percent reductions for number of fronds, growth rate, and dry weight were not significant in any treatment group.

This toxicity study is scientifically sound and satisfies the U.S. EPA Guideline Subdivision J, §123-2 for an aquatic vascular plant study with *Lemna gibba*. As a result, this study is classified as Core.

Results Synopsis

Test Organism: *Lemna gibba* G3
Test Type: Static

Number of fronds:
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: ND 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Growth rates (day 7):
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: could not determine 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Plant biomass (dry weight):
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: could not determine 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Endpoint(s) Affected: None

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The test protocol was based on the following guidelines: OECD Proposed Guideline 221 and U.S. EPA-FIFRA Pesticide Assessment Guidelines, Subdivision J, Hazard Evaluation: Nontarget Plants Guidelines 122-2 and 123-2. The following deviations from U.S. EPA Guideline 123-2 are noted:

1. The pretest health of the test organism was not reported.

2. The definitive test was conducted under static conditions and the test solution was not renewed as recommended.

These deviations do not affect the acceptability or the validity of the study.

COMPLIANCE: Signed and dated GLP, Quality Assurance and No Data Confidentiality statements were provided.

A. MATERIALS:

1. Test Material Penoxsulam metabolite (BSTCA)

Description: Not reported

Lot No./Batch No. : E0767-54 and E1145-46

Purity: ≥98%

Stability of Compound
Under Test Conditions: Day 0 measured concentrations ranged from 100 to 102% of nominal concentrations and day 14 measured concentrations ranged from 105 to 110% of nominal concentrations. The mean measured concentrations were 100 to 110% of nominal.

(OECD requires water solubility, stability in water and light, pKa, Pow, vapor pressure of test compound)
OECD requirements were not reported.

Storage conditions of test chemicals: Stored in a freezer (Approximately -20°C).

2. Test organism:

Name: Duckweed, *Lemna gibba* *(EPA requires a vascular species: Lemna gibba.)*
Strain, if provided: G3
Source: Laboratory cultures (original supplier: University of Toronto, Toronto, Canada)
Age of inoculum: 5 days old
Method of cultivation: 20X Algal Assay Procedure (AAP) Medium

B. STUDY DESIGN:

a) Range-finding Study: No range-finding study was conducted.

b) Definitive Study

Table 1 . Experimental Parameters

Parameter	**Details**	**Remarks** ***Criteria***
Acclimation period: culturing media and conditions: (same as test or not) health: (any toxicity observed)	Continuous culture 20X Algal Assay Procedure (AAP) Medium; same as test. Not reported	
Test system static/static renewal/ renewal rate for static renewal:	Static	*EPA expects the test concentrations to be renewed every 3 to 4 days (one renewal for the 7 day test, 3-4 renewals for the 14 day test).*
Incubation facility	Environmental chamber	
Duration of the test	14 days	*EPA requires a duration of 14 days. Seven day studies will be accepted for review by the Agency.*
Test vessel material: (glass/polystyrene) size: fill volume:	Sterile crystallizing dishes 270 mL 100 mL	
Details of growth medium name: pH at test initiation: pH at test termination: Chelator used: Carbon source:	20X Algal Assay Procedure (AAP) Medium 7.5-7.7 (Table 2, p. 23) 8.7-9.2 Yes $NaHCO_3$	*EPA recommend the following culture media:* *Modified hoagland's E+ or 20X-AAP.*
If non-standard nutrient medium was used, detailed composition provided (Yes/No)	Not applicable	
Dilution water source/type: pH: water pretreatment (if any): Total Organic Carbon:	Sterile deionized water 7.5 ± 0.1 pH adjusted using 0.1 *N* hydrochloric acid 0.47 mg/L (January 2002	*EPA recommends a pH of ~5.0. A solution pH of 7.5 is acceptable if type 20X-AAP nutrient media is used.*

Parameter	Details	Remarks *Criteria*
	analysis) particulate matter: N/A metals: Not detected pesticides: Not detected chlorine: N/A	
Indicate how the test material is added to the medium (added directly or used stock solution)	Stock solution	
Aeration or agitation	Not reported.	
Sediment used **(for rooted aquatic vascular plants)** origin: textural classification (% sand, silt and clay): organic carbon (%): geographic location:	Not applicable	
Number of replicates control: solvent control: treatments:	 3 3 3	
Number of plants/replicate	5 plants per replicate	*EPA requires 5 plants.*
Number of fronds/plant	3 fronds per plant (15 total fronds per replicate)	*EPA requires 3 fronds per plant.*
Test concentrations nominal: measured:	 0 (negative and solvent controls), 0.10, 0.26, 0.64, 1.6, 4.0, and 10 mg a.i./L <0.027 (<LOQ, negative and solvent controls), 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L	*EPA requires at least 5 test concentrations with a dose range of 2X or 3X progression.*
Solvent (type, percentage, if used)	Dimethylformamide (DMF), 0.10 mL/L	
Method and interval of analytical verification	HPLC; days 0 and 14.	
Test conditions temperature:	 23-26°C	*EPA temperature: 25 °C*

Parameter	Details	Remarks *Criteria*
photoperiod: light intensity and quality:	continuous light 7400-8900 lux	*EPA photoperiod: continuous* *EPA light: 5.0 Klux (±15%)*
Reference chemical (if used) name: concentrations:	None	
Other parameters, if any	None	

2. Observations:

Table 2: Observation parameters

Parameters	Details	Remarks/Criteria
Parameters measured (eg: number of fronds, plant dry weight or other toxicity symptoms)	Number of fronds, toxicity symptoms, and terminal dry weights.	
Measurement technique for frond number and other end points	Direct counts and weights.	
Observation intervals	Days 7 and 14.	
Other observations, if any	None	
Indicate whether there was an exponential growth in the control	Yes	
Were raw data included?	Replicate data provided.	

II. RESULTS and DISCUSSION:

A. INHIBITORY EFFECTS:

After 14 days, the mean frond number percent inhibitions compared to the pooled controls were 1, 4, 4, 2, 1, and 1% in the 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L treatment groups, respectively. The mean growth rate percent inhibitions compared to the pooled controls were 0, 5, 2, 2, 2, and -2% in the 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L treatment groups, respectively. The mean dry weight percent inhibitions compared to the pooled controls were 4, -28, -8, 6, -2, and -31% in the 0.11, 0.27, 0.65, 1.6, 4.1, and 10 mg a.i./L treatment groups, respectively. The percent reductions for number of fronds, growth rate, and dry weight were not significant in any treatment group.

Table 3: Effect of Penoxsulam metabolite (BSTCA) on frond number and dry weight of Duckweed, *Lemna gibba*

Treatment[1] (estimated measured	Initial frond number/test	Mean frond number at	Mean Growth	Mean Biomass (dry weights, g)

		7 days	14 days	% inhibition at 14 days		
Negative control (dilution water)	15	326	735	---	0.44	0.0998
Solvent control	15	299	726	---	0.43	0.1023
0.11 (0.10)	15	322	724	1	0.44	0.0970
0.27 (0.26)	15	273	704	4	0.42	0.1293
0.68 (0.64)	15	304	699	4	0.43	0.1088
1.6 (1.6)	15	302	715	2	0.43	0.0950
4.1 (4.0)	15	295	726	1	0.43	0.1031
10 (10)	15	334	724	1	0.45	0.1325
Reference chemical (if used)	Not applicable					

[1] Nominal concentrations are in parentheses.

Table 4: Statistical endpoint values.

Statistical Endpoint[a]	frond No.	growth rate (day 7)	dry weight
NOAEC or EC_{05} (mg a.i./L)	10	10	10
LOAEC (mg a.i./L)	>10	>10	>10
EC_{50} (mg a.i./L) (95% C.I.)	>10	>10	>10
EC_{25} (mg a.i./L) (95% C.I.)	>10	Not reported	>10
Reference chemical NOAEC IC_{50}/EC_{50}	Not applicable	Not applicable	Not reported

[a] Statistical data based on measured test concentrations.

B. REPORTED STATISTICS: A t-test was used to compare the dilution water (negative) and solvent controls. The controls were pooled for all statistical analyses. The data was analyzed for normality using the Shapiro-Wilk's Test and homogeneity of variance using Bartlett's Test. The Williams' test was used to compare the treatment groups to the pooled control. The NOAEC and LOAEC were determined from significance data. The EC_{50} was empirically estimated to be greater than the highest concentration tested (no concentrations with >50% inhibition). The reported statistics were based on the mean measured test concentrations..

C. VERIFICATION OF STATISTICAL RESULTS:

Statistical method: Frond number, growth rate, and dry weight data satisfied the assumptions of ANOVA (i.e., normal distribution and variance homogeneity); the NOAEC and LOAEC values were determined using ANOVA via TOXSTAT statistical software. For all endpoints, the solvent control was compared to the negative control using a Student's t-test and, upon finding no differences, the two were pooled for comparison to treatment. While reductions equaled or exceeded 5% in at least one treatment group for growth rate and dry weight, the responses were not monotonic so EC_{05} values could not be determined using the Probit method via Nuthatch software. Reductions did not exceed 5% for frond number and no endpoint exhibited reductions of 50%, so the EC_{50} could be visually determined for all endpoints.

Number of fronds:
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: Not determined 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Growth rates (day 7):
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: could not determine 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Plant biomass (dry weight):
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: could not determine 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Endpoint(s) Affected: None

D. STUDY DEFICIENCIES:

The deviations did not affect the acceptability or the validity of the study.

E. REVIEWER'S COMMENTS:

The reviewer's conclusions agreed with the study author's; there was no toxicity of XDE-638 Metabolite (BSTCA) to duckweed.

The amount of test substance was limited , so further tests to determine EC_{50} were not performed. The study author reported these test results define the toxicity of the metabolite relative to the parent compound.

The test was conducted according to U.S. EPA Good Laboratory Practice Regulations with the following exception: The data for routine water contaminant screening analysis was not collected in accordance to GLP procedures. A GLP statement was provided.

F. CONCLUSIONS: This toxicity study is scientifically sound and satisfies the U.S. EPA Guideline Subdivision

J, §123-2 for an aquatic vascular plant study with *Lemna gibba*. As a result, this study is classified as Core. There was no toxicity of XDE-638 Metabolite (BSTCA) to duckweed.

Number of fronds:
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: Not determined 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Growth rates (day 7):
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: could not determine 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Plant biomass (dry weight):
NOAEC: 10 mg a.i./L
LOAEC: >10 mg a.i./L
EC_{05}/IC_{05}: could not determine 95% C.I.: N/A
EC_{50}/IC_{50}: >10 mg a.i./L 95% C.I.: N/A
Slope: N/A

Endpoint(s) Affected: None

III. REFERENCES:

ASTM. 2000. Standard practice for conducting acute toxicity tests with fishes, macroinvertebrates, and amphibians. Standard E729-88a, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania.

Horning, W.B. and C.I. Weber, 1985. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. EPA/600/4-89/014. Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio.

Hillman, W.S. 1961. The Lemnacea, or duckweeds. *Bot. Rev.* 27:221-287.

Miller, W.E., J.C. Green and T. Shiroyama. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. EPA 600/9-78-018. U.S. Environmental Protection Agency, Corvallis, Oregon.

OECD. 1997. Good Laboratory Practices as acknowledged in the EEC Council Directive 88/320/EEC of 9 June 1988.

OECD. 2000. OECD Guideline for Testing of Chemicals. *Lemna* sp. Growth Inhibition Test. Proposed Guideline #221. Revised Draft, October 2000.

Sokal, R.R. and F.J. Rohlf. 1981. *Biometry.* 2nd Edition. W.H. Freeman and Co. New York, NY. 859 pp.

U.S. EPA. 1982. *Pesticide Assessment Guidelines, Subdivision J, Hazard Evaluation: Nontarget Plants.* EPA 540/9-82-020, 27 October 1982. U.S. EPA, Washington, D.C.

U.S. EPA. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Good Laboratory Practice Standards; Final Rule (40 CFR, Part 160). Federal Register, 48 (230); 34052-34074. U.S. Environmental Protection Agency, Washington, DC.

Weber, C.I., W.H. Peltier, T.J. Norberg-King, W.B. Horning II, F.A. Kessier, J.R. Menkedick, T.W. Neiheisel, P.A. Lewis, D.J. Kiemm, Q.H. Pickering, E.L. Robinson, J.M. Lazorchak, L.J. Wymer and R.W. Freyberg (eds.). 1989. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. 2nd ed. EPA/600/4/89/001. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH.

Williams, D.A. 1971. A test for differences between treatment means when several dose levels are compared with a zero dose control. *Biometrics* 27: 103-117.

Williams, D.A. 1972. A comparison of several dose levels with a zero control. *Biometrics* 28: 519-531.

APPENDIX I. OUTPUT OF REVIEWER'S STATISTICAL RESULTS:

frond production

File: 1106f Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	2965.333	494.222	0.481
Within (Error)	17	17484.000	1028.471	
Total	23	20449.333		

Critical F value = 2.70 (0.05,6,17)

Since F < Critical F FAIL TO REJECT Ho:All groups equal

frond production

File: 1106f Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	GRPS 1&2 POOLED	730.667	730.667		
2	0.11	724.000	724.000	0.294	
3	0.27	704.333	704.333	1.161	
4	0.65	699.333	699.333	1.382	
5	1.6	714.667	714.667	0.706	
6	4.1	726.000	726.000	0.206	
7	10	723.667	723.667	0.309	

Bonferroni T table value = 2.65 (1 Tailed Value, P=0.05, df=17,6)

frond production

File: 1106f Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	GRPS 1&2 POOLED	6			
2	0.11	3	60.207	8.2	6.667
3	0.27	3	60.207	8.2	26.333
4	0.65	3	60.207	8.2	31.333
5	1.6	3	60.207	8.2	16.000
6	4.1	3	60.207	8.2	4.667

7	10	3	60.207	8.2	7.000

frond production
File: 1106f Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	ORIGINAL N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	GRPS 1&2 POOLED	6	730.667	730.667	730.667
2	0.11	3	724.000	724.000	724.000
3	0.27	3	704.333	704.333	713.600
4	0.65	3	699.333	699.333	713.600
5	1.6	3	714.667	714.667	713.600
6	4.1	3	726.000	726.000	713.600
7	10	3	723.667	723.667	713.600

frond production
File: 1106f Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
GRPS 1&2 POOLED	730.667				
0.11	724.000	0.294		1.74	k= 1, v=17
0.27	713.600	0.753		1.82	k= 2, v=17
0.65	713.600	0.753		1.85	k= 3, v=17
1.6	713.600	0.753		1.87	k= 4, v=17
4.1	713.600	0.753		1.87	k= 5, v=17
10	713.600	0.753		1.88	k= 6, v=17

s = 32.070
Note: df used for table values are approximate when v > 20.

growth rate
File: 1106g Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	0.0019	0.0003	0.600
Within (Error)	17	0.0084	0.0005	

Total	23	0.0103

Critical F value = 2.70 (0.05,6,17)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

growth rate
File: 1106g Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	GRPS 1&2 POOLED	0.437	0.437		
2	0.11	0.440	0.440	-0.211	
3	0.27	0.413	0.413	1.476	
4	0.65	0.427	0.427	0.632	
5	1.6	0.430	0.430	0.422	
6	4.1	0.427	0.427	0.632	
7	10	0.443	0.443	-0.422	

Bonferroni T table value = 2.65 (1 Tailed Value, P=0.05, df=17,6)

growth rate
File: 1106g Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	GRPS 1&2 POOLED	6			
2	0.11	3	0.042	9.6	-0.003
3	0.27	3	0.042	9.6	0.023
4	0.65	3	0.042	9.6	0.010
5	1.6	3	0.042	9.6	0.007
6	4.1	3	0.042	9.6	0.010
7	10	3	0.042	9.6	-0.007

growth rate
File: 1106g Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN

1	GRPS 1&2 POOLED	6	0.437	0.437	0.430
2	0.11	3	0.440	0.440	0.430
3	0.27	3	0.413	0.413	0.430
4	0.65	3	0.427	0.427	0.430
5	1.6	3	0.430	0.430	0.430
6	4.1	3	0.427	0.427	0.430
7	10	3	0.443	0.443	0.443

growth rate
File: 1106g Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
GRPS 1&2 POOLED	0.430				
0.11	0.430	0.426		1.74	k= 1, v=17
0.27	0.430	0.426		1.82	k= 2, v=17
0.65	0.430	0.426		1.85	k= 3, v=17
1.6	0.430	0.426		1.87	k= 4, v=17
4.1	0.430	0.426		1.87	k= 5, v=17
10	0.443	0.426		1.88	k= 6, v=17

s = 0.022
Note: df used for table values are approximate when v > 20.

ECx

!!!Failure #3: Data not suitable for probit model fit.

Criterion is 3 or more distinct isotone means.

dry weight
File: 1106d Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	4392.132	732.022	2.105
Within (Error)	17	5912.233	347.778	
Total	23	10304.365		

Critical F value = 2.70 (0.05,6,17)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

dry weight
File: 1106d Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	GRPS 1&2 POOLED	101.033	101.033		
2	0.11	97.033	97.033	0.303	
3	0.27	129.300	129.300	-2.144	
4	0.65	108.833	108.833	-0.592	
5	1.6	94.967	94.967	0.460	
6	4.1	103.100	103.100	-0.157	
7	10	132.500	132.500	-2.386	

Bonferroni T table value = 2.65 (1 Tailed Value, P=0.05, df=17,6)

dry weight
File: 1106d Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	GRPS 1&2 POOLED	6			
2	0.11	3	35.011	34.7	4.000
3	0.27	3	35.011	34.7	-28.267
4	0.65	3	35.011	34.7	-7.800
5	1.6	3	35.011	34.7	6.067
6	4.1	3	35.011	34.7	-2.067
7	10	3	35.011	34.7	-31.467

dry weight
File: 1106d Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	ORIGINAL N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	GRPS 1&2 POOLED	6	101.033	101.033	99.700
2	0.11	3	97.033	97.033	99.700
3	0.27	3	129.300	129.300	109.050
4	0.65	3	108.833	108.833	109.050
5	1.6	3	94.967	94.967	109.050

6	4.1	3	103.100	103.100	109.050
7	10	3	132.500	132.500	132.500

dry weight
File: 1106d Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
GRPS 1&2 POOLED	99.700				
0.11	99.700	0.101		1.74	k= 1, v=17
0.27	109.050	0.608		1.82	k= 2, v=17
0.65	109.050	0.608		1.85	k= 3, v=17
1.6	109.050	0.608		1.87	k= 4, v=17
4.1	109.050	0.608		1.87	k= 5, v=17
10	132.500	2.386	*	1.88	k= 6, v=17

s = 18.649
Note: df used for table values are approximate when v > 20.

ECx

!!!Failure #3: Data not suitable for probit model fit.

Criterion is 3 or more distinct isotone means.