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DATA EVALUATION RECORD

STUDY 8

CHEM 129034 Flumioxazin §164-1
CAS No. 103361-09-7
FORMULATION--06--WETTABLE POWDER

STUDY ID 44295043
Corbin, B. R. 1996. Soil dissipation of phenyl-^{14}C-flumioxazin under field conditions in North Carolina. Valent Project No.: 10728. PTRL Project No.: 767. Ricerca Document No.: 5661-93-0136-EF-001. Unpublished study performed by PTRL East, Inc., Richmond, KY (in-life and analytical phases); and Ricerca, Inc., Painesville, OH (analytical phase); and submitted by Valent U.S.A. Corporation, Walnut Creek, CA.

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CONCLUSIONS

Field Dissipation - Terrestrial

1. This study is scientifically valid and provides supplemental information on the terrestrial field dissipation of flumioxazin in lysimeter-enclosed bareground plots of loamy sand soil in North Carolina. It should be noted that the study was not conducted under typical use conditions for peanuts or soybeans.

2. Uniformly phenyl ring-labeled [^{14}C]flumioxazin, applied at a nominal application rate of 43.4 g a.i./A (0.348 mg/lysimeter) to lysimeter-enclosed bareground plots of Dothan loamy sand soil in Clayton, NC, dissipated with a registrant-calculated half-life of 27 days (0-111 day data; $r^2 = 0.97$); the half-life was determined from the parent compound detected in the 0- to 3-inch depth only. However, the observed first half-life occurred between 17 and 27 days; only 32.4% of the applied remained as parent at 27 days. Dissipation was observed to be biphasic with the more rapid phase occurring through 111 days. Residue data were reported as parent equivalents. The parent compound was initially present in the 0- to 3-inch depth at 95.1% (0.102 ppm) of the applied radioactivity, was 59.5% (0.064 ppm) at 17 days and 32.4% (0.035 ppm) at 27 days, decreased to 13.2% (0.014 ppm) by 69 days, and was 5.1-5.5% (0.005-0.006 ppm) at 111-177 days. Unidentified radioactivity (designated as "Region 2"; fractions 15-22) was detected in the 0- to 3-inch depth at a maximum of 11.0-11.2% (0.012 ppm) from 17 to 43 days posttreatment, and was 6.0-6.4% (0.006 ppm) from 111 to 177 days; unidentified radioactivity consisted of multiple components, each of which was <0.01 ppm. Nonextractable [^{14}C]residues were 6.5% (0.007 ppm) of the applied radioactivity at 6 days posttreatment, were 17.8% (0.019 ppm) at 17 days, and increased to 25.2-29.0% (0.027-0.031 ppm) by 43-177 days. Total [^{14}C]residues were not detected above 0.01 μg/g (designated the limit of analysis) below the 3-inch depth. [^{14}C]Residues were not detected in the leachate samples and were only detected once in the run-off samples, at 0.02% (day 111) of the applied radioactivity. Characterization data for the run-off samples were not reported.

METHODOLOGY

Uniformly phenyl ring-labeled [^{14}C]flumioxazin (51% WP; V-53482; radiochemical purity ≥98.6%, specific activity 129 mCi/mmol; p. 11; Appendix 2, p. 201), dissolved in dimethyl sulfoxide, was applied once at a nominal rate of 43.4 g a.i./A (0.348 mg/lysimeter) to 8-inch diameter steel lysimeter-enclosed bareground plots (<2% slope, p. 32) of Dothan loamy sand soil (0-3 inches: 87% sand, 5% silt, 7% clay, 0.9% organic matter, pH 5.7, CEC 1.7 meq M+/100 g; Appendix 1, Table I, p. 51) in Clayton, NC (pp. 32, 34). Prior to treatment (22 days), the test plot was tilled (3-inch depth) and 32 steel lysimeters (38-inch length; 8-inch i.d.) were inserted vertically into the soil to a target depth of 36 inches

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(leaving the rim two inches above the soil surface; pp. 79, 81). The lysimeters were inserted 12 inches apart and 12 inches from an access trench (4 feet deep x 4 feet wide). The lower end of the lysimeter was fitted with a wire mesh and equipped with a leachate collection apparatus consisting of a glass funnel inserted into a glass collection jar (pp. 32, 33). An overflow collection apparatus, consisting of Teflon tubing inserted through a hole in the lysimeter (0.25 inches above the soil surface) and connected to a glass jar wrapped with aluminum foil, was used to collect water that pooled on the top of the soil surface. The lysimeters remained untreated for 21 days prior to the initiation of the study; lysimeter-enclosed plots received two inches of water (precipitation plus irrigation) during the two weeks prior to treatment. The soil surfaces within 28 lysimeters were individually treated drop-wise around the inner six-inch area with the test solution using a glass Pasteur pipette; each lysimeter was immediately irrigated with 84 mL of water following treatment (p. 34). Of the remaining lysimeters, four were utilized as untreated controls. The test plot containing the lysimeters was not treated with pesticides for at least three years prior to treatment with flumioxazin (p. 32). The depth to the water table was not reported. Environmental data were collected off-site (distance from test site not reported; p. 34). Precipitation was supplemented with irrigation; total water input through 181 days posttreatment (25.3 inches) was approximately 113% (reviewer-calculated) of the 10-year mean annual precipitation (pp. 101-108). Pan evaporation was 41.8 inches (reviewer-calculated) through 181 days posttreatment.

Duplicate treated lysimeters were removed at 0, 1, 3, 6, 10, 17, 27, 43, 69, 111, and 177 days posttreatment; single control lysimeters were removed at 0, 27, 69, and 177 days posttreatment (Appendix 1, Table II, p. 52). Samples were collected by removing the entire lysimeter from the plot and the steel lysimeters were cut open with a reciprocating saw (p. 35). For the day-0 samples, the 0- to 3-inch depth soil was "scooped" from the lysimeter prior to cutting open the lysimeter. The soil columns within the lysimeters were sectioned into 3-inch (0- to 12-inch depth) and 6-inch (12- to 18-inch depth) increments, placed into bags, and placed in a cooler containing dry or blue ice. Samples were shipped frozen to the PTRL East analytical lab where the soil was homogenized and analyzed for total radioactivity by LSC following combustion; the limit of quantitation was twice the background (46 dpm/g; pp. 36-38). Soil samples containing $\geq$0.01 μg/g [^{14}C]residues were shipped to Ricerca, Inc., and extracted and analyzed (p. 14). Soil samples were stored frozen at Ricerca, Inc. for less than two weeks prior to analysis (p. 211). Leachate and run-off water samples were monitored approximately once a week and following any significant rainfall (p. 36). When leachate/run-off was present in the collection jars, samples were placed into collection vials and stored frozen, or immediately shipped frozen to the PTRL East analytical lab.

At Ricerca, Inc., soil samples were analyzed for the parent and the following potential degradates: N-[7-fluoro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-3,4,5,6-tetrahydrophthalamic acid (482-HA); 2-[7-fluoro-3-oxo-6-(3,4,5,6-tetrahydrophthalimido)-2H-1,4-benzoxazin-4-yl]propionic acid (482-CA); 7-fluoro-6-

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(3,4,5,6-tetrahydrophthalimido)-2H-1,4-benzoxazin-3(4H)-one (IMOXA); 6-amino-7-fluoro-4-(2-propynyl)-2H-1,4-benzoxazin-3(4H)-one (APF); and 7-fluoro-6-nitro-4-(2-propynyl)-2H-1,4-benzoxazin-3(4H)-one (PNF; pp. 202-204). Triplicate soil subsamples were oven dried and analyzed for total radioactivity by LSC following combustion (pp. 211-212). Soil samples were extracted twice by blending with acetone:0.1 *N* HCl (4:1, v:v), filtered, and washed with additional solvent (unspecified; Appendix 2, Figure 3, p. 234). The extracts were combined and concentrated by rotary evaporation, and triplicate aliquots were analyzed for total radioactivity by LSC. Aliquots of the extracts were centrifuged (to pellet the fine soil residue), and the supernatant was decanted and analyzed for total radioactivity by LSC. The soil pellet was further extracted once by vortexing with acetonitrile and centrifuged, and the supernatant was decanted and analyzed for total radioactivity by LSC. The soil pellet was suspended in solution and analyzed for total radioactivity by LSC. Aliquots of the supernatants were combined and duplicate aliquots were analyzed by HPLC (Zorbax® SB-Phenyl column) using a mobile phase gradient of water:methanol (both with 0.05% H_3PO_4; 60:40 to 0:100, v:v) with UV (254 nm) and radioactive flow detection (p. 209). Samples were co-chromatographed with nonradiolabeled reference standards of the parent and the potential degradates which were dissolved in acetonitrile or dimethyl sulfoxide. Eluent fractions were collected at one-minute intervals (1 mL) and analyzed for total radioactivity by LSC. Post-extracted soil samples were analyzed for total radioactivity by LSC following combustion (p. 212).

Aliquots of the leachate and run-off samples were analyzed for total radioactivity by LSC at the PTRL East analytical lab; the limits of quantitation were 44 dpm/mL and 50 dpm/mL, respectively (p. 14).

DATA SUMMARY

Uniformly phenyl ring-labeled [^{14}C]flumioxazin (V-53482; radiochemical purity ≥98.6%), applied at a nominal application rate of 43.4 g a.i./A (0.348 mg/lysimeter) to lysimeter-enclosed bareground plots of Dothan loamy sand soil in Clayton, NC, dissipated with a registrant-calculated half-life of 27 days (0-111 day data; r^2 = 0.97; Appendix 2, Figure 29, p. 260); the half-life was determined only from the parent compound detected in the 0- to 3-inch depth (see Comment #4). However, the observed first half-life occurred between 17 and 27 days; only 32.4% of the applied remained as parent at 27 days. Dissipation was observed to be biphasic with the rapid phase occurring through 111 days. Residue data were reported as parent equivalents. The parent compound was initially present in the 0- to 3-inch depth at 95.1% (0.102 ppm) of the applied radioactivity, was 79.0-82.8% (0.084-0.089 ppm) of the applied from 1 to 3 days posttreatment, was 59.5% (0.064 ppm) at 17 days and 32.4% (0.035 ppm) of the applied at 27 days posttreatment, decreased to 13.2% (0.014 ppm) of the applied by 69 days, and was 5.1-5.5% (0.005-0.006 ppm) of the applied from 111 to 177 days posttreatment (Appendix 2, Tables V and VI, pp. 230-231). Unidentified radioactivity (designated as "Region 2"; fractions 15-22) was initially

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present (day 0) in the 0- to 3-inch depth at 3.7% (0.004 ppm) of the applied radioactivity, was 7.5% (0.008 ppm) of the applied at 3 days posttreatment, increased to a maximum of 11.0-11.2% (0.012 ppm) of the applied at 17-43 days posttreatment, and was 6.0-6.4% (0.006 ppm) of the applied from 111 to 177 days posttreatment; unidentified radioactivity consisted of multiple components, each of which was <0.01 ppm (pp. 9, 16; Appendix 2, Figures 7-28, pp. 238-259; see Comment #5). Unidentified polar radioactivity (designated as "Region 1"; fractions 4-6) was initially present (day 0) in the 0- to 3-inch depth at 0.6% (0.001 ppm) of the applied radioactivity, and was 1.6-2.9% (0.002-0.003 ppm) of the applied from 3 to 177 days posttreatment; unidentified radioactivity consisted of multiple components, each of which was <0.01 ppm. Nonextractable [^{14}C]residues were initially 1.9% (0.002 ppm) of the applied radioactivity, were 6.5% (0.007 ppm) of the applied at 6 days posttreatment, were 17.8% (0.019 ppm) of the applied at 17 days, and increased to 25.2-29.0% (0.027-0.031 ppm) of the applied by 43-177 days posttreatment (Appendix 2, Tables III, IV, pp. 228, 229). Total [^{14}C]residues were not detected above 0.01 μg/g (designated the limit of analysis) below the 3-inch depth (Appendix 1, Table IV, p. 68).

[^{14}C]Residues were not detected in the leachate samples and were only detected once in the run-off samples, at 0.02% (day 111) of the applied radioactivity (Appendix 1, Table VI, p. 70). Characterization data for the run-off samples were not reported.

Material balances were 95.1-116.9% of the applied radioactivity from 0 to 6 days posttreatment, were 75.3-83.3% of the applied from 10 to 43 days posttreatment with the exception of 17 days (90.6-93.0% of the applied), and decreased to 54.5-67.1% of the applied from 69 to 177 days posttreatment (Appendix 1, Table VI, p. 70).

COMMENTS

1. Total water input through 181 days posttreatment was 25.3 inches at the North Carolina field site, while total pan evaporation through the same period was 41.8 inches (pp. 101-109). Additionally, total water input though the half-life intervals was 3.7 inches, while total pan evaporation was 7.2 inches, indicating that sufficient water may not have been available to create favorable leaching conditions. The reviewer also noted that 158 mL of run-off water were collected through 177 days posttreatment which would increase the negative water balance (Appendix 1, Table V, p. 69). It is likely that these environmental conditions would preclude observations of leaching in the soil.

2. The study was not conducted under typical use conditions. The lysimeters (8-inch inner diameter) were too small to be representative of actual use conditions, the method of application was atypical (glass Pasteur pipette), and only limited areas of the plot (the inner six inches of the lysimeter) were treated (p. 34).

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3. Inadequate storage stability data were provided. The study author stated that the parent was stable in soil extracts (day 111) which were re-analyzed after approximately eight weeks of frozen storage (pp. 15, 233). Storage stability studies should be conducted using samples collected from the test site which are fortified separately with the parent and degradates, and stored for a length of time equal to the longest storage interval utilized for the test samples.

4. The registrant-calculated half-life was based on data from the 0- to 3-inch depth, rather than the 0- to 6-inch depth. However, the study author reported that the parent was not detected above the "limit of analysis" (<0.01 μg/g) below the 0- to 3-inch depth (Appendix 1, Table IV, footnote 1, p. 68).

5. The radioactivity detected in both "Regions 1 and 2" were not characterized because each of the components was present at less than 0.01 ppm (pp. 9, 16). However, based on comparisons of the retention times of the reference standards, the study author stated that the fractions designated as "Region 1" may have contained APF, and the fractions designated as "Region 2" may have contained 482-HA, IMOXA, 482-CA, and/or PNF (p 16; Appendix 2, Figures 2, 7-28, pp. 233, 238-260). Further clarification by the registrant may be necessary.

6. The parent was applied at a slightly exaggerated rate (47.3 g a.i./A); the study author stated that the proposed maximum use rate for flumioxazin is 36.1 g a.i./A for soybeans and 43.4 g a.i./A for peanuts (p. 10).

7. Material balances are generally not required for terrestrial field dissipation studies and are generally not reported since nonradiolabeled compounds are usually used. Because this study was conducted with radiolabeled test compounds applied in lysimeters, material balances were reported. A patten of decline over time was observed in the material balances which were 55.7-96.2% (reviewer-calculated mean of two replicates) of the applied radioactivity from 0 to 177 days posttreatment (Appendix 1, Table VI, p. 70). [^{14}C]Volatiles were not monitored in this study. The study author stated that the decrease in the material balances over time was likely due to the formation of $^{14}CO_2$ and that the conversion of flumioxazin to CO_2 is consistent with results found in other [^{14}C]flumioxazin studies (p. 16). The reviewer notes, however, that in two submitted photodegradation on soil studies (MRIDs 44295038 and 44295039; phenyl and tetrahydrophthalimido labels, respectively), evolved $^{14}CO_2$ was negligible for both the irradiated and dark control soils (for both labels), although the parent was observed to degrade in under each lighting condition in both label studies. In the submitted aerobic soil metabolism study (MRID 44295040), nonradiolabeled parent compound was utilized and volatiles were not determined.

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8. The study was conducted at one site (North Carolina). Additional terrestrial field dissipation studies conducted in Illinois (MRID 44295044), Mississippi (MRID 44295045), Iowa (MRID 44295046), and Indiana (MRID 44295047) were also submitted.

9. The reviewer noted a typographical error in the reported sampling schedules. The study author reported that leachate from lysimeter 32 was recovered on December 2, 7, and 13, 1993 (205, 210, and 216 days posttreatment); however, that particular lysimeter was removed from the site on May 28, 1993 (17 days posttreatment; Appendix 1 in Appendix 2, p. 99).

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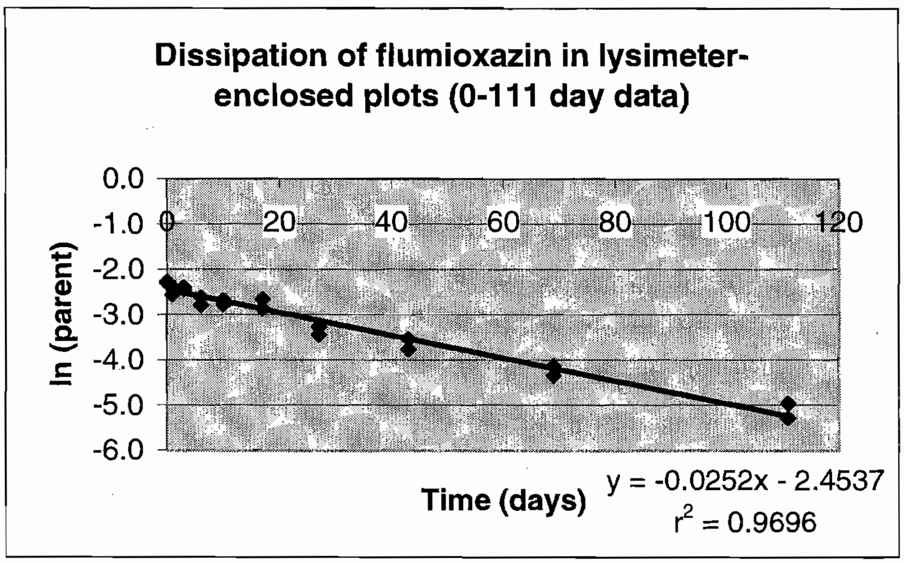
Flumioxazin #8 MRID 44295043 164-1 Dothan loamy sand soil

Time (days)	parent (ug/g)	Ave. parent (ug/g)	Time (days)	ln parent
0	0.103		0	-2.3
0	0.101	0.102	0	-2.3
1	0.077		1	-2.6
1	0.092	0.085	1	-2.4
3	0.086		3	-2.5
3	0.091	0.089	3	-2.4
6	0.073		6	-2.6
6	0.061	0.067	6	-2.8
10	0.069		10	-2.7
10	0.062	0.066	10	-2.8
17	0.057		17	-2.9
17	0.070	0.064	17	-2.7
27	0.032		27	-3.4
27	0.038	0.035	27	-3.3
43	0.023		43	-3.8
43	0.029	0.026	43	-3.5
69	0.016		69	-4.1
69	0.013	0.015	69	-4.3
111	0.007		111	-5.0
111	0.005	0.006	111	-5.3



half-life= 27.5 days

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Table I. Physicochemical Characteristics of the Dothan Loamy Sand Collected From Three Locations and Eight Depths Within the Study Area.

Soil Depth	Lysimeter	pH (Std. Units)	Cation Exchange Capacity (meq M+/100g)	Water Holding Capacity at: 0.1 Bar %(w/w)	0.33 Bar %(w/w)	15 Bars %(w/w)	Organic Matter %(w/w)	Bulk Density (g/cm^3)	Texture Classification	Sand %(w/w)	Silt %(w/w)	Clay %(w/w)
0–3"	26	5.4	1.7	6.78	4.35	1.76	0.9	1.67	Loamy Sand	87	7	6
	13	5.8	2.1	6.36	3.69	2.13	0.9	1.63	Loamy Sand	87	5	8
	6	6.0	1.4	7.52	4.57	2.31	0.8	1.63	Loamy Sand	88	4	8
	Average	**5.7**	**1.7**	**6.89**	**4.20**	**2.07**	**0.9**	**1.64**	**Loamy Sand**	**87**	**5**	**7**
3–6"	26	5.5	1.5	7.12	4.35	1.73	0.7	1.69	Loamy Sand	87	5	8
	13	6.1	1.7	7.06	4.14	1.99	0.6	1.64	Sand	89	5	6
	6	5.7	1.4	7.96	4.45	2.40	0.6	1.66	Loamy Sand	86	8	6
	Average	**5.8**	**1.5**	**7.38**	**4.31**	**2.04**	**0.6**	**1.66**	**Loamy Sand**	**87**	**6**	**7**
6–9"	26	5.8	1.2	7.72	4.17	1.65	0.6	1.72	Loamy Sand	87	7	6
	13	6.6	1.4	7.55	3.82	1.61	0.4	1.69	Loamy Sand	87	5	8
	6	5.9	1.1	7.97	4.07	1.95	0.4	1.67	Loamy Sand	86	6	8
	Average	**6.1**	**1.2**	**7.75**	**4.02**	**1.74**	**0.5**	**1.69**	**Loamy Sand**	**87**	**6**	**7**
9–12"	26	5.8	0.9	7.21	3.57	1.42	0.4	1.73	Sand	89	5	6
	13	6.7	1.0	7.57	4.39	1.93	0.4	1.72	Loamy Sand	84	8	8
	6	6.5	0.8	7.72	4.12	1.90	0.3	1.69	Loamy Sand	86	6	8
	Average	**6.3**	**0.9**	**7.50**	**4.03**	**1.75**	**0.4**	**1.71**	**Loamy Sand**	**86**	**6**	**7**
12–18"	26	5.8	0.8	7.49	4.29	1.62	0.2	1.71	Loamy Sand	85	7	8
	13	6.8	0.8	6.85	3.76	1.92	0.2	1.69	Loamy Sand	86	2	12
	6	6.2	0.9	7.87	3.70	2.27	0.3	1.65	Loamy Sand	84	8	8
	Average	**6.3**	**0.8**	**7.40**	**3.92**	**1.94**	**0.2**	**1.68**	**Loamy Sand**	**85**	**6**	**9**
18–24"	26	5.8	0.6	7.39	3.94	1.64	0.1	1.76	Loamy Sand	83	9	8
	13	6.7	0.7	7.85	4.15	1.99	0.1	1.67	Loamy Sand	84	8	8
	6	6.1	0.8	8.59	4.31	2.38	0.3	1.69	Loamy Sand	82	8	10
	Average	**6.2**	**0.7**	**7.94**	**4.13**	**2.00**	**0.2**	**1.71**	**Loamy Sand**	**83**	**8**	**9**
24–30"	26	5.0	1.3	12.82	7.66	4.62	0.2	1.62	Sandy Loam	77	7	16
	13	5.3	2.1	14.51	9.58	8.38	0.2	1.55	Sandy Clay Loam	76	4	20
	6	4.8	1.9	13.13	8.47	5.85	0.4	1.41	Sandy Clay Loam	74	6	20
	Average	**5.0**	**1.8**	**13.49**	**8.57**	**6.28**	**0.3**	**1.53**	**Sandy Loam**	**76**	**6**	**19**
30–36"	26	4.9	2.4	20.50	13.02	8.57	0.2	1.40	Sandy Clay Loam	63	9	28
	13	5.0	2.7	20.35	14.19	10.17	0.2	1.36	Sandy Clay Loam	64	6	30
	6	4.8	2.5	17.19	12.95	8.98	0.2	1.39	Sandy Clay Loam	66	6	28
	Average	**4.9**	**2.5**	**19.35**	**13.39**	**9.24**	**0.2**	**1.38**	**Sandy Clay Loamy**	**64**	**7**	**29**

Table II. Sampling Order and Treatment for Lysimeters Used to Study [Phenyl-^{14}C]Flumioxazin.

Lysimeter Number	Treatment	Days After Treatment (DAT)
10	^{14}C	0[1]
14	^{14}C	0
26	Control	0
4	^{14}C	1
22	^{14}C	1
3	^{14}C	3
18	^{14}C	3
21	^{14}C	6
29	^{14}C	6
9	^{14}C	10
11	^{14}C	10
24	^{14}C	17
31	^{14}C	17
13	Control	27
15	^{14}C	27
19	^{14}C	27
8	^{14}C	43
25	^{14}C	43
7	^{14}C	69
17	^{14}C	69
30	Control	69
27	^{14}C	111
28	^{14}C	111
5	^{14}C	177
6	Control	177
23	^{14}C	177
32	^{14}C	NS[2]
20	^{14}C	NS
1	^{14}C	NS
16	^{14}C	NS
12	^{14}C	NS
2	^{14}C	NS

[1] 0 DAT was May 11, 1993, the day of [^{14}C]Flumioxazin application.
[2] Not sampled or analyzed prior to termination of in–life phase.

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Table IV. Concentration of Radioactive Equivalents in Surface Layers of Soil Treated with [Phenyl-^{14}C]Flumioxazin.

Sampling DAT	Lysimeter Number	[Phenyl−^{14}C]Flumioxazin Equivalents at:[1] 0 − 3 inches		3 − 6 inches	
		ug/g	% Applied	ug/g	% Applied
0	10	0.101	97.20	<0.01	0.00
0	14	0.100	95.10	<0.01	0.00
Average		**0.101**	**96.15**	**<0.01**	**0.00**
1	4	0.117	107.63	<0.01	0.00
1	22	0.111	116.87	<0.01	0.00
Average		**0.114**	**112.25**	**<0.01**	**0.00**
3	3	0.108	99.10	<0.01	0.08
3	18	0.108	99.65	<0.01	0.11
Average		**0.108**	**99.38**	**<0.01**	**0.10**
6	21	0.114	103.25	<0.01	0.00
6	29	0.089	103.46	<0.01	0.00
Average		**0.102**	**103.36**	**<0.01**	**0.00**
10	9	0.084	81.81	<0.01	1.19
10	11	0.078	76.55	<0.01	1.11
Average		**0.081**	**79.18**	**<0.01**	**1.15**
17	24	0.088	86.63	<0.01	2.67
17	31	0.094	90.99	<0.01	1.45
Average		**0.091**	**88.81**	**<0.01**	**2.06**
27	15	0.073	72.24	<0.01	2.51
27	19	0.083	71.10	<0.01	3.12
Average		**0.078**	**71.67**	**<0.01**	**2.82**
43	8	0.060	72.58	<0.01	1.96
43	25	0.080	74.17	<0.01	2.24
Average		**0.070**	**73.38**	**<0.01**	**2.10**
69	7	0.058	62.41	<0.01	3.21
69	17	0.063	58.94	<0.01	3.50
Average		**0.061**	**60.68**	**<0.01**	**3.36**
111	27	0.051	60.13	<0.01	2.49
111	28	0.047	50.06	<0.01	3.47
Average		**0.049**	**55.10**	**<0.01**	**2.98**
177	5	0.048	49.76	<0.01	4.51
177	23	0.049	45.65	<0.01	5.89
Average		**0.049**	**47.71**	**<0.01**	**5.20**

[1] Soil was radioassayed to a depth of approximately 36 inches. [Phenyl−^{14}C]Flumioxazin equivalents in all soil segments below 3 inches were <0.01 ug/g.

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Table V. Water Balance in Soil Lysimeters Maintained up to 218 Days After Treatment with [Phenyl-^{14}C]Flumioxazin.

Lysimeter Number	Sampling DAT	Total Water Input:[1] Rainfall + Irrigation (inches)	(mL)	Water Collected from each Lysimeter as: Leachate (mL)	Runoff (mL)	Total (mL)
10	0	0.12	99	NS [2]	NS	NA [3]
14	0	0.12	99	NS	NS	NA
26	0	0.12	99	NS	NS	NA
4	1	0.12	99	NS	NS	NA
22	1	0.12	99	NS	NS	NA
3	3	0.49	404	NS	NS	NA
18	3	0.49	404	NS	NS	NA
21	6	0.49	404	NS	NS	NA
29	6	0.49	404	NS	NS	NA
9	10	1.59	1,310	NS	NS	NA
11	10	1.59	1,310	NS	NS	NA
24	17	2.90	2,389	NS	NS	NA
31	17	2.90	2,389	NS	NS	NA
13	27	3.73	3,072	NS	NS	NA
15	27	3.73	3,072	NS	NS	NA
19	27	3.73	3,072	NS	NS	NA
8	43	6.00	4,942	NS	NS	NA
25	43	6.00	4,942	NS	NS	NA
7	69	8.52	7,018	NS	NS	NA
17	69	8.52	7,018	20	NS	20
30	69	8.52	7,018	NS	NS	NA
27	111	15.34	12,636	NS	158	158
28	111	15.34	12,636	200	NS	200
5	177	24.86	20,477	NS	NS	NA
6	177	24.86	20,477	NS	NS	NA
23	177	24.86	20,477	662	NS	662
32	218 [4]	30.39	25,032	1,486	NS	1,486
20	218	30.39	25,032	2,232	358	2,590
1	218	30.39	25,032	1,882	NS	1,882
16	218	30.39	25,032	4,934	128	5,062
12	218	30.39	25,032	405	214	619
2	218	30.39	25,032	841	NS	841

[1] Differences in water input reported and that presented as cumulative rainfall in Table III are due to rainfall which fell on the sampling day after lysimeters were removed.
[2] NS = No samples collected.
[3] NA = Not Applicable
[4] Lysimeters remaining after the last scheduled sampling (177 DAT) were maintained in the field through 218 DAT, when the in-life phase was terminated.

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Table VI. Total Radiocarbon Balance from Lysimeters Treated with [Phenyl-^{14}C]Flumioxazin.

Lysimeter Number	Sampling DAT	% Recovery[1] Soil	Leachate	Runoff	Total
10	0	97.20	NS [2]	NS	97.20
14	0	95.10	NS	NS	95.10
4	1	107.63	NS	NS	107.63
22	1	116.87	NS	NS	116.87
3	3	99.22	NS	NS	99.22
18	3	99.76	NS	NS	99.76
21	6	103.33	NS	NS	103.33
29	6	103.46	NS	NS	103.46
9	10	83.32	NS	NS	83.32
11	10	78.21	NS	NS	78.21
24	17	90.64	NS	NS	90.64
31	17	92.99	NS	NS	92.99
15	27	75.67	NS	NS	75.67
19	27	75.46	NS	NS	75.46
8	43	75.34	NS	NS	75.34
25	43	77.47	NS	NS	77.47
7	69	67.07	NS	NS	67.07
17	69	64.24	0.00	NS	64.24
27	111	64.09	NS	0.02	64.11
28	111	55.66	0.00	NS	55.66
5	177	56.92	NS	NS	56.92
23	177	54.46	0.00	NS	54.46
				Average:	**83.37**
				Std Dev:	**17.91**

[1] Based on an application of 3.068×10^8 dpm per lysimeter.
[2] NS = No samples collected from that lysimeter.

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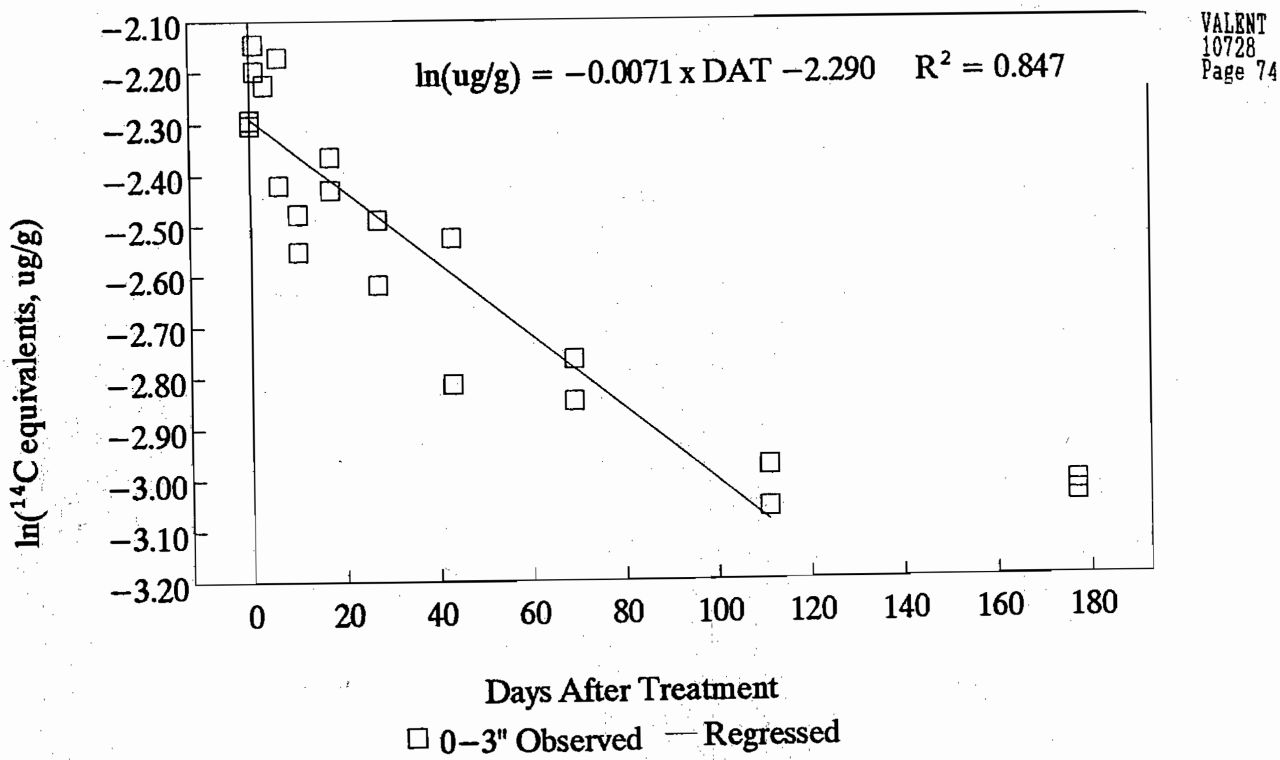

Sampling Day	Lysimeter Number	^{14}C Residues ug/g	^{14}C Residues ln(ug/g)	Regressed ln(ug/g)
0	10	0.101	−2.29	−2.29
0	14	0.100	−2.30	−2.29
1	4	0.117	−2.15	−2.30
1	22	0.111	−2.20	−2.30
3	3	0.108	−2.23	−2.31
3	18	0.108	−2.23	−2.31
6	21	0.114	−2.17	−2.33
6	29	0.089	−2.42	−2.33
10	9	0.084	−2.48	−2.36
10	11	0.078	−2.55	−2.36
17	24	0.088	−2.43	−2.41
17	31	0.094	−2.36	−2.41
27	15	0.073	−2.62	−2.48
27	19	0.083	−2.49	−2.48
43	8	0.060	−2.81	−2.60
43	25	0.080	−2.53	−2.60
69	7	0.058	−2.85	−2.78
69	17	0.063	−2.76	−2.78
111	27	0.051	−2.98	−3.08
111	28	0.047	−3.06	−3.08
177	5	0.048	−3.04	
177	23	0.049	−3.02	

Regression of 0−3", 0−111 DAT	
Y Intercept	−2.290
Std Err of Y Est	0.110
R Squared	0.847
No. of Observations	20
Degrees of Freedom	18
Slope	−0.0071
Std Err of Coef.	0.0007
Half Life as −ln(2)/slope:	97 days

Figure 4. First-Order Kinetic Interpretation of Total Radiocarbon Dissipation in the 0-3 Inch Layer of Lysimeters Treated With [Phenyl-^{14}C]Flumioxazin.

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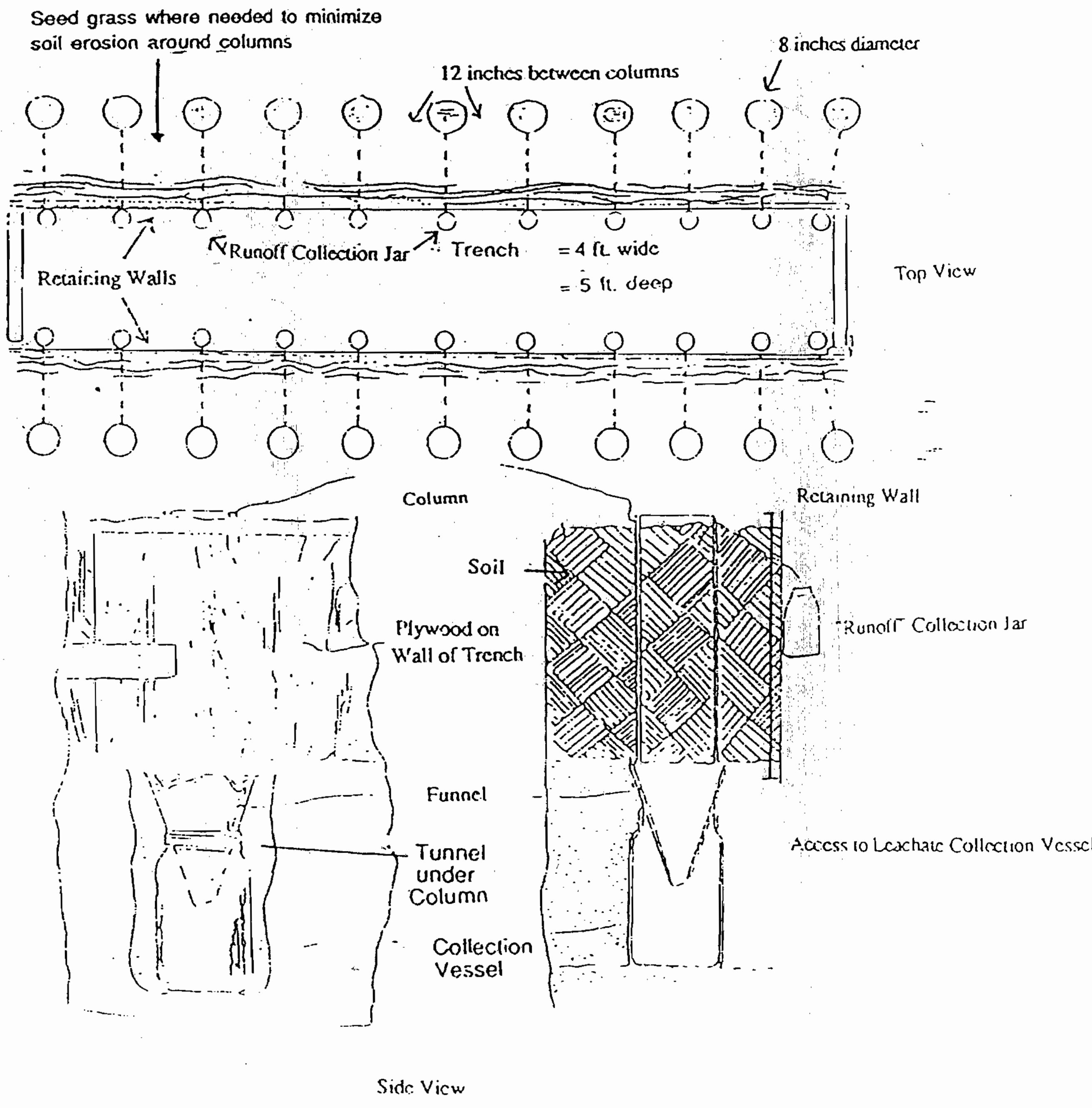

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Appendix 2. Chronology of Significant Events During the Biological Phase.

Calendar Date	Study DAT	
04–19–93	–22	Tilled soil then inserted steel cylinders to produce lysimeters
05–05–93	–6	1.02 inches (840 ml) irrigation water added to each lysimeter
05–11–93	0	[Phenyl–^{14}C]Flumioxazin applied to treated lysimeters
05–11–93	0	Removed lysimeters 10, 14 and control 26
05–12–93	1	Removed lysimeters 4 and 22
05–14–93	3	Removed lysimeters 3 and 18
05–17–93	6	Removed lysimeters 21 and 29
05–18–93	7	Applied 0.12 inches (99 ml) irrigation water to each remaining lysimeter
05–21–93	10	Removed lysimeters 9 and 11
05–25–93	14	Applied 0.57 inches (470 ml) irrigation water to each remaining lysimeter
05–27–93	16	Recovered leachate from lysimeters 16 and 17
05–28–93	17	Removed lysimeters 24 and 32
06–01–93	21	Recovered leachate from lysimeter 16
06–07–93	27	Removed lysimeters 15, 19 and control 13
06–08–93	28	Applied 0.34 inches (280 ml) irrigation water to each remaining lysimeter
06–15–93	35	Applied 1.25 inches (1,030 ml) irrigation water to each remaining lysimeter
06–18–93	38	Recovered leachate from lysimeter 16
06–22–93	42	Applied 0.62 inches (511 ml) irrigation water to each remaining lysimeter
06–23–93	43	Removed lysimeters 8 and 25
06–29–93	49	Applied 0.63 inches (519 ml) irrigation water to each remaining lysimeter
07–13–93	63	Applied 0.27 inches (222 ml) irrigation water to each remaining lysimeter
07–19–93	69	Removed lysimeters 7, 17 and control 30
08–03–93	84	Applied 0.78 inches (642 ml) irrigation water to each remaining lysimeter
08–05–93	86	Recovered leachate from lysimeters 16, 20 and 28
08–09–93	90	Recovered leachate from lysimeters 16 and 20
08–17–93	98	Recovered leachate from lysimeters 16, 20 and 23
08–17–93	98	Recovered runoff from lysimeter 27
08–17–93	98	Applied 0.34 inches (280 ml) irrigation water to each remaining lysimeter
08–19–93	100	Recovered leachate from lysimeters 16 and 20
08–24–93	105	Applied 1.03 inches (848 ml) irrigation water to each remaining lysimeter
08–30–93	111	Removed lysimeters 27 and 28
08–31–93	112	Applied 1.04 inches (852 ml) irrigation water to each remaining lysimeter
09–02–93	114	Recovered leachate from lysimeters 16 and 20
09–07–93	119	Applied 0.06 inches (49 ml) irrigation water to each remaining lysimeter
09–14–93	126	Applied 1.10 inches (906 ml) irrigation water to each remaining lysimeter
09–21–93	133	Recovered leachate from lysimeters 16 and 20
09–28–93	140	Applied 0.11 inches (91 ml) irrigation water to each remaining lysimeter
10–05–93	147	Applied 0.66 inches (544 ml) irrigation water to each remaining lysimeter
11–02–93	175	Recovered leachate from lysimeters 2, 16, 20, 23 and 32
11–04–93	177	Removed lysimeters 5, 23 and control 6
11–09–93	182	Recovered leachate from lysimeters 16 and 20
11–23–23	196	Applied 0.40 inches (329 ml) irrigation water to each remaining lysimeter
11–29–93	202	Recovered leachate from lysimeters 1, 2, 12, 16 and 32
11–29–93	202	Recovered runoff from lysimeters 12, 16 and 20
12–02–93	205	Recovered leachate from lysimeters 16, 20 and 32
12–07–93	210	Recovered leachate from lysimeters 1, 16 and 32
12–09–93	212	Visual inspection of all remaining lysimeters
12–13–93	216	Recovered leachate from lysimeters 1, 16, 20 and 32
12–17–93	218	End of in–life phase of study

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Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F) Air[4]		Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
11-May-93	0	0.00	0.12	0.12	0.12			0.28	86	61	76.00	69.00
12-May-93	1	0.00	NA [7]	0.00	0.12			0.29	89	63	74.00	69.00
13-May-93	2	0.37	NA	0.37	0.49			0.35	88	65	73.00	69.00
14-May-93	3	0.00	NA	0.00	0.49			0.12	81	59	71.00	69.00
15-May-93	4	0.00	NA	0.00	0.49			0.17	73	50	72.00	68.00
16-May-93	5	0.00	NA	0.00	0.49			0.26	86	55	73.00	69.00
17-May-93	6	0.00	NA	0.00	0.49	0.55	0.55	0.36	88	58	73.00	68.00
18-May-93	7	0.00	0.12	0.12	0.61			0.24	88	60	74.00	70.00
19-May-93	8	0.98	NA	0.98	1.59			0.21	90	66	75.00	72.00
20-May-93	9	0.00	NA	0.00	1.59			0.13	78	59	72.00	69.00
21-May-93	10	0.00	NA	0.00	1.59			0.13	73	53	71.00	68.00
22-May-93	11	0.05	NA	0.05	1.64			0.29	73	44	70.00	65.00
23-May-93	12	0.00	NA	0.00	1.64			0.25	73	45	72.00	65.00
24-May-93	13	0.00	NA	0.00	1.64	1.46	2.01	0.28	82	51	72.00	67.00
25-May-93	14	0.04	0.57	0.61	2.25			0.31	86	54	73.00	69.00
26-May-93	15	0.00	NA	0.00	2.25			0.32	87	60	73.00	69.00
27-May-93	16	0.65	NA	0.65	2.90			0.11	73	59	76.00	70.00
28-May-93	17	0.00	NA	0.00	2.90			0.24	83	53	76.00	70.00

[1] All data obtained from NOAA Station 31-1820-07.
[2] Calculated from NOAA records for Clayton, North Carolina (NOAA Station 1820) for years 1979-1988.
[3] Pan evaporation data were obtained from NOAA Stations 31-0375-07 and 31-1677-03. Pan Evaporation data is not available for August 14, 1993.
[4] Air temperatures were obtained from NOAA Stations 31-7994-07 and 31-0375-07.
[5] Soil temperatures were obtained from NOAA Station 31-7069-04.
[6] Soil temperatures given for each month are bareground, except for June temperatures which are sod.
[7] NA = Not Applicable

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Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F) Air[4]		Temperature (F) Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
29-May-93	18	0.00	NA	0.00	2.90			0.29	89	59	77.00	69.00
30-May-93	19	0.00	NA	0.00	2.90			0.32	92	63	77.00	71.00
31-May-93	20	0.48	NA	0.48	3.38	1.06	3.07	0.27	80	62	76.00	72.00
01-Jun-93	21	0.00	NA	0.00	3.38			0.11	81	63	76.00	72.00
02-Jun-93	22	0.00	NA	0.00	3.38			0.19	74	52	77.00	70.00
03-Jun-93	23	0.00	NA	0.00	3.38			0.30	80	58	77.00	71.00
04-Jun-93	24	0.35	NA	0.35	3.73			0.20	88	62	79.00	74.00
05-Jun-93	25	0.00	NA	0.00	3.73			0.34	93	61	80.00	74.00
06-Jun-93	26	0.00	NA	0.00	3.73			0.55	95	60	78.00	73.00
07-Jun-93	27	0.00	NA	0.00	3.73	0.63	3.70	0.26	85	60	78.00	73.00
08-Jun-93	28	0.00	0.34	0.34	4.07			0.24	94	61	81.00	75.00
09-Jun-93	29	0.00	NA	0.00	4.07			0.24	94	71	83.00	77.00
10-Jun-93	30	0.00	NA	0.00	4.07			0.19	97	72	86.00	78.00
11-Jun-93	31	0.00	NA	0.00	4.07			0.20	99	75	85.00	79.00
12-Jun-93	32	0.00	NA	0.00	4.07			0.34	97	68	81.00	79.00
13-Jun-93	33	0.00	NA	0.00	4.07			0.25	91	64	79.00	75.00
14-Jun-93	34	0.00	NA	0.00	4.07	1.14	4.84	0.12	73	60	79.00	72.00
15-Jun-93	35	0.00	1.25	1.25	5.32			0.22	83	57	80.00	72.00
16-Jun-93	36	0.03	NA	0.03	5.35			0.21	88	67	82.00	76.00
17-Jun-93	37	0.00	NA	0.00	5.35			0.26	92	67	83.00	76.00
18-Jun-93	38	0.00	NA	0.00	5.35			0.22	93	67	83.00	77.00
19-Jun-93	39	0.00	NA	0.00	5.35			0.30	96	69	85.00	78.00
20-Jun-93	40	0.00	NA	0.00	5.35			0.35	96	66	86.00	78.00
21-Jun-93	41	0.00	NA	0.00	5.35	0.59	5.43	0.33	95	70	88.00	79.00
22-Jun-93	42	0.03	0.62	0.65	6.00			0.29	93	69	88.00	78.00
23-Jun-93	43	0.00	NA	0.00	6.00			0.26	95	69	84.00	76.00
24-Jun-93	44	0.00	NA	0.00	6.00			0.35	90	62	85.00	77.00

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Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F)			
									Air[4]		Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
25-Jun-93	45	0.00	NA	0.00	6.00			0.37	91	55	86.00	77.00
26-Jun-93	46	0.00	NA	0.00	6.00			0.27	90	60	85.00	79.00
27-Jun-93	47	0.00	NA	0.00	6.00			0.09	93	67	84.00	80.00
28-Jun-93	48	0.00	NA	0.00	6.00	0.60	6.03	0.32	88	64	86.00	79.00
29-Jun-93	49	0.00	0.63	0.63	6.63			0.30	96	73	87.00	80.00
30-Jun-93	50	0.00	NA	0.00	6.63			0.33	97	70	86.00	80.00
01-Jul-93	51	0.00	NA	0.00	6.63			0.29	94	69	83.00	80.00
02-Jul-93	52	0.20	NA	0.20	6.83			0.34	89	69	84.00	80.00
03-Jul-93	53	1.09	NA	1.09	7.92			0.19	92	68	86.00	79.00
04-Jul-93	54	0.00	NA	0.00	7.92			0.25	94	70	86.00	81.00
05-Jul-93	55	0.00	NA	0.00	7.92	0.89	6.92	0.41	97	71	87.00	81.00
06-Jul-93	56	0.00	NA	0.00	7.92			0.32	95	70	87.00	81.00
07-Jul-93	57	0.00	NA	0.00	7.92			0.30	98	70	86.00	81.00
08-Jul-93	58	0.00	NA	0.00	7.92			0.31	97	72	86.00	81.00
09-Jul-93	59	0.00	NA	0.00	7.92			0.47	100	71	88.00	82.00
10-Jul-93	60	0.00	NA	0.00	7.92			0.34	102	72	90.00	82.00
11-Jul-93	61	0.15	NA	0.15	8.07			0.39	103	70	91.00	82.00
12-Jul-93	62	0.08	NA	0.08	8.15	0.73	7.65	0.27	100	69	89.00	82.00
13-Jul-93	63	0.10	0.27	0.37	8.52			0.34	100	70	89.00	82.00
14-Jul-93	64	0.00	NA	0.00	8.52			0.64	100	69	89.00	83.00
15-Jul-93	65	0.00	NA	0.00	8.52			0.36	101	70	87.00	84.00
16-Jul-93	66	0.00	NA	0.00	8.52			0.30	98	71	86.00	82.00
17-Jul-93	67	0.00	NA	0.00	8.52			0.22	90	68	86.00	81.00
18-Jul-93	68	0.00	NA	0.00	8.52			0.29	96	72	86.00	82.00
19-Jul-93	69	0.76	NA	0.76	9.28	0.77	8.42	0.26	93	70	83.00	81.00
20-Jul-93	70	0.00	NA	0.00	9.28			0.17	92	68	86.00	79.00
21-Jul-93	71	0.00	NA	0.00	9.28			0.29	94	68	88.00	81.00

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Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F) Air[4]		Temperature (F) Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
22-Jul-93	72	0.00	NA	0.00	9.28			0.26	96	68	86.00	81.00
23-Jul-93	73	0.00	NA	0.00	9.28			0.44	95	69	87.00	81.00
24-Jul-93	74	0.00	NA	0.00	9.28			0.31	89	69	85.00	81.00
25-Jul-93	75	1.64	NA	1.64	10.92			0.25	93	70	87.00	82.00
26-Jul-93	76	0.00	NA	0.00	10.92	1.00	9.42	0.28	96	69	85.00	81.00
27-Jul-93	77	0.00	NA	0.00	10.92			0.32	91	69	87.00	81.00
28-Jul-93	78	0.00	NA	0.00	10.92			0.15	92	69	89.00	85.00
29-Jul-93	79	0.00	NA	0.00	10.92			0.29	98	71	89.00	84.00
30-Jul-93	80	0.00	NA	0.00	10.92			0.36	99	66	88.00	84.00
31-Jul-93	81	0.00	NA	0.00	10.92			0.29	90	60	86.00	81.00
01-Aug-93	82	0.00	NA	0.00	10.92			0.30	88	60	87.00	80.00
02-Aug-93	83	0.00	NA	0.00	10.92	1.22	10.64	0.33	92	62	86.00	81.00
03-Aug-93	84	1.01	0.78	1.79	12.71			0.23	95	64	87.00	82.00
04-Aug-93	85	0.00	NA	0.00	12.71			0.29	91	66	83.00	79.00
05-Aug-93	86	0.00	NA	0.00	12.71			0.18	88	71	84.00	79.00
06-Aug-93	87	0.00	NA	0.00	12.71			0.21	90	61	84.00	79.00
07-Aug-93	88	0.50	NA	0.50	13.21			0.64	87	62	84.00	79.00
08-Aug-93	89	0.20	NA	0.20	13.41			0.05	73	60	81.00	77.00
09-Aug-93	90	0.00	NA	0.00	13.41	1.10	11.74	0.15	80	70	81.00	76.00
10-Aug-93	91	0.00	NA	0.00	13.41			0.21	85	60	82.00	76.00
11-Aug-93	92	0.00	NA	0.00	13.41			0.22	85	62	83.00	77.00
12-Aug-93	93	0.02	NA	0.02	13.43			0.17	88	62	83.00	78.00
13-Aug-93	94	0.19	NA	0.19	13.62			0.29	90	62	81.00	78.00
14-Aug-93	95	0.00	NA	0.00	13.62				77	65	82.00	77.00
15-Aug-93	96	0.00	NA	0.00	13.62			0.19	67	62	83.00	78.00
16-Aug-93	97	0.31	NA	0.31	13.93	1.23	12.97	0.24	82	62	86.00	79.00
17-Aug-93	98	0.00	0.34	0.34	14.27			0.28	83	64	84.00	80.00

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Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F) Air[4]		Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
18-Aug-93	99	0.00	NA	0.00	14.27			0.28	91	72	88.00	83.00
19-Aug-93	100	0.00	NA	0.00	14.27			0.16	92	63	83.00	79.00
20-Aug-93	101	0.00	NA	0.00	14.27			0.27	90	63	83.00	79.00
21-Aug-93	102	0.00	NA	0.00	14.27			0.28	92	63	83.00	79.00
22-Aug-93	103	0.00	NA	0.00	14.27			0.29	93	69	84.00	79.00
23-Aug-93	104	0.00	NA	0.00	14.27	0.94	13.91	0.23	89	68	84.00	79.00
24-Aug-93	105	0.00	1.03	1.03	15.30			0.32	90	69	84.00	79.00
25-Aug-93	106	0.04	NA	0.04	15.34			0.23	92	60	86.00	80.00
26-Aug-93	107	0.00	NA	0.00	15.34			0.28	68	62	84.00	80.00
27-Aug-93	108	0.00	NA	0.00	15.34			0.28	95	64	84.00	79.00
28-Aug-93	109	0.00	NA	0.00	15.34			0.29	93	67	85.00	80.00
29-Aug-93	110	0.00	NA	0.00	15.34			0.27	95	67	87.00	80.00
30-Aug-93	111	0.00	NA	0.00	15.34	0.98	14.89	0.13	99	67	87.00	81.00
31-Aug-93	112	0.00	1.04	1.04	16.38			0.12	95	65	86.00	82.00
01-Sep-93	113	0.00	NA	0.00	16.38			0.32	92	65	87.00	82.00
02-Sep-93	114	0.00	NA	0.00	16.38			0.62	100	64	86.00	82.00
03-Sep-93	115	0.00	NA	0.00	16.38			0.30	99	68	87.00	84.00
04-Sep-93	116	0.00	NA	0.00	16.38			0.34	96	68	85.00	78.00
05-Sep-93	117	0.69	NA	0.69	17.07			0.48	97	67	82.00	78.00
06-Sep-93	118	0.09	NA	0.09	17.16	0.68	15.57	0.03	77	64	81.00	77.00
07-Sep-93	119	0.00	0.06	0.06	17.22			0.14	86	67	82.00	78.00
08-Sep-93	120	0.00	NA	0.00	17.22			0.16	88	65	82.00	79.00
09-Sep-93	121	0.00	NA	0.00	17.22			0.08	86	65	82.00	79.00
10-Sep-93	122	0.00	NA	0.00	17.22			0.19	89	65	81.00	79.00
11-Sep-93	123	0.00	NA	0.00	17.22			0.32	88	63	83.00	76.00
12-Sep-93	124	0.00	NA	0.00	17.22			0.32	79	49	80.00	74.00
13-Sep-93	125	0.00	NA	0.00	17.22	1.08	16.65	0.26	95	43	80.00	75.00

Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F)			
									Air[4]		Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
14-Sep-93	126	0.00	1.10	1.10	18.32			0.15	86	55	79.00	77.00
15-Sep-93	127	0.00	NA	0.00	18.32			0.25	89	60	80.00	77.00
16-Sep-93	128	0.00	NA	0.00	18.32			0.22	92	65	78.00	76.00
17-Sep-93	129	1.23	NA	1.23	19.55			0.24	90	67	80.00	76.00
18-Sep-93	130	0.00	NA	0.00	19.55			0.16	87	69	79.00	77.00
19-Sep-93	131	0.00	NA	0.00	19.55			0.01	82	60	79.00	77.00
20-Sep-93	132	0.00	NA	0.00	19.55	0.94	17.59	0.25	80	58	78.00	75.00
21-Sep-93	133	0.17	NA	0.17	19.72			0.21	79	60	78.00	75.00
22-Sep-93	134	0.00	NA	0.00	19.72			0.10	82	56	77.00	75.00
23-Sep-93	135	0.00	NA	0.00	19.72			0.20	83	58	77.00	75.00
24-Sep-93	136	0.00	NA	0.00	19.72			0.24	87	51	78.00	76.00
25-Sep-93	137	0.00	NA	0.00	19.72			0.25	82	60	76.00	74.00
26-Sep-93	138	0.23	NA	0.23	19.95			0.10	82	67	78.00	76.00
27-Sep-93	139	0.00	NA	0.00	19.95	0.65	18.24	0.40	89	64	78.00	76.00
28-Sep-93	140	0.00	0.11	0.11	20.06			0.26	86	41	77.00	71.00
29-Sep-93	141	0.00	NA	0.00	20.06			0.21	73	42	76.00	70.00
30-Sep-93	142	0.00	NA	0.00	20.06			0.19	84	42	74.00	69.00
01-Oct-93	143	0.00	NA	0.00	20.06			0.22	67	32	71.00	66.00
02-Oct-93	144	0.00	NA	0.00	20.06			0.15	70	38	70.00	66.00
03-Oct-93	145	0.00	NA	0.00	20.06			0.18	80	31	70.00	68.00
04-Oct-93	146	0.00	NA	0.00	20.06	0.60	18.84	0.17	72	39	71.00	67.00
05-Oct-93	147	0.00	0.66	0.66	20.72			0.06	81	40	71.00	68.00
06-Oct-93	148	0.00	NA	0.00	20.72			0.28	81	47	71.00	69.00
07-Oct-93	149	0.00	NA	0.00	20.72			0.14	72	49	70.00	68.00
08-Oct-93	150	0.46	NA	0.46	21.18			0.13	75	59	70.00	69.00
09-Oct-93	151	0.30	NA	0.30	21.48			0.11	70	49	72.00	69.00
10-Oct-93	152	0.34	NA	0.34	21.82			0.15	82	62	72.00	63.00

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Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F) Air[4]		Temperature (F) Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
11-Oct-93	153	0.20	NA	0.20	22.02	0.67	19.51	0.12	76	40		
12-Oct-93	154	0.00	NA	0.00	22.02			0.09	53	39	65.00	63.00
13-Oct-93	155	0.00	NA	0.00	22.02			0.13	68	33	65.00	63.00
14-Oct-93	156	0.00	NA	0.00	22.02			0.15	69	42	65.00	63.00
15-Oct-93	157	0.00	NA	0.00	22.02			0.07	64	38	66.00	62.00
16-Oct-93	158	0.00	NA	0.00	22.02			0.15	73	49	66.00	64.00
17-Oct-93	159	0.65	NA	0.65	22.67			0.06	69	58	66.00	64.00
18-Oct-93	160	0.00	NA	0.00	22.67	0.25	19.76	0.05	71	50	70.00	64.00
19-Oct-93	161	0.00	NA	0.00	22.67			0.14	79	56	69.00	67.00
20-Oct-93	162	0.08	NA	0.08	22.75			0.11	80	61	71.00	68.00
21-Oct-93	163	0.04	NA	0.04	22.79			0.14	84	61	71.00	69.00
22-Oct-93	164	0.00	NA	0.00	22.79			0.21	84	50	70.00	66.00
23-Oct-93	165	0.00	NA	0.00	22.79			0.10	59	40	66.00	63.00
24-Oct-93	166	0.00	NA	0.00	22.79			0.12	65	31	64.00	61.00
25-Oct-93	167	0.02	NA	0.02	22.81	0.42	20.18	0.00	69	38	64.00	61.00
26-Oct-93	168	0.00	NA	0.00	22.81			0.08	73	52	64.00	62.00
27-Oct-93	169	0.50	NA	0.50	23.31			0.05	65	52	66.00	63.00
28-Oct-93	170	0.00	NA	0.00	23.31			0.09	71	49	66.00	61.00
29-Oct-93	171	0.00	NA	0.00	23.31			0.13	63	28	65.00	60.00
30-Oct-93	172	0.00	NA	0.00	23.31			0.12	64	46	62.00	59.00
31-Oct-93	173	1.55	NA	1.55	24.86			0.03	65	46	59.00	58.00
01-Nov-93	174	0.00	NA	0.00	24.86	1.27	21.45	0.18	54	30	58.00	55.00
02-Nov-93	175	0.00	NA	0.00	24.86			0.13	52	29	55.00	52.00
03-Nov-93	176	0.00	NA	0.00	24.86			0.08	52	30	53.00	51.00
04-Nov-93	177	0.00	NA	0.00	24.86			0.05	53	29	57.00	52.00
05-Nov-93	178	0.34	NA	0.34	25.20			0.07	68	51	57.00	54.00
06-Nov-93	179	0.06	NA	0.06	25.26			0.01	66	51	60.00	57.00

Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F)			
									Air[4]		Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
07-Nov-93	180	0.00	NA	0.00	25.26			0.16	61	32	57.00	53.00
08-Nov-93	181	0.00	NA	0.00	25.26	0.90	22.35	0.08	53	27	56.00	53.00
09-Nov-93	182	0.00	NA	0.00	25.26			0.09	54	33	54.00	52.00
10-Nov-93	183	0.00	NA	0.00	25.26			0.03	53	35	54.00	52.00
11-Nov-93	184	0.00	NA	0.00	25.26			0.06	58	23	54.00	51.00
12-Nov-93	185	0.00	NA	0.00	25.26			0.08	63	25	56.00	52.00
13-Nov-93	186	0.00	NA	0.00	25.26			0.04	64	35	57.00	53.00
14-Nov-93	187	0.00	NA	0.00	25.26			0.09	77	37	60.00	56.00
15-Nov-93	188	0.00	NA	0.00	25.26	0.53	22.88	0.09	80	45	64.00	59.00
16-Nov-93	189	0.00	NA	0.00	25.26			0.12	85	50	64.00	60.00
17-Nov-93	190	0.00	NA	0.00	25.26			0.10	73	50	62.00	61.00
18-Nov-93	191	0.00	NA	0.00	25.26			0.10	77	49	63.00	60.00
19-Nov-93	192	0.00	NA	0.00	25.26			0.14	65	42	63.00	60.00
20-Nov-93	193	0.00	NA	0.00	25.26			0.08	67	42	61.00	57.00
21-Nov-93	194	0.00	NA	0.00	25.26			0.22	61	24	57.00	54.00
22-Nov-93	195	0.00	NA	0.00	25.26	0.63	23.51	0.08	68	26	56.00	54.00
23-Nov-93	196	0.00	0.40	0.40	25.66			0.05	66	33	57.00	54.00
24-Nov-93	197	0.00	NA	0.00	25.66			0.09	62	31	57.00	55.00
25-Nov-93	198	0.00	NA	0.00	25.66			0.04	69	31	56.00	55.00
26-Nov-93	199	0.00	NA	0.00	25.66			0.17	62	39	55.00	54.00
27-Nov-93	200	0.00	NA	0.00	25.66			0.05	57	49	56.00	54.00
28-Nov-93	201	2.79	NA	2.79	28.45			0.03	70	50	58.00	56.00
29-Nov-93	202	0.00	NA	0.00	28.45	0.74	24.25	0.19	64	28	56.00	52.00
30-Nov-93	203	0.00	NA	0.00	28.45			0.06	54	22	53.00	50.00
01-Dec-93	204	0.00	NA	0.00	28.45			0.09	54	27	50.00	49.00
02-Dec-93	205	0.00	NA	0.00	28.45			0.08	53	27	51.00	50.00
03-Dec-93	206	0.00	NA	0.00	28.45			0.07	59	27	53.00	50.00

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Study Date		Water Input in Inches[1]				Ten-Year Average Rainfall (inches)[2]		Pan Evaporation[3]	Temperature (F)			
									Air[4]		Soil (4")[5,6]	
Calendar	DAT	Rainfall	Irrigation	Total	Cumulative	Weekly	Cumulative		Max	Min	Max	Min
04-Dec-93	207	0.00	NA	0.00	28.45			0.04	65	27	54.00	53.00
05-Dec-93	208	0.76	NA	0.76	29.21			0.09	70	41	55.00	53.00
06-Dec-93	209	0.00	NA	0.00	29.21	0.81	25.06	0.18	67	25	56.00	52.00
07-Dec-93	210	0.00	NA	0.00	29.21			0.08	60	24	55.00	51.00
08-Dec-93	211	0.00	NA	0.00	29.21			0.08	56	23	52.00	51.00
09-Dec-93	212	0.00	NA	0.00	29.21			0.02	61	22	51.00	49.00
10-Dec-93	213	0.00	NA	0.00	29.21			0.05	62	23	51.00	50.00
11-Dec-93	214	0.59	NA	0.59	29.80			0.01	57	29	52.00	48.00
12-Dec-93	215	0.00	NA	0.00	29.80			0.10	55	19	48.00	44.00
13-Dec-93	216	0.00	NA	0.00	29.80	0.67	25.73	0.10	42	14	46.00	43.00
14-Dec-93	217	0.00	NA	0.00	29.80			0.10	55	19	46.00	45.00
15-Dec-93	218	0.59	NA	0.59	30.39			0.09	48	32	46.00	45.00
Total:		20.95	9.44		30.39			45.00				

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MATERIALS AND METHODS

Test Substance

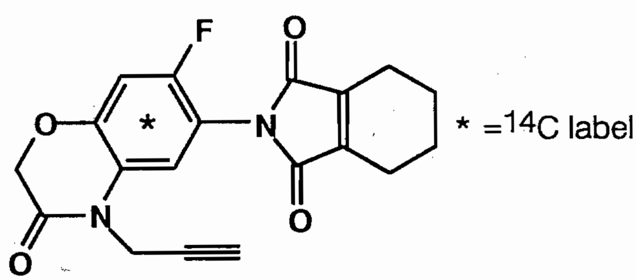
Phenyl-^{14}C-Flumioxazin or [PH-^{14}C]-S-53482 or [PH-^{14}C]-V-53482

Label: uniformly labeled in the phenyl ring

Lot No.: C-93-011

Stated specific activity:	129 mCi/mmole
	0.365 µCi/µg
	810,300 dpm/µg
Stated radiochemical purity:	99.9%
Stated chemical purity:	98.3% (HPLC - UV @ 292 nm)
Storage:	<-5 °C
Source:	Sumitomo Chemical Company, Ltd.
	5-33, Kitahama 4-chome
	Chuo-ku, Osaka 541
	JAPAN

Structure:



The identity of [PH-^{14}C]-S-53482 was confirmed by high-performance liquid chromatography by coinjection of the test substance with authentic S-53482 (FIGURE 1).

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Reference Substances

a) Flumioxazin

Code: S-53482 or V-53482 or SB-1855

Chemical name: 7-Fluoro-6-[(3,4,5,6-tetrahydro)phthalimido]-4-(2-propynyl)-1,4-benzoxazin-3(2H)-one

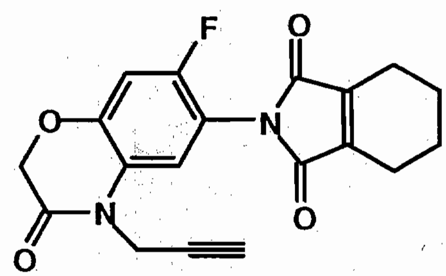
CAS No.: 103361-09-7

Lot No.: LEG-90601

Stated chemical purity: 99.4%

Stated water solubility: 1.790 mg/L at 25 °C

Structure:



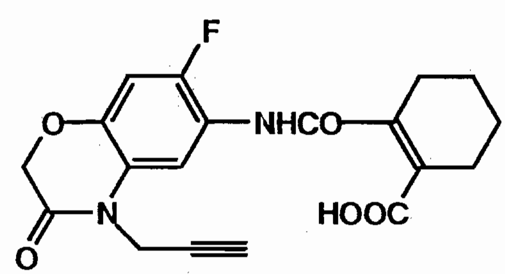
b) Code: 482-HA

Chemical name: N-[7-Fluoro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-3,4,5,6-tetrahydrophthalamic acid

Lot: SB-9

Stated chemical purity: 98.9%

Structure:



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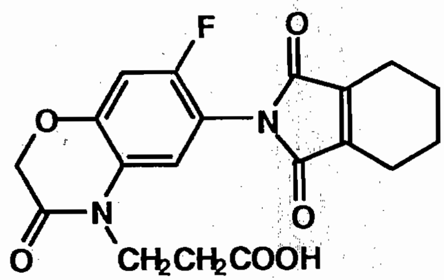
c) Code: 482-CA

Chemical name: 2-[7-Fluoro-3-oxo-6-(3,4,5,6-tetrahydrophthalimido)-2H-1,4-benzoxazin-4-yl]propionic acid

Lot: SB-20-2

Stated chemical purity: 98.7%

Structure:



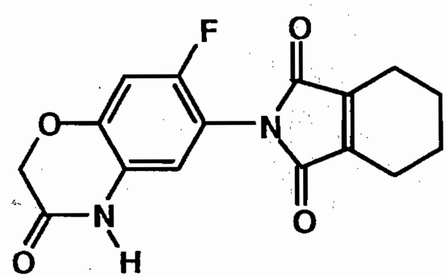
d) Code: IMOXA

Chemical name: 7-Fluoro-6-(3,4,5,6-tetrahydrophthalimido)-2H-1,4-benzoxazin-3(4H)-one

Lot : SB-19-2

Stated chemical purity: 92.3%

Structure:



e) Code: APF

Chemical name: 6-Amino-7-fluoro-4-(2-propynyl)-2H-1,4-benzoxazin-3(4H)-one

Lot: SB-89-002

Stated chemical purity: 97.5%

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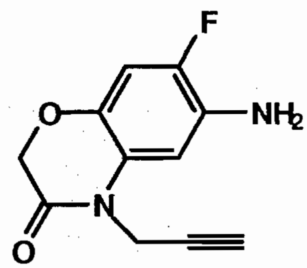
Structure:



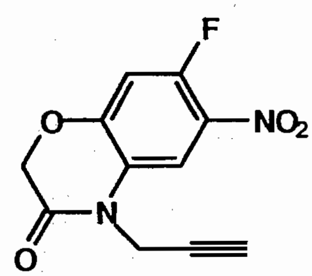
f) Code: PNF

Chemical name: 7-Fluoro-6-nitro-4-(2-propynyl)-2H-1,4-benzoxazin-3(4H)-one

Lot: SB-89-006

Stated chemical purity: 97.3%

Structure:



Control Substances

a) Morwet D-425

Chemical name: alkylated napthalene sulfonate, sodium salt

CAS No.: 68425-94-5

Lot No.: 428-18-14

Supplier: Witco
3200 Brookfield Street
Houston TX 77045

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TABLE III

DISTRIBUTION OF ^{14}C AS PPM IN THE SOIL SAMPLES, EXTRACTABLE AND BOUND FRACTIONS

Day	Sample No.	Combustion µg/g dry soil	Extracted ^{14}C µg/g(ppm) (1)	Bound ^{14}C µg/g(ppm) (1)
0	767-10-09-1	0.109	0.110	0.002
	767-14-17-1	0.105	0.108	0.001
Average		0.107	0.109	0.002
1	767-22-33-1	0.095	0.084	0.003
	767-04-25-1	0.111	0.103	0.003
Average		0.103	0.093	0.003
3	767-03-41-1	0.103	0.099	0.005
	767-18-49-1	0.102	0.104	0.006
Average		0.103	0.102	0.006
6	767-21-57-1	0.111	0.090	0.008
	767-29-65-1	0.082	0.079	0.007
Average		0.097	0.086	0.007
10	767-09-73-1	0.095	0.086	0.014
	767-11-81-1	0.090	0.077	0.013
Average		0.093	0.082	0.014
17	767-24-89-1	0.082	0.074	0.017
	767-31-97-1	0.092	0.088	0.020
Average		0.087	0.080	0.019
27	767-15-113-1	0.076	0.049	0.021
	767-19-121-1	0.086	0.057	0.022
Average		0.081	0.053	0.021
43	767-08-129-1	0.058	0.039	0.024
	767-25-137-1	0.080	0.049	0.030
Average		0.069	0.045	0.027
69	767-07-145-1	0.059	0.034	0.032
	767-17-153-1	0.057	0.027	0.023
Average		0.058	0.030	0.028
111	767-27-169-1	0.048	0.020	0.032
	767-28-177-1	0.045	0.014	0.030
Average		0.047	0.017	0.031
177	767-05-185-1	0.047	0.015	0.028
	767-23-201-1	0.049	0.020	0.032
Average		0.048	0.017	0.030

(1) Data are not normalized to 100%.

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TABLE IV

DISTRIBUTION OF ^{14}C IN THE EXTRACTABLE AND BOUND FRACTIONS EXPRESSED AS A PERCENTAGE OF THE APPLIED ^{14}C

Day	Sample No.	Total ^{14}C %	Extracted ^{14}C(1) %	Bound ^{14}C(1) %
0	767-10-09-1	101.9	102.8	1.9
	767-14-17-1	98.1	100.9	0.9
Average		100.0	101.9	1.9
1	767-22-33-1	88.8	78.5	2.8
	767-04-25-1	103.7	96.3	2.8
Average		96.3	86.9	2.8
3	767-03-41-1	96.3	92.5	4.7
	767-18-49-1	95.3	97.2	5.6
Average		96.3	95.3	5.6
6	767-21-57-1	103.7	84.1	7.5
	767-29-65-1	76.6	73.8	6.5
Average		90.7	80.4	6.5
10	767-09-73-1	88.8	80.4	13.1
	767-11-81-1	84.1	72.0	12.1
Average		86.9	76.6	13.1
17	767-24-89-1	76.6	69.2	15.9
	767-31-97-1	86.0	82.2	18.7
Average		81.3	74.8	17.8
27	767-15-113-1	71.0	45.8	19.6
	767-19-121-1	80.4	53.3	20.6
Average		75.7	49.5	19.6
43	767-08-129-1	54.2	36.4	22.4
	767-25-137-1	74.8	45.8	28.0
Average		64.5	42.1	25.2
69	767-07-145-1	55.1	31.8	29.9
	767-17-153-1	53.3	25.2	21.5
Average		54.2	28.0	26.2
111	767-27-169-1	44.9	18.7	29.9
	767-28-177-1	42.1	13.1	28.0
Average		43.9	15.9	29.0
177	767-05-185-1	43.9	14.0	26.2
	767-23-201-1	45.8	18.7	29.9
Average		44.9	15.9	28.0

(1) Data are not normalized to 100%, i.e. the total ^{14}C in each sample.

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TABLE V

DISTRIBUTION OF THE EXTRACTABLE ^{14}C AS A PERCENTAGE OF THE APPLIED ^{14}C

Day	Sample No.	S-53482 (1) %	Region 1 (2) %	Region 2 (3) %
0	767-10-09-1	96.1	0.7	3.7
	767-14-17-1	94.1	0.6	3.8
Average		95.1	0.6	3.7
1	767-22-33-1	71.6	0.8	4.2
	767-04-25-1	86.3	0.7	6.3
Average		79.0	0.8	5.2
3	767-03-41-1	80.5	1.3	7.4
	767-18-49-1	85.0	1.9	7.5
Average		82.8	1.6	7.5
6	767-21-57-1	68.7	2.9	9.2
	767-29-65-1	57.3	1.6	10.1
Average		63.0	2.2	9.7
10	767-09-73-1	64.7	1.9	10.2
	767-11-81-1	58.3	2.4	8.8
Average		61.5	2.2	9.5
17	767-24-89-1	53.2	2.0	10.6
	767-31-97-1	65.7	1.8	11.3
Average		59.5	1.9	11.0
27	767-15-113-1	29.5	2.9	10.4
	767-19-121-1	35.3	2.9	12.0
Average		32.4	2.9	11.2
43	767-08-129-1	21.2	2.0	10.0
	767-25-137-1	27.3	2.2	12.3
Average		24.3	2.1	11.1
69	767-07-145-1	14.6	1.9	11.4
	767-17-153-1	11.8	1.9	8.7
Average		13.2	1.9	10.0
111	767-27-169-1	6.7	1.9	7.3
	767-28-177-1	4.3	2.1	4.7
Average		5.5	2.0	6.0
177	767-05-185-1	4.8	1.3	5.6
	767-23-201-1	5.5	2.1	7.1
Average		5.1	1.7	6.4

All data are a percentage of the average analyses of the Day 0 samples (0.107 ppm)

(1) Defined by fractions 23-25 (APPENDIX E).
(2) Defined by fractions 4-6 (APPENDIX E).
(3) Defined by fractions 15-22 (APPENDIX E).

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TABLE VI

DISTRIBUTION OF THE EXTRACTABLE ^{14}C AS PPM S-53482, "REGION 1" AND "REGION 2"

Day	Sample No.	S-53482 (1) (ppm)	Region 1 (2) (ppm)	Region 2 (3) (ppm)
0	767-10-09-1	0.103	0.001	0.004
	767-14-17-1	0.101	0.001	0.004
Average		0.102	0.001	0.004
1	767-22-33-1	0.077	0.001	0.004
	767-04-25-1	0.092	0.001	0.007
Average		0.084	0.001	0.006
3	767-03-41-1	0.086	0.001	0.008
	767-18-49-1	0.091	0.002	0.008
Average		0.089	0.002	0.008
6	767-21-57-1	0.073	0.003	0.010
	767-29-65-1	0.061	0.002	0.011
Average		0.067	0.002	0.010
10	767-09-73-1	0.069	0.002	0.011
	767-11-81-1	0.062	0.003	0.009
Average		0.066	0.002	0.010
17	767-24-89-1	0.057	0.002	0.011
	767-31-97-1	0.070	0.002	0.012
Average		0.064	0.002	0.012
27	767-15-113-1	0.032	0.003	0.011
	767-19-121-1	0.038	0.003	0.013
Average		0.035	0.003	0.012
43	767-08-129-1	0.023	0.002	0.011
	767-25-137-1	0.029	0.002	0.013
Average		0.026	0.002	0.012
69	767-07-145-1	0.016	0.002	0.012
	767-17-153-1	0.013	0.002	0.009
Average		0.014	0.002	0.011
111	767-27-169-1	0.007	0.002	0.008
	767-28-177-1	0.005	0.002	0.005
Average		0.006	0.002	0.006
177	767-05-185-1	0.005	0.001	0.006
	767-23-201-1	0.006	0.002	0.008
Average		0.005	0.002	0.007

Note : Two aliquots were removed from each soil sample and each aliquot was analyzed twice by high-performance liquid chromatography. The concentrations of S-53482, "Region 1", and "Region 2" are calculated from the total ^{14}C found in each sample in TABLE III.

(1) Defined by fractions 23-25 (APPENDIX E).
(2) Defined by fractions 4-6 (APPENDIX E).
(3) Defined by fractions 15-22 (APPENDIX E).

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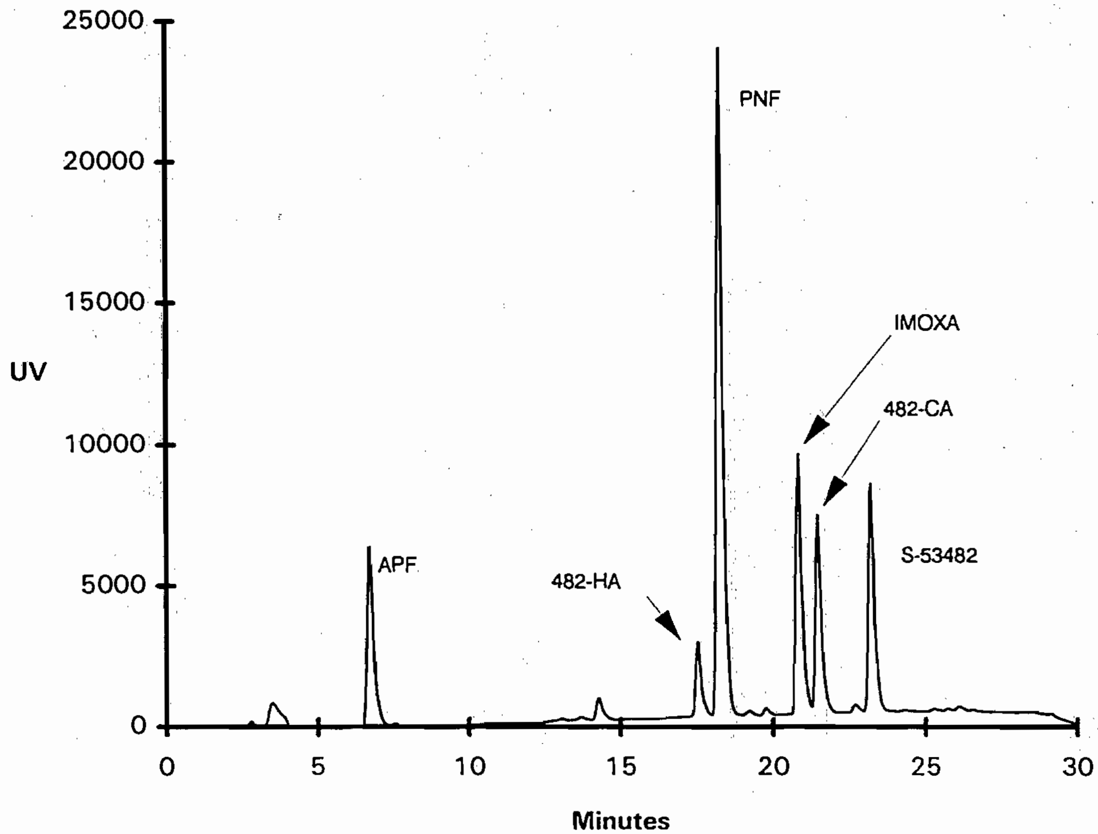
FIGURE 2

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHIC ANALYSIS OF THE TEST MIXTURE



Column : Zorbax® SB-Phenyl (4.6 mm i.d. x 250 mm)
Flow : 1 mL/minute
Ultraviolet detection at 254 nm
Gradient : 40% (0.05% H_3PO_4 in methanol) / 60% (0.05% H_3PO_4 in water) at 0 minutes
100% (0.05% H_3PO_4 in methanol) at 20 minutes
100% (0.05% H_3PO_4 in methanol) at 30 minutes

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FIGURE 3

PROCEDURE FOR THE EXTRACTION AND ANALYSIS OF SOIL SAMPLES

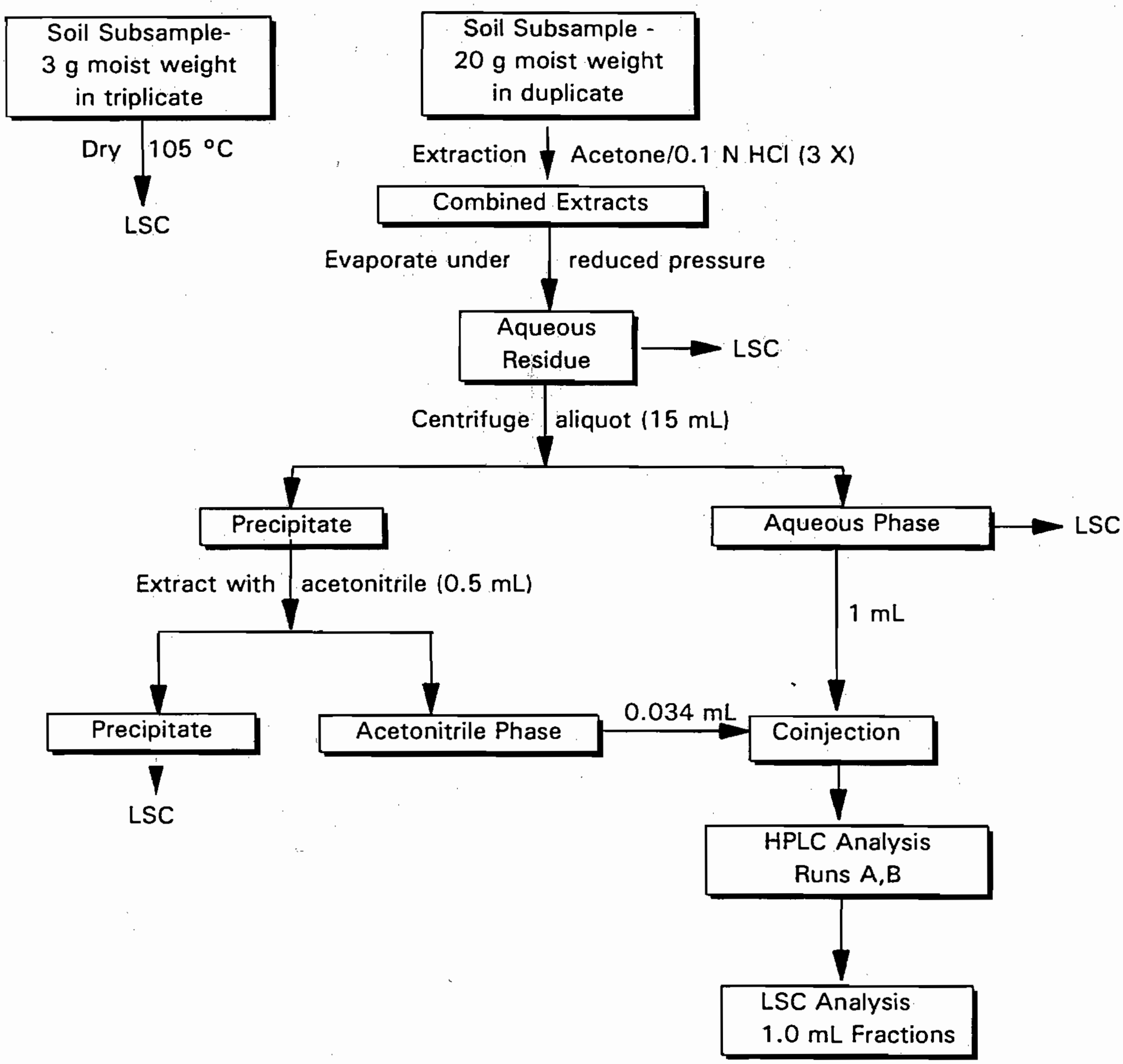

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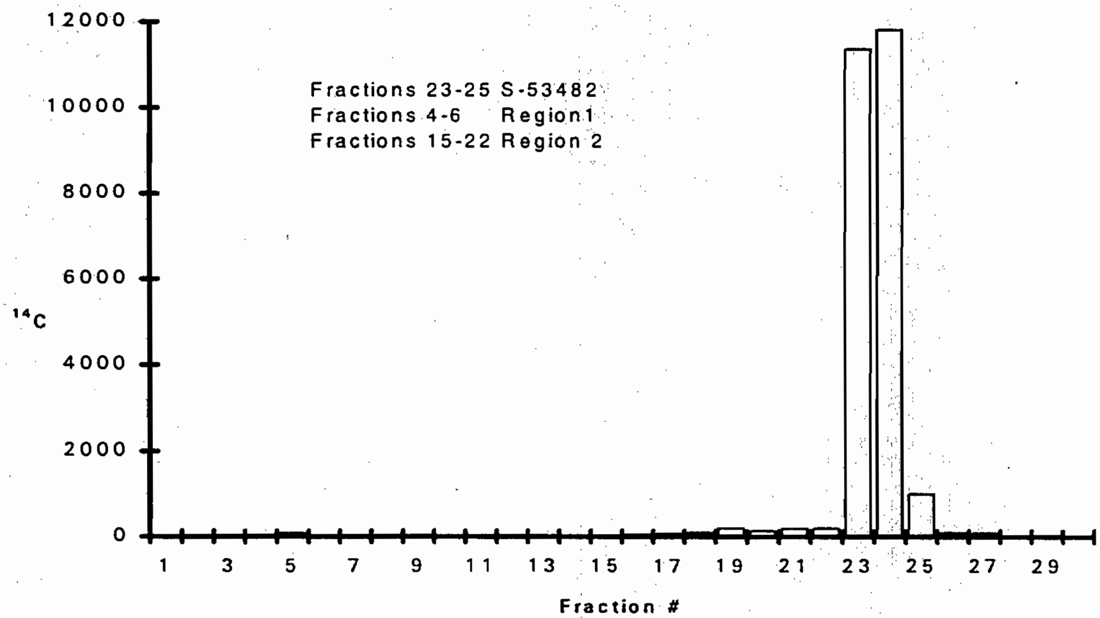
FIGURE 7

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-10-9-1 (DAY 0)

Collection of fractions



Radiochemical Flow Detector

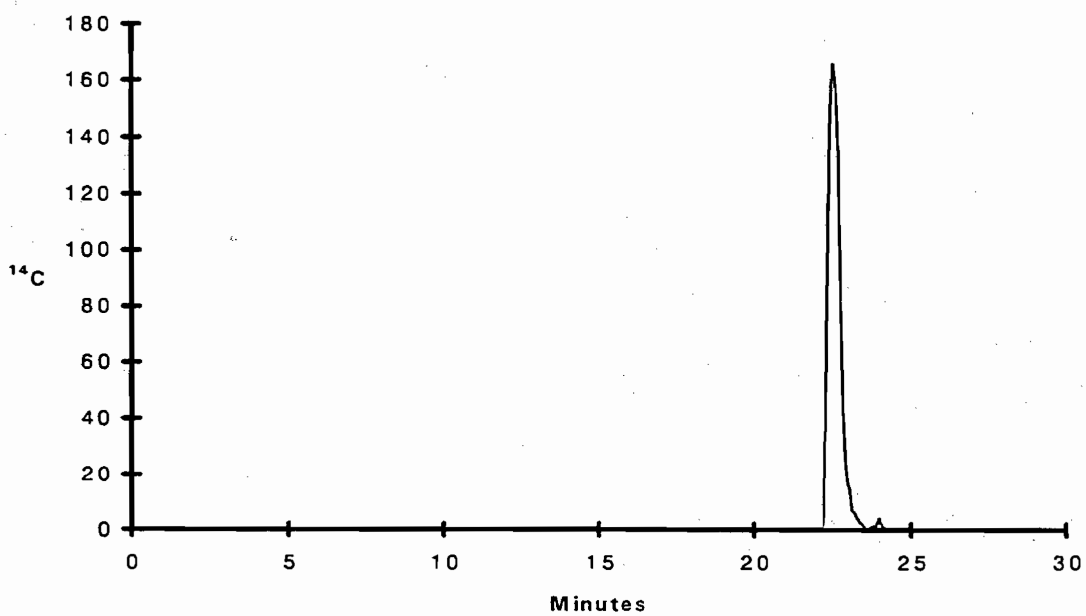


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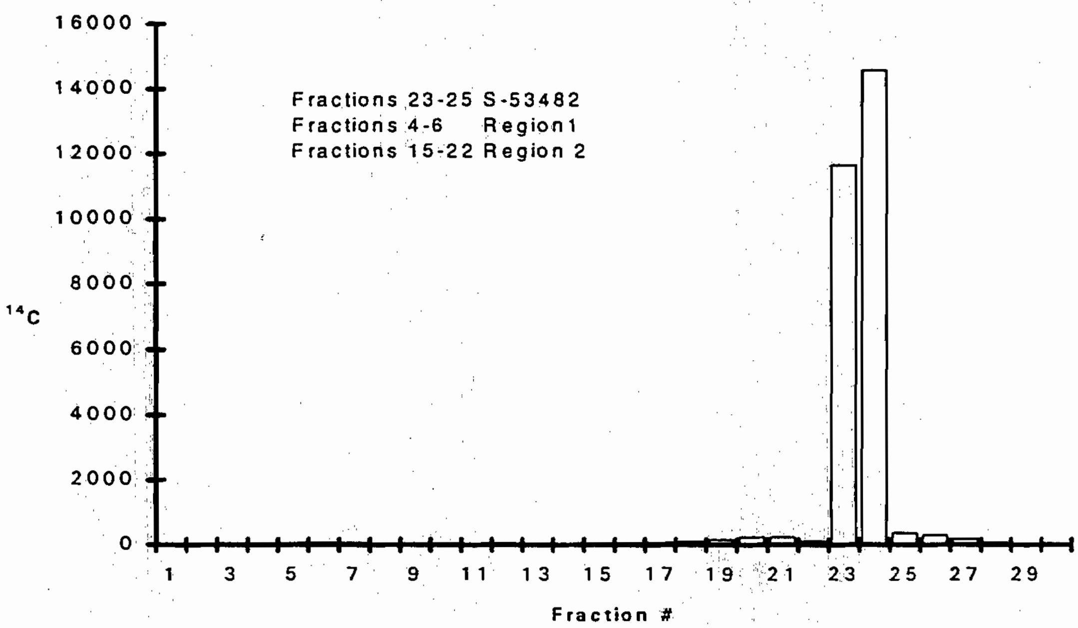
FIGURE 8

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-14-17-1 (DAY 0)

Collection of fractions



Radiochemical Flow Detector

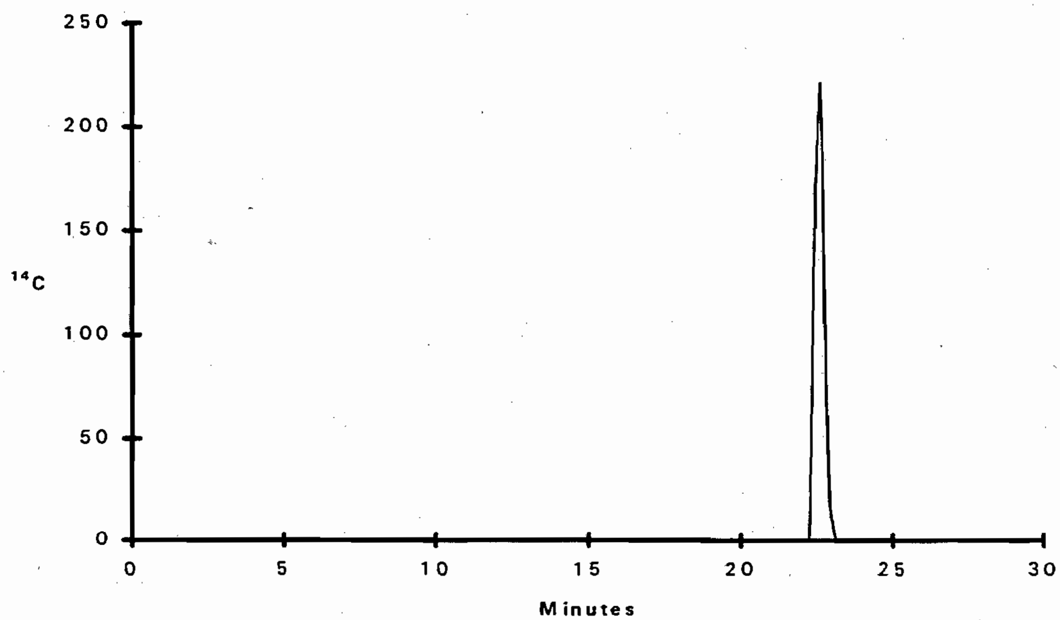


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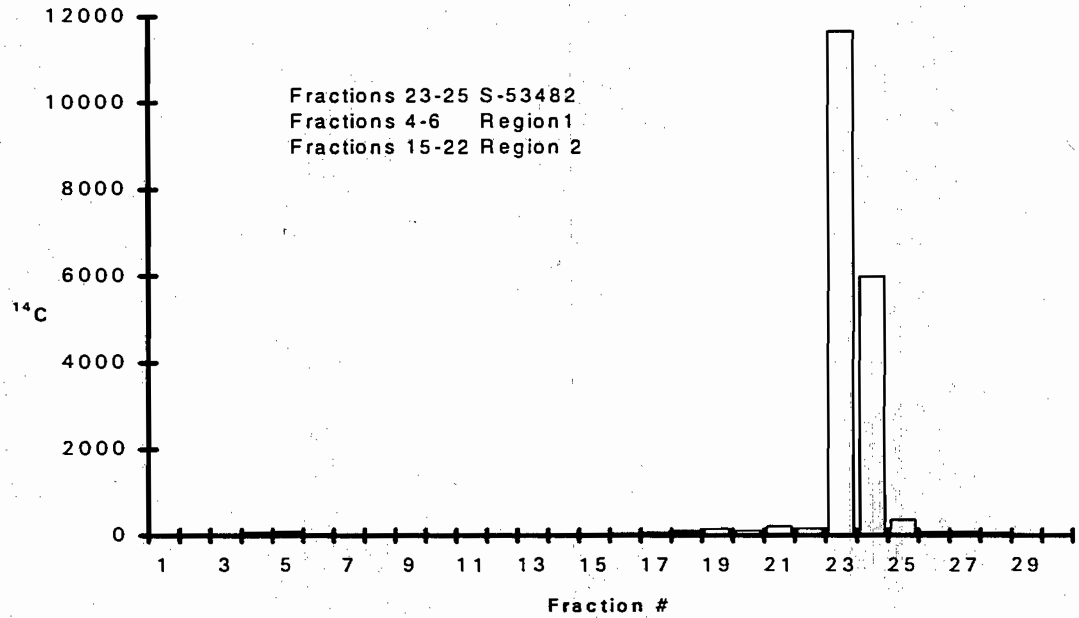
FIGURE 9

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-22-33-1 (DAY 1)

Collection of fractions



Radiochemical Flow Detector

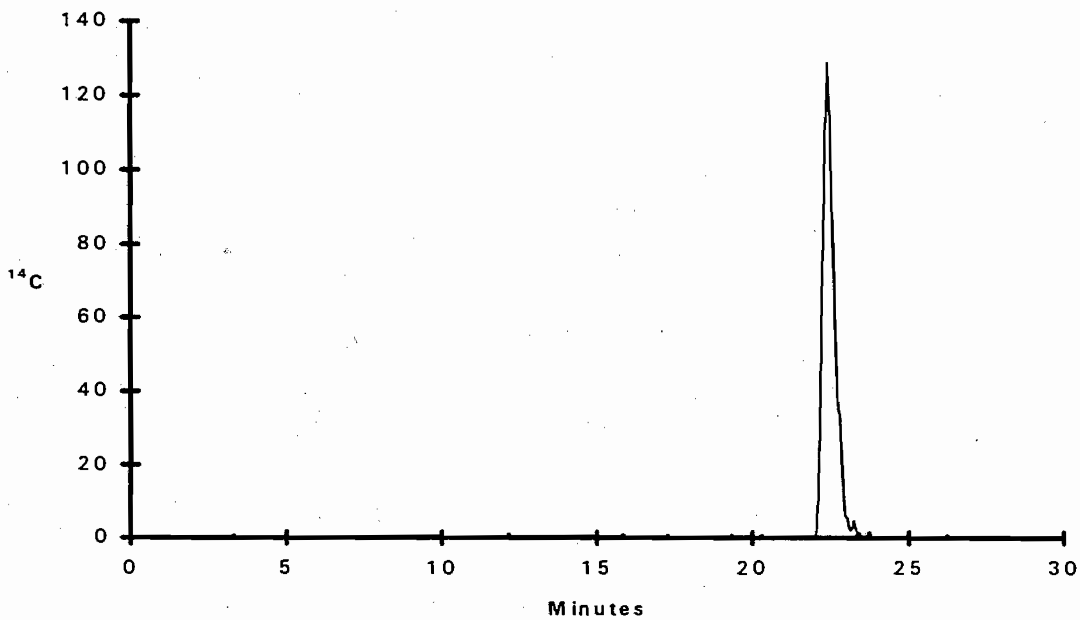


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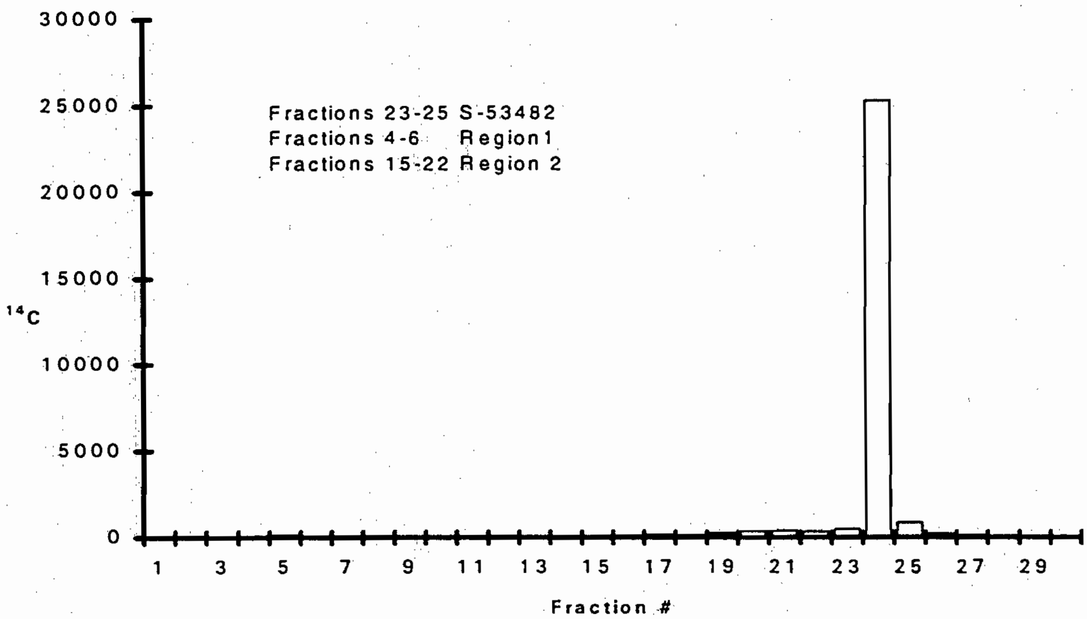
FIGURE 10

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-4-25-1 (DAY 1)

Collection of fractions



Radiochemical Flow Detector

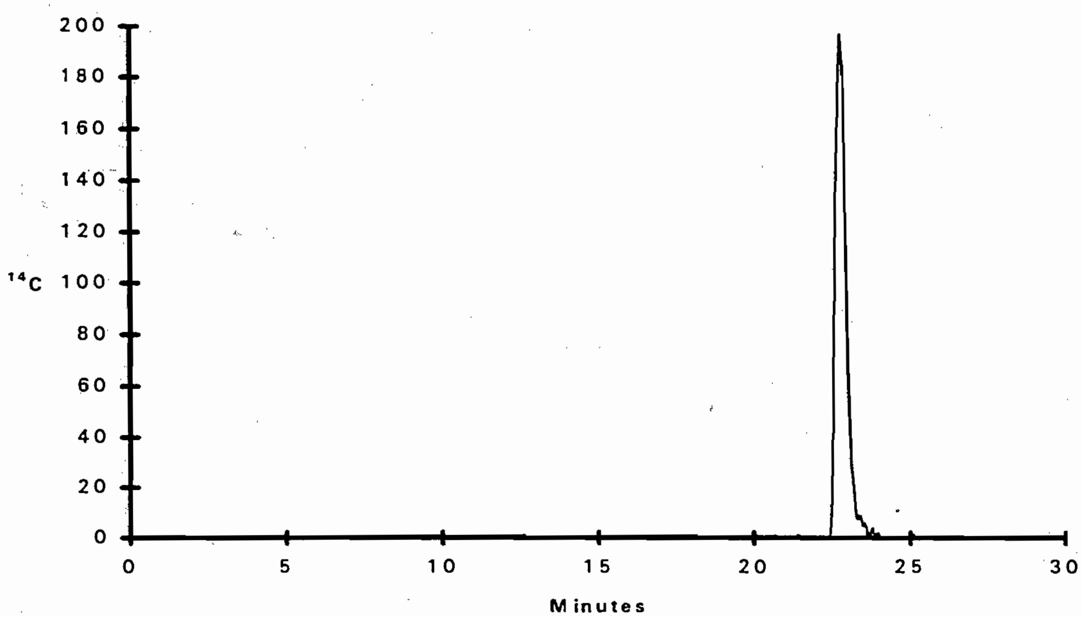


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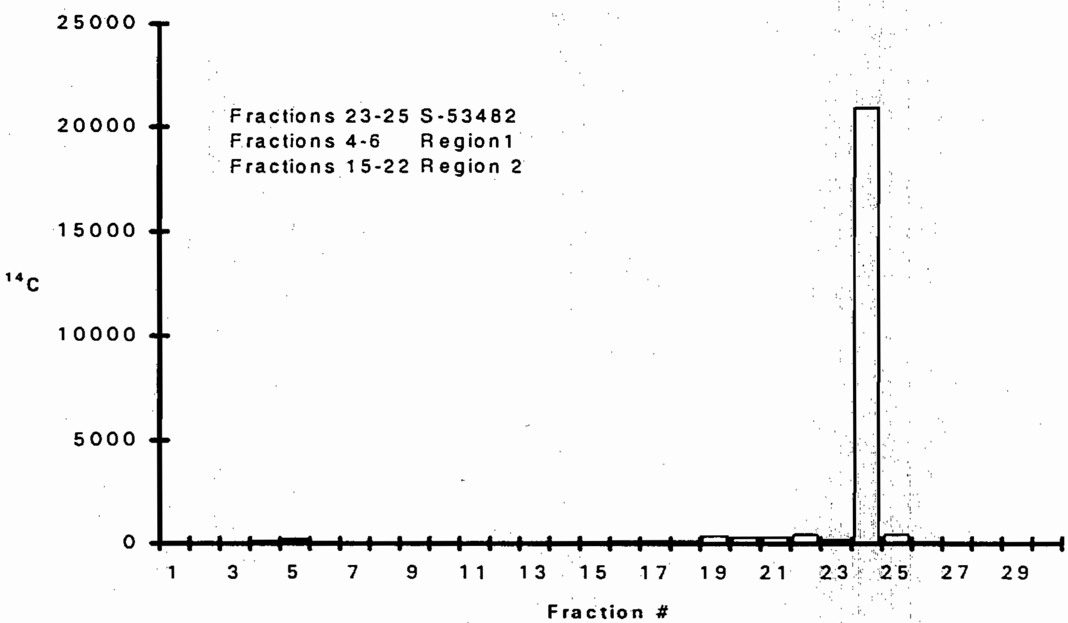
FIGURE 11

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-18-49-1 (DAY 3)

Collection of fractions



Radiochemical Flow Detector

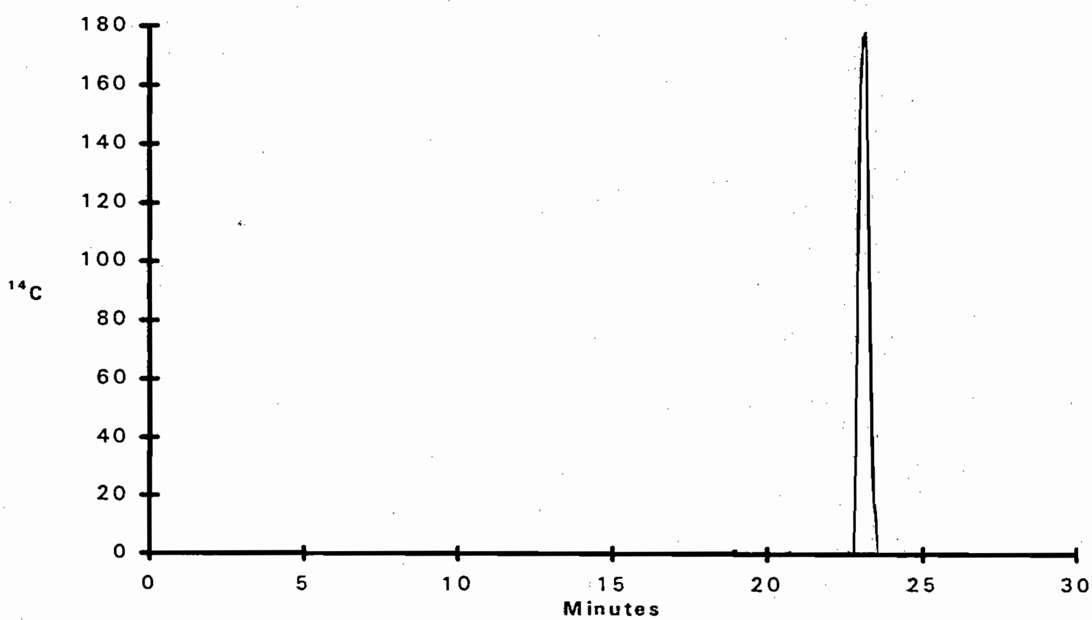


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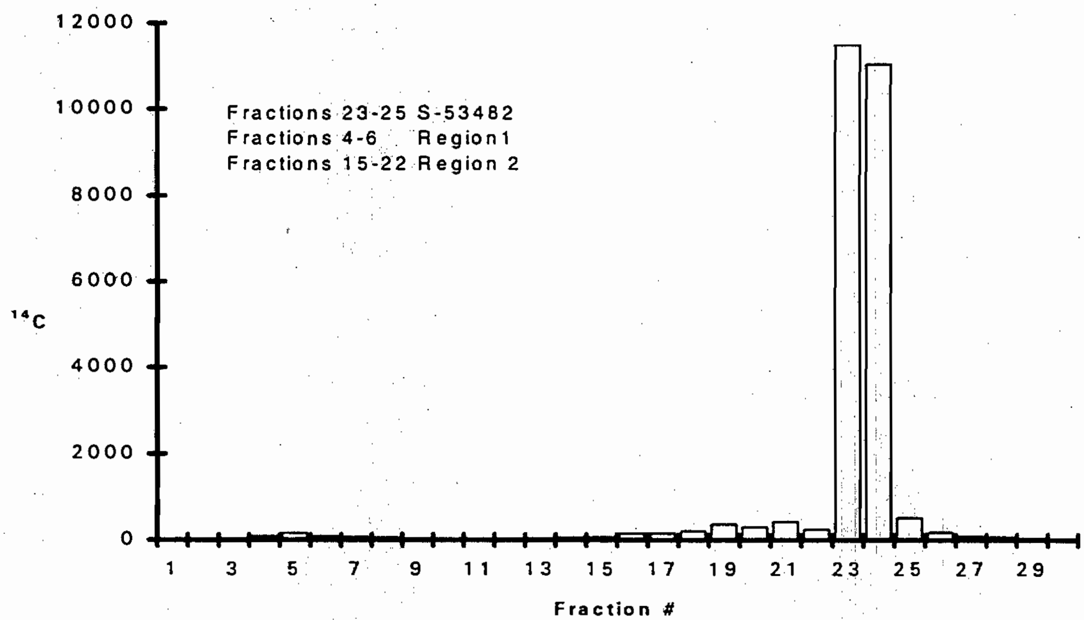
FIGURE 12

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-3-41-1 (DAY 3)

Collection of fractions



Radiochemical Flow Detector

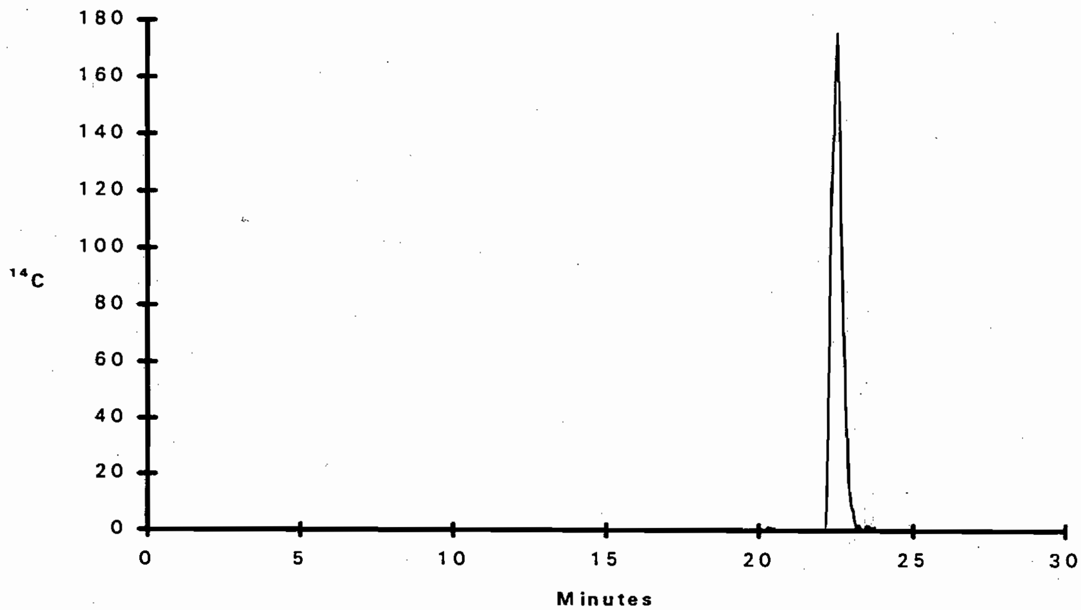


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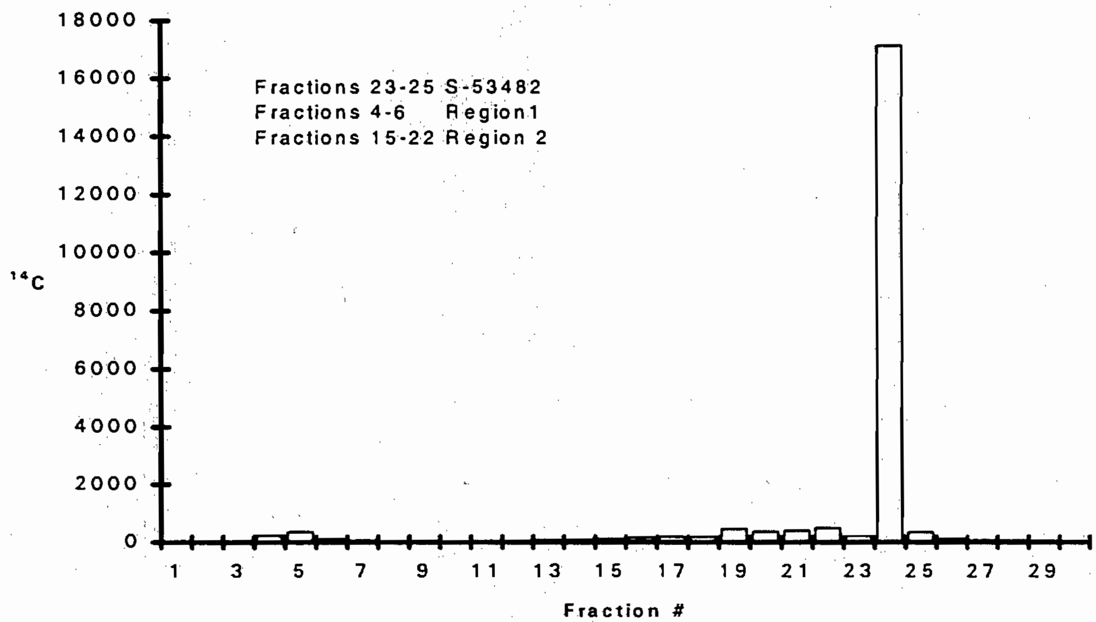
FIGURE 13

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-21-57-1 (DAY 6)

Collection of fractions



Radiochemical Flow Detector

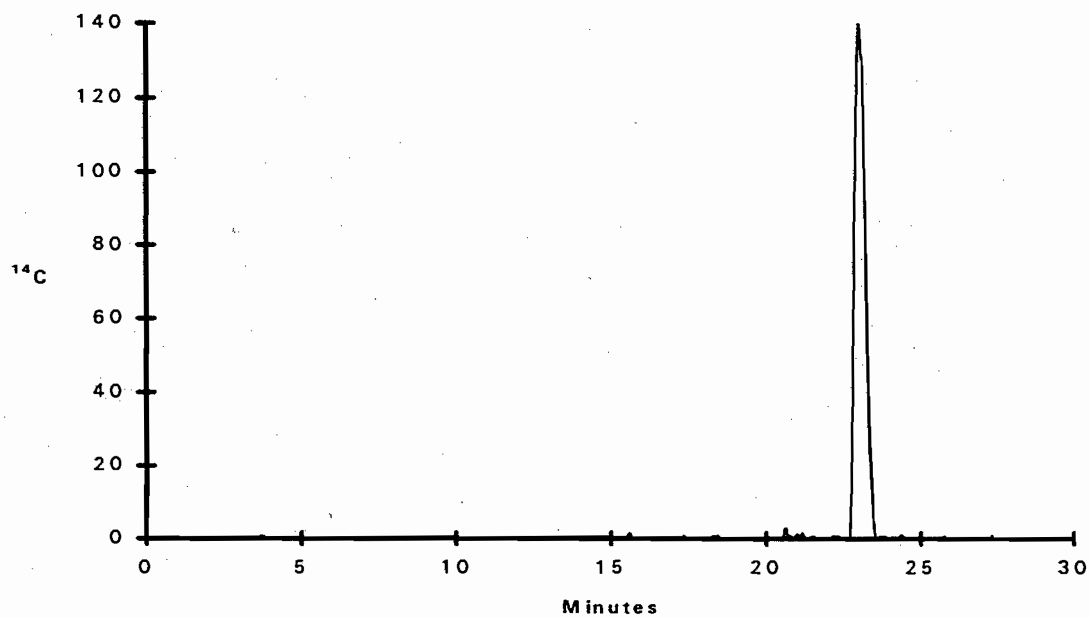


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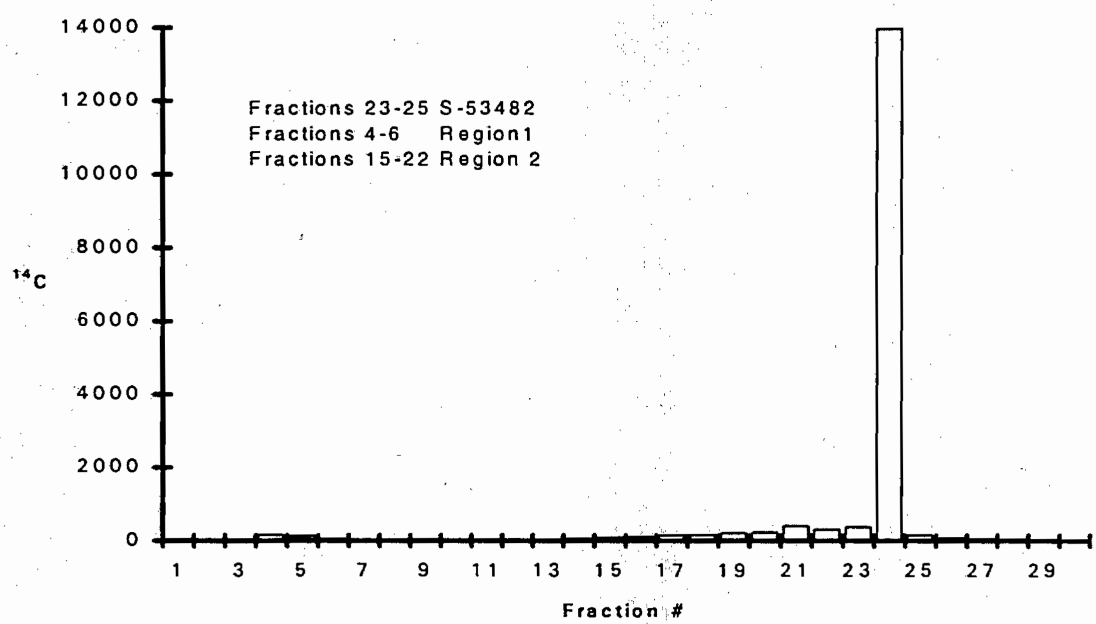
FIGURE 14

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-29-65-1 (DAY 6)

Collection of fractions



Radiochemical Flow Detector

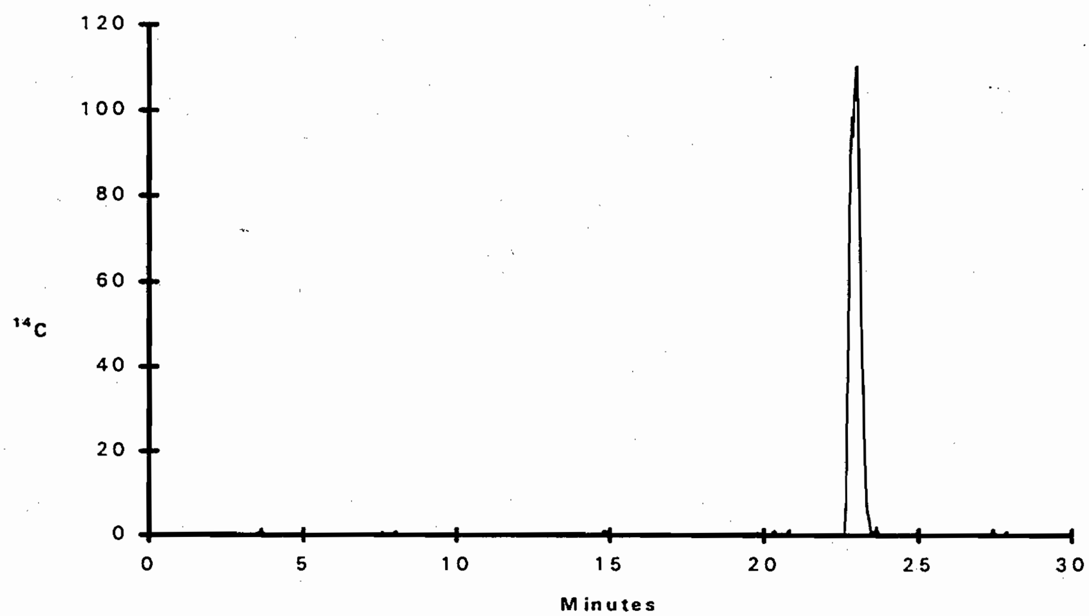


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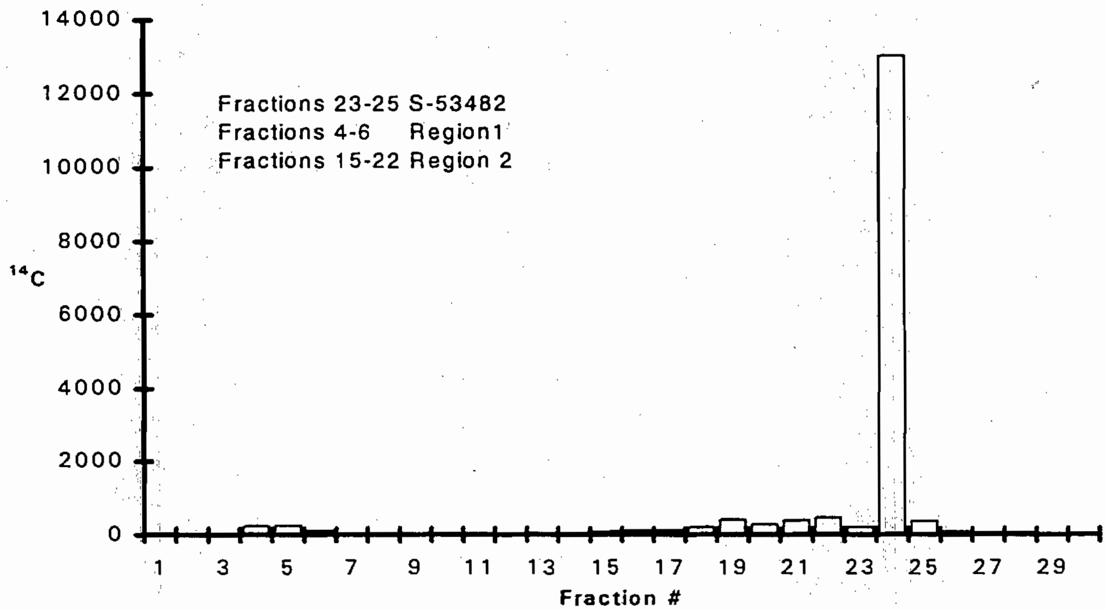
FIGURE 15

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-11-18-1 (DAY 10)

Collection of fractions



Radiochemical Flow Detector

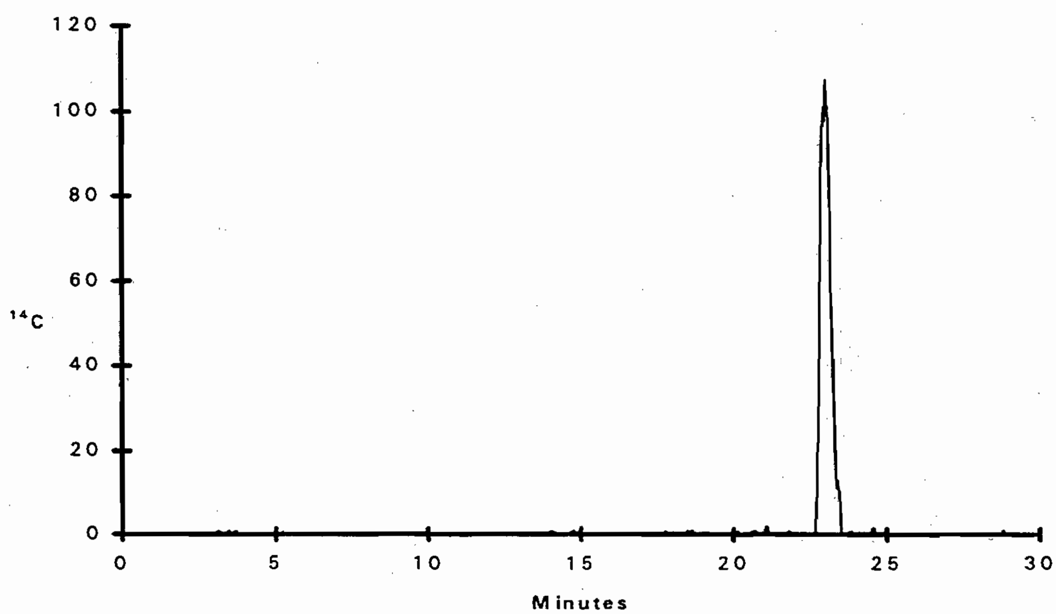


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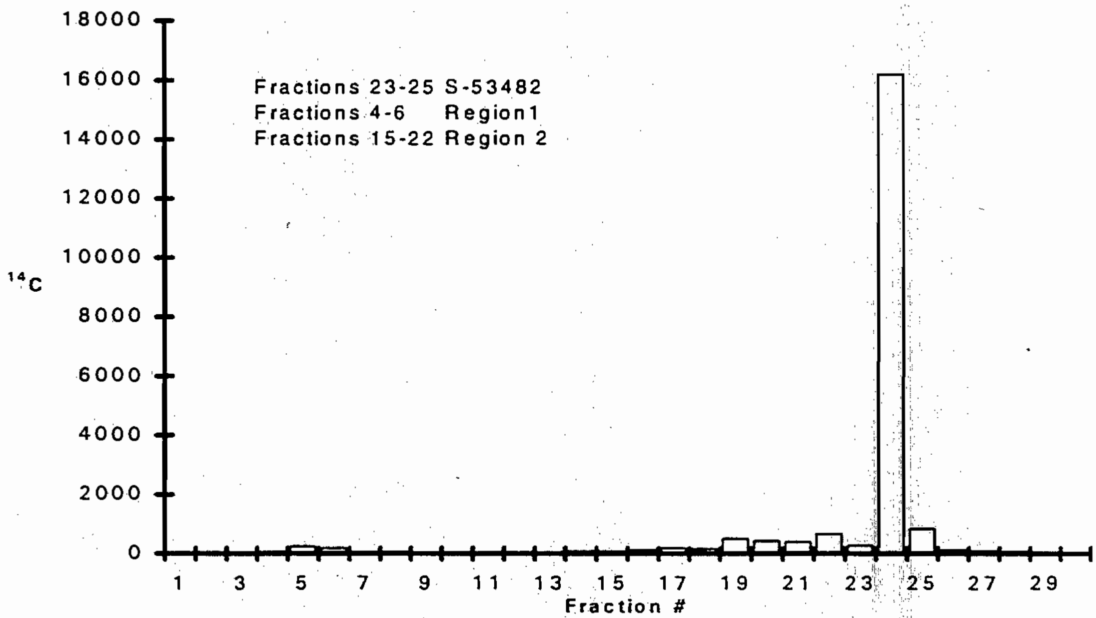
FIGURE 16

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-9-73-1 (DAY 10)

Collection of fractions



Radiochemical Flow Detector

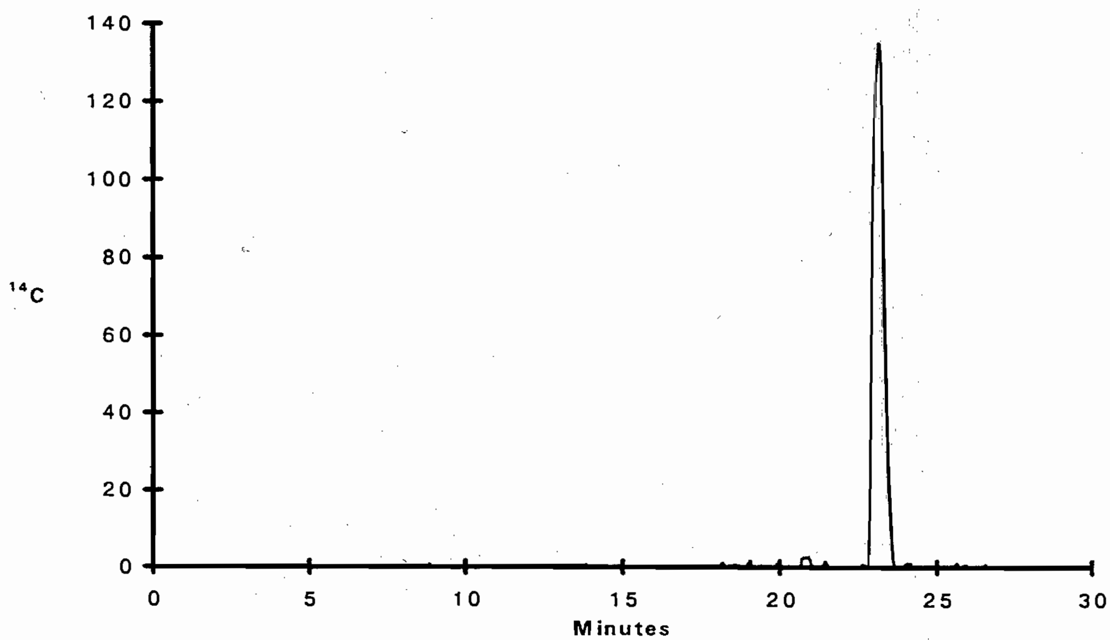


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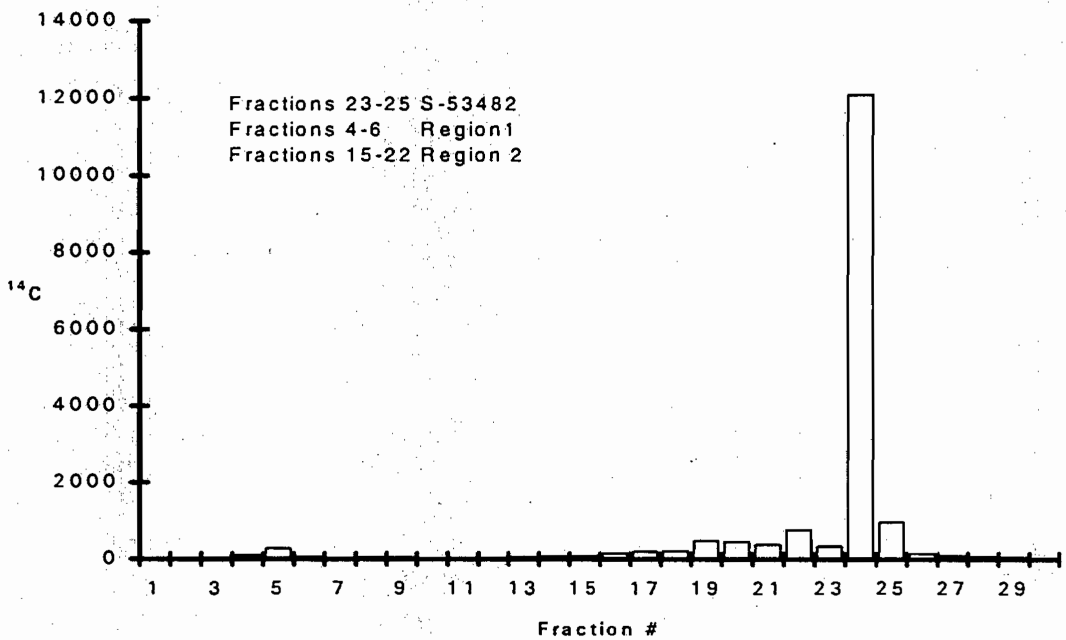
FIGURE 17

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-24-89-1 (DAY 17)

Collection of fractions



Radiochemical Flow Detector

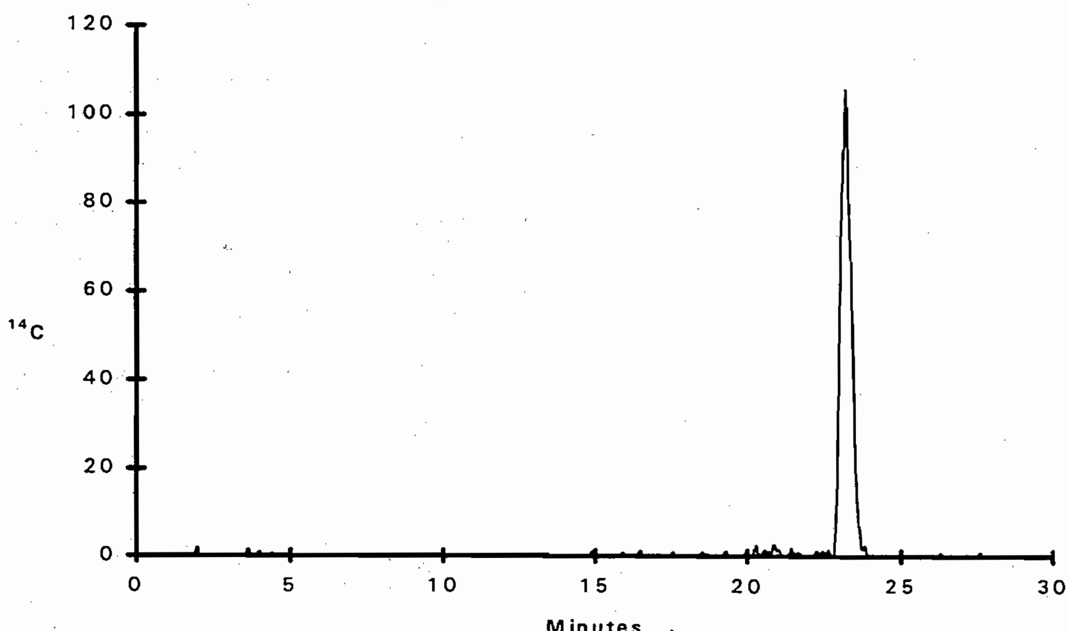


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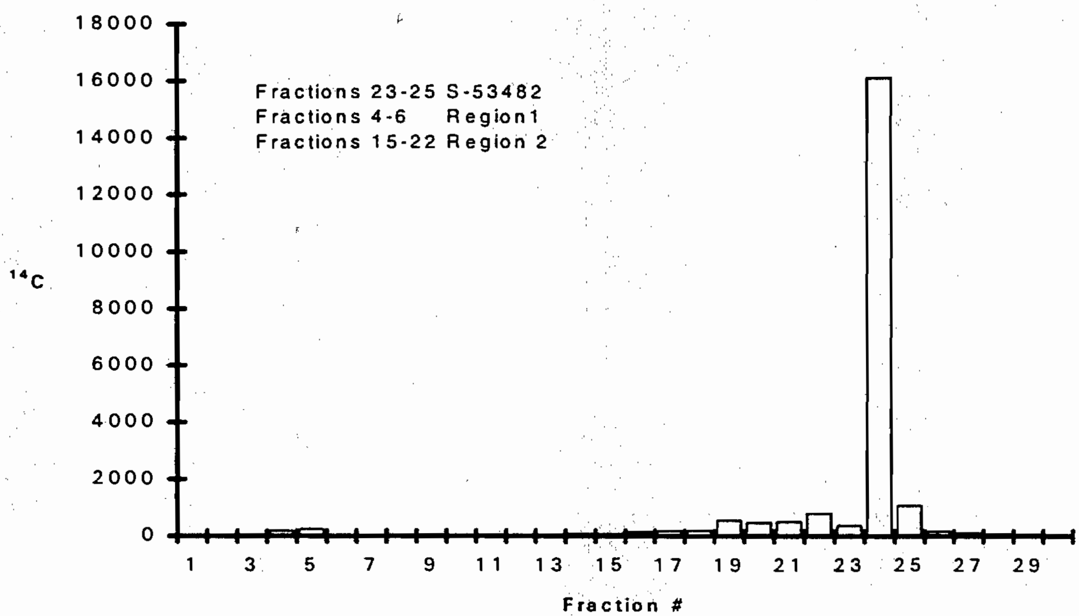
FIGURE 18

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-31-97-1 (DAY 17)

Collection of fractions



Radiochemical Flow Detector

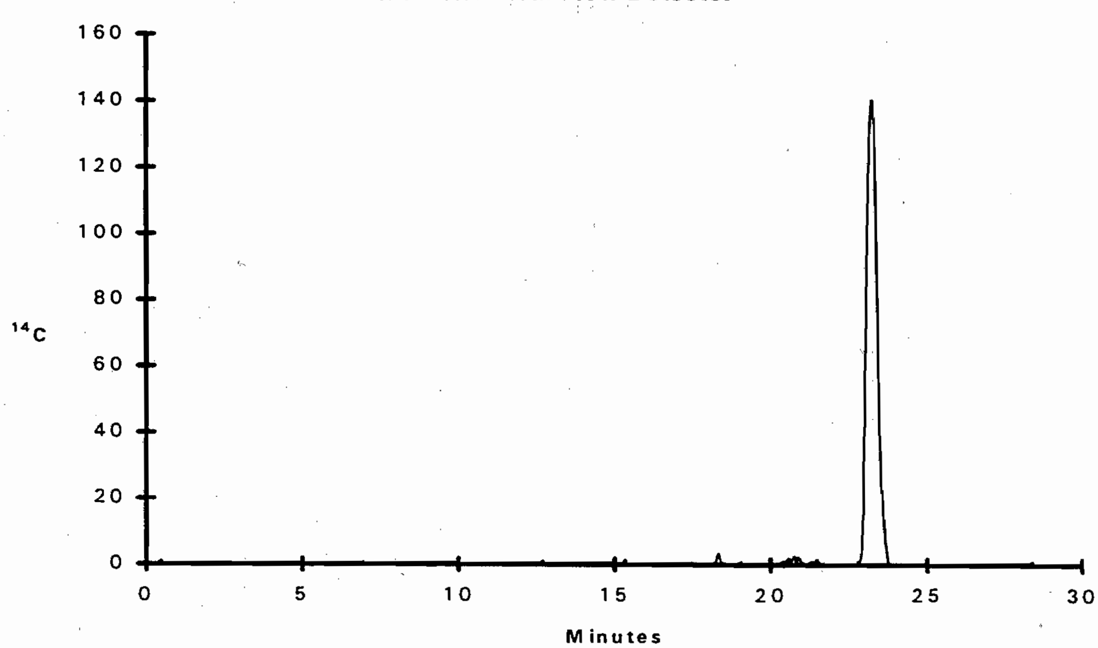


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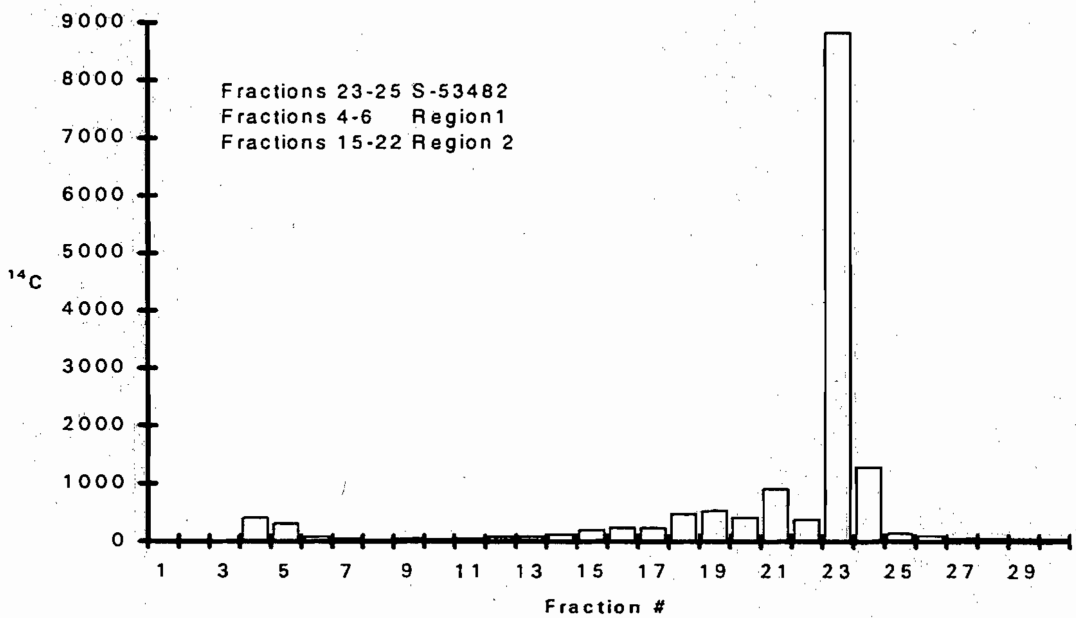
FIGURE 19

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-19-121-1 (DAY 27)

Collection of fractions



Radiochemical Flow Detector

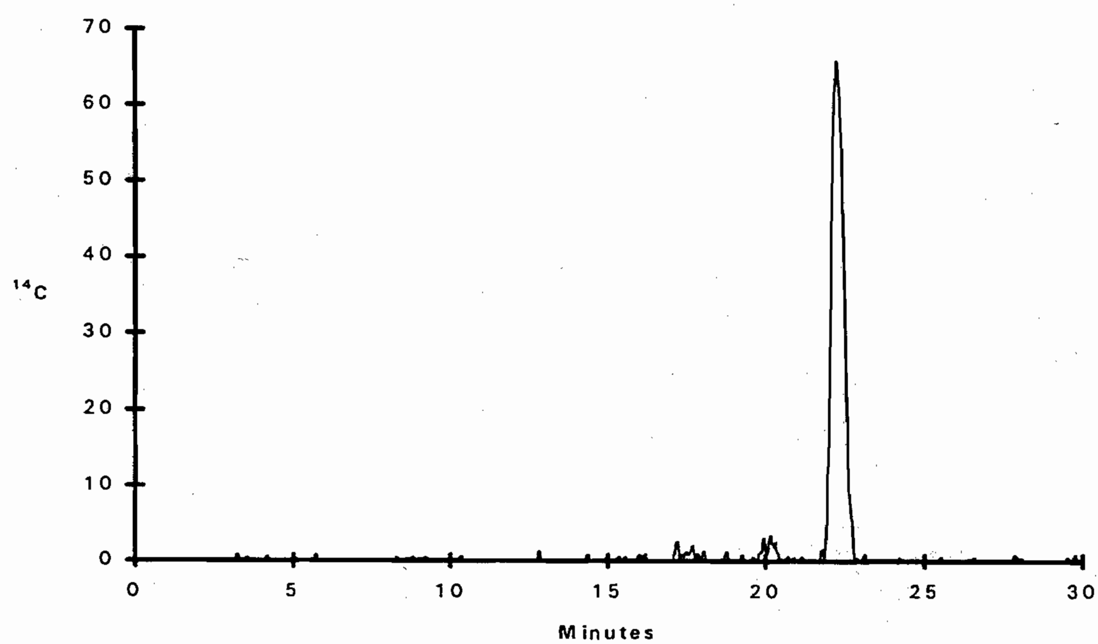


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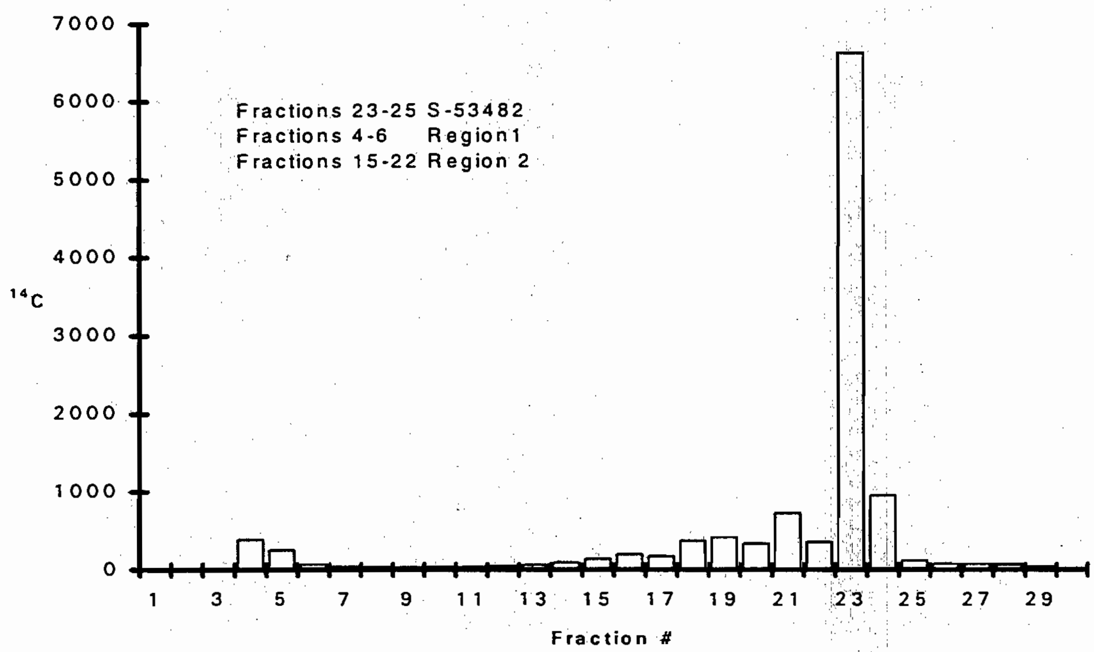
FIGURE 20

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-27-113-1 (DAY 27)

Collection of fractions



Radiochemical Flow Detector

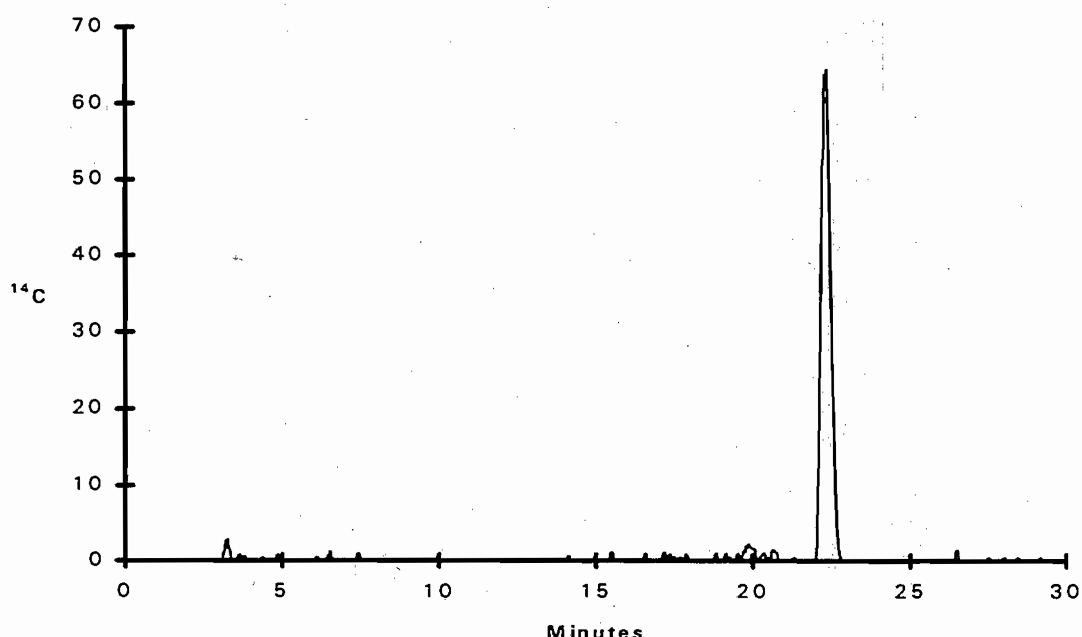


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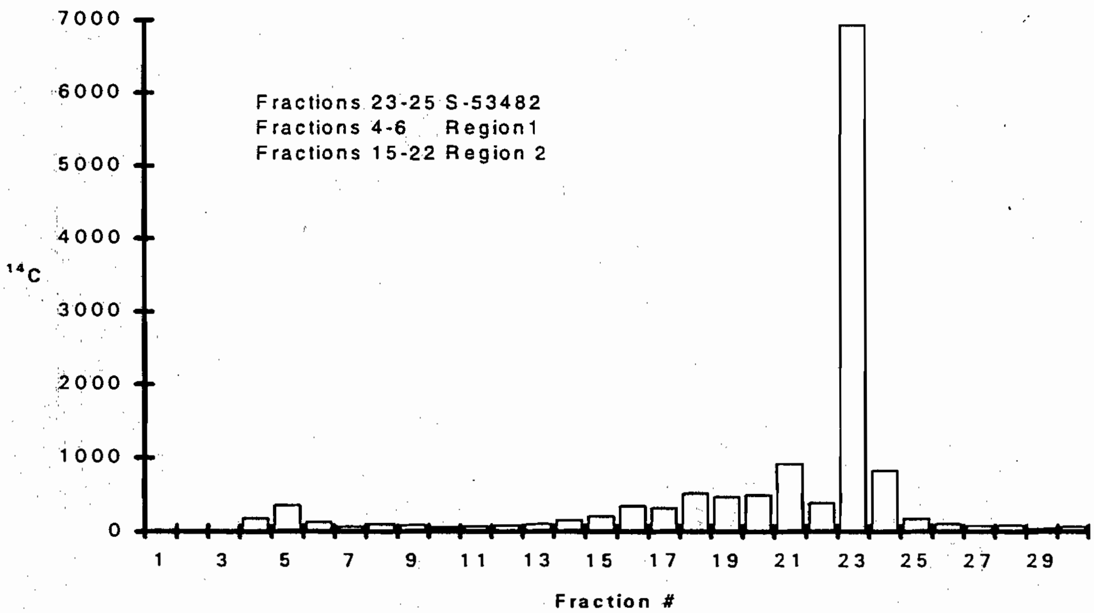
FIGURE 21

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-25-137-1 (DAY 43)

Collection of fractions



Radiochemical Flow Detector

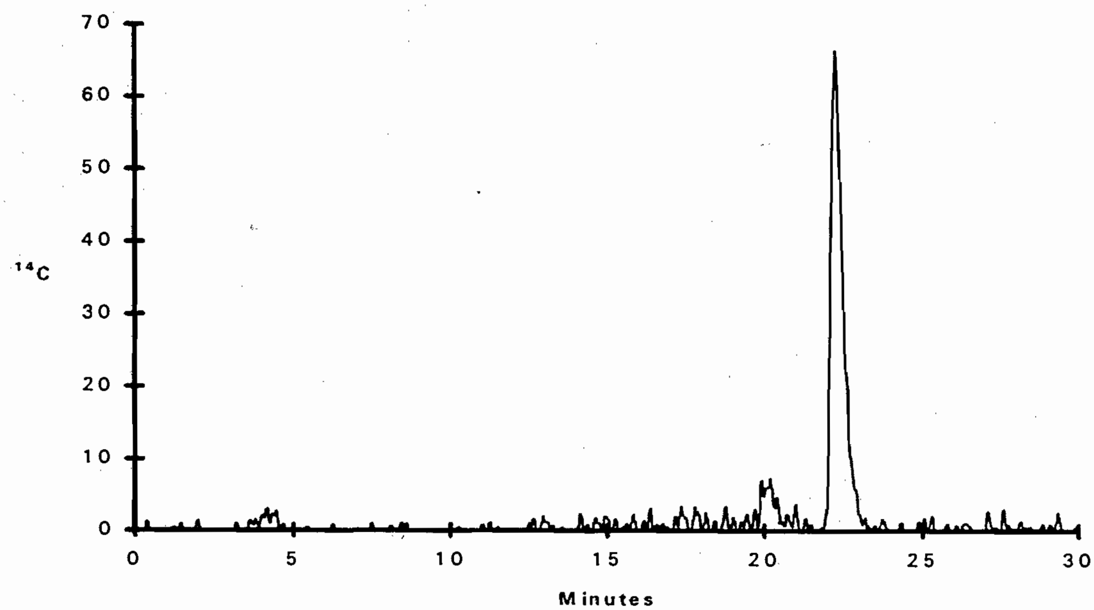


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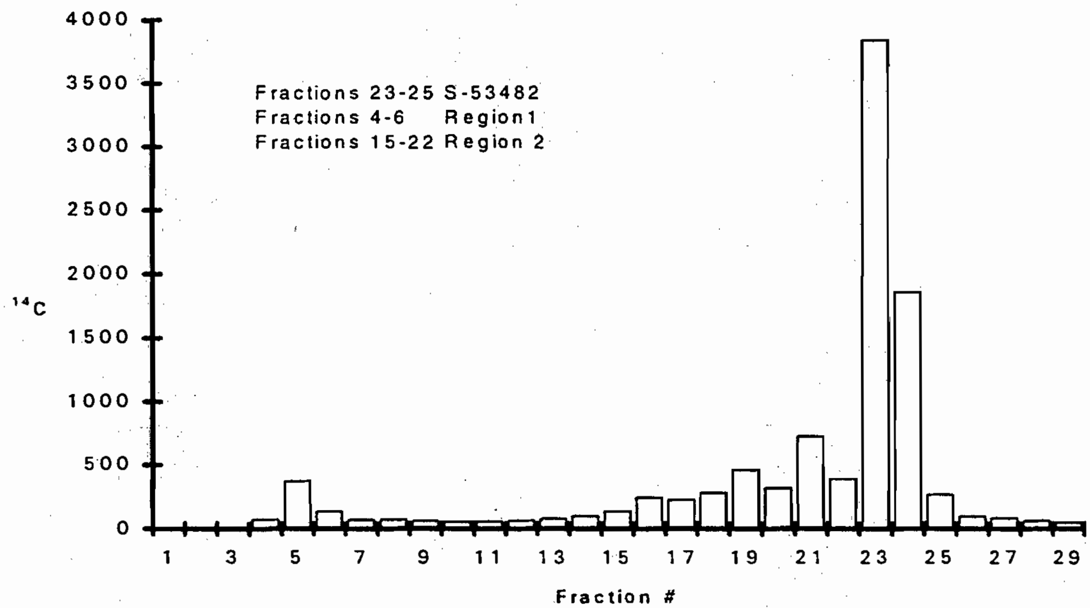
FIGURE 22

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-8-129-1 (DAY 43)

Collection of fractions



Radiochemical Flow Detector

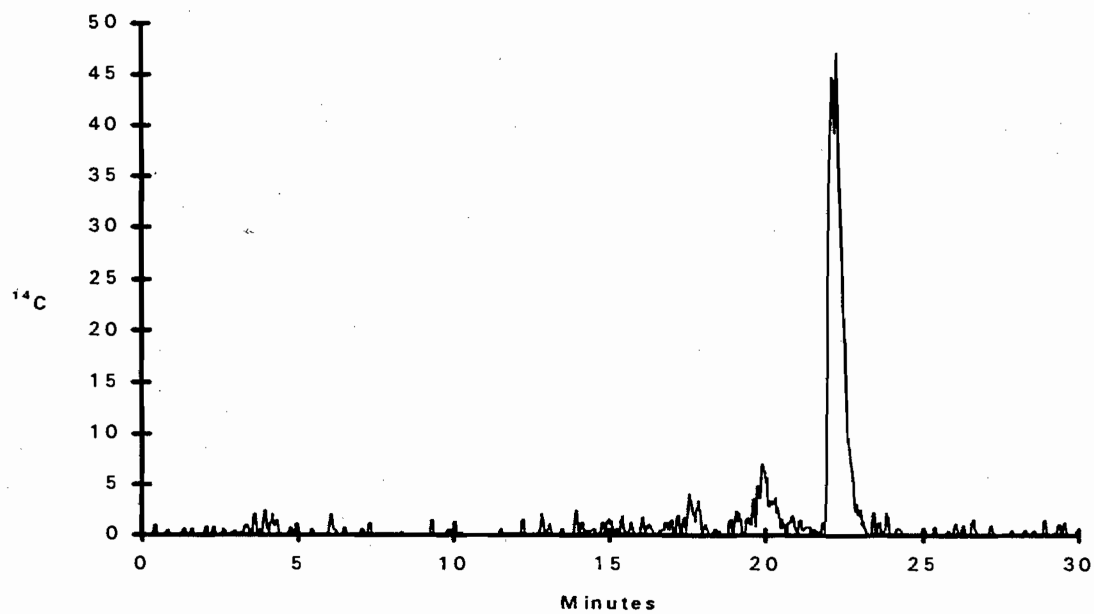


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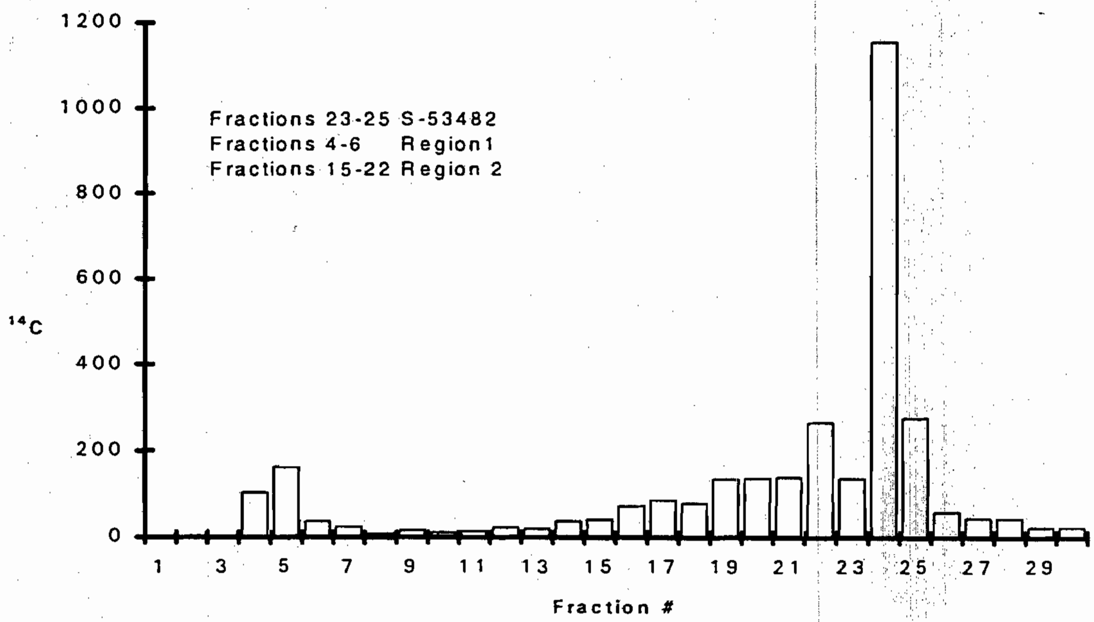
FIGURE 23

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-17-153-1 (DAY 69)

Collection of fractions



Radiochemical Flow Detector

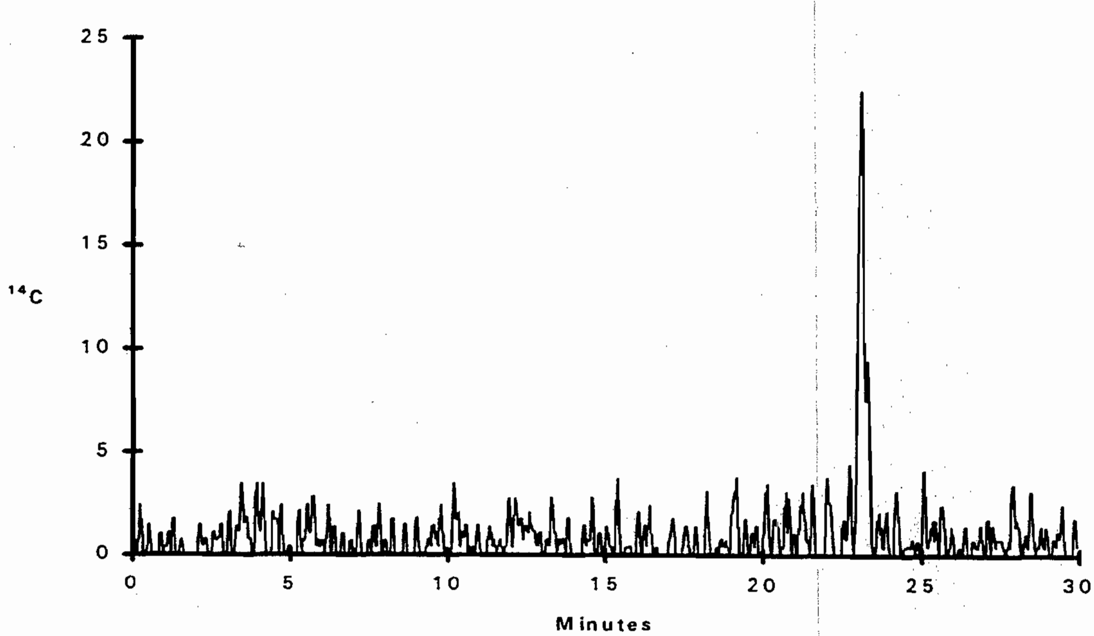


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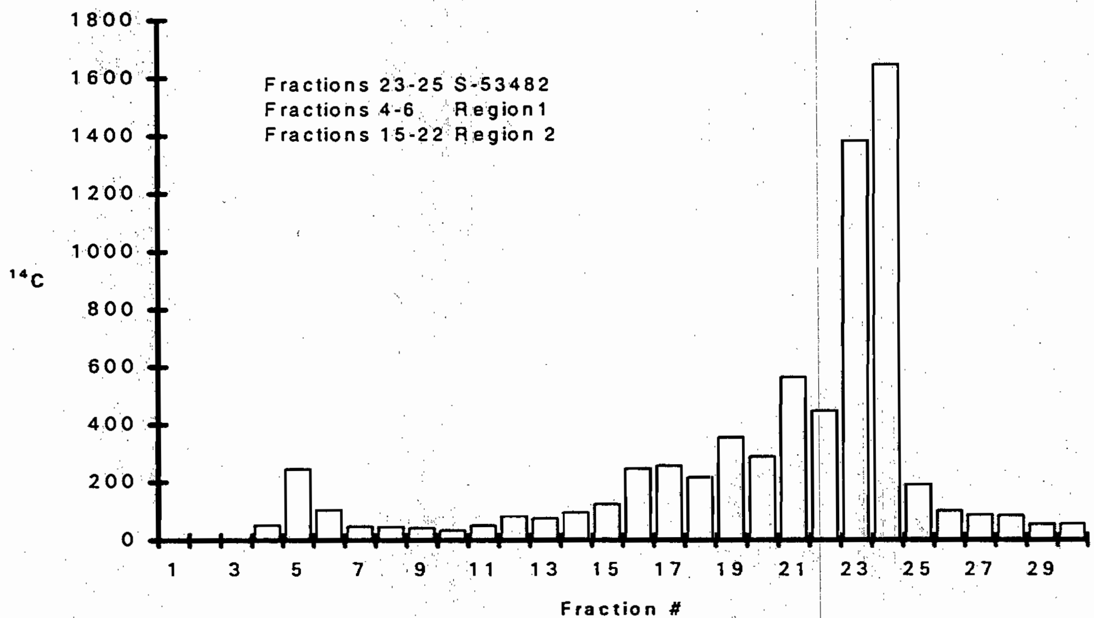
FIGURE 24

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-7-145-1 (DAY 69)

Collection of fractions



Radiochemical Flow Detector

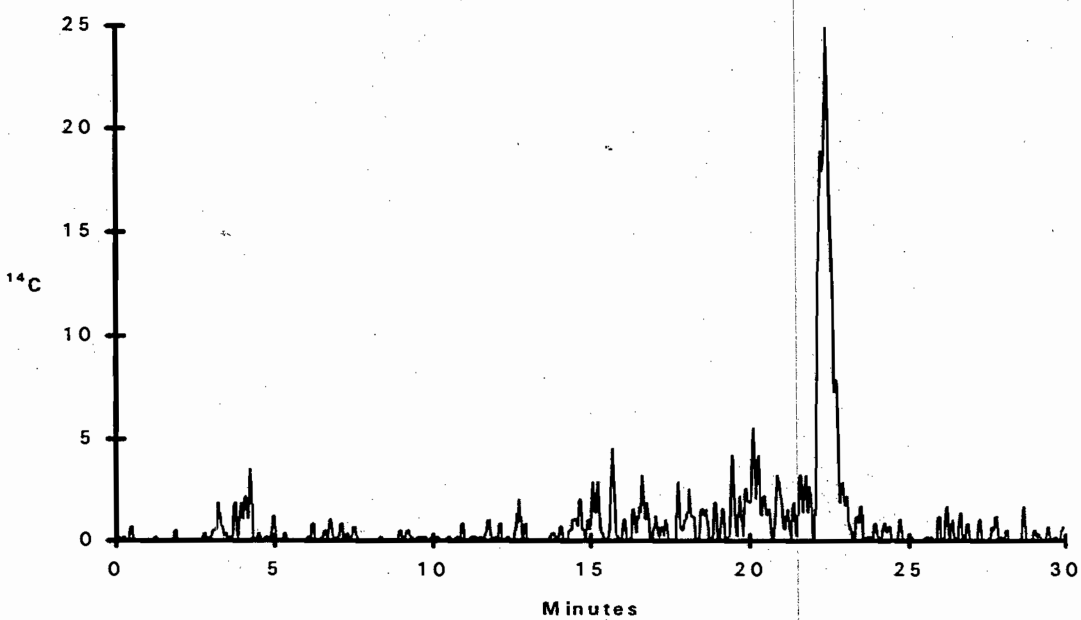


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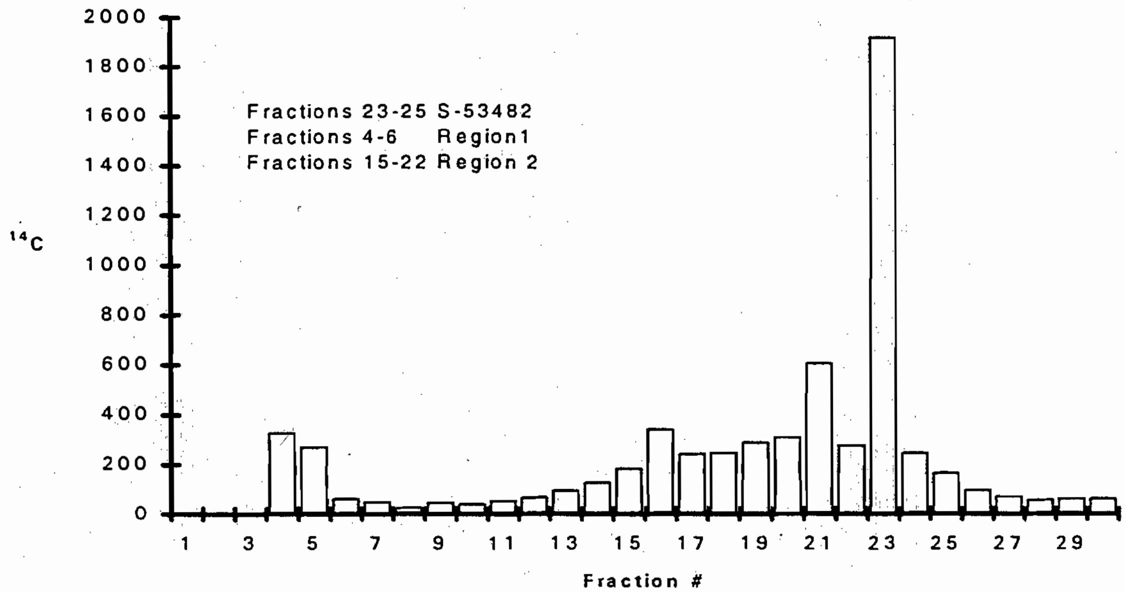
FIGURE 25

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-27-169-1 (DAY 111)

Collection of fractions



Radiochemical Flow Detector

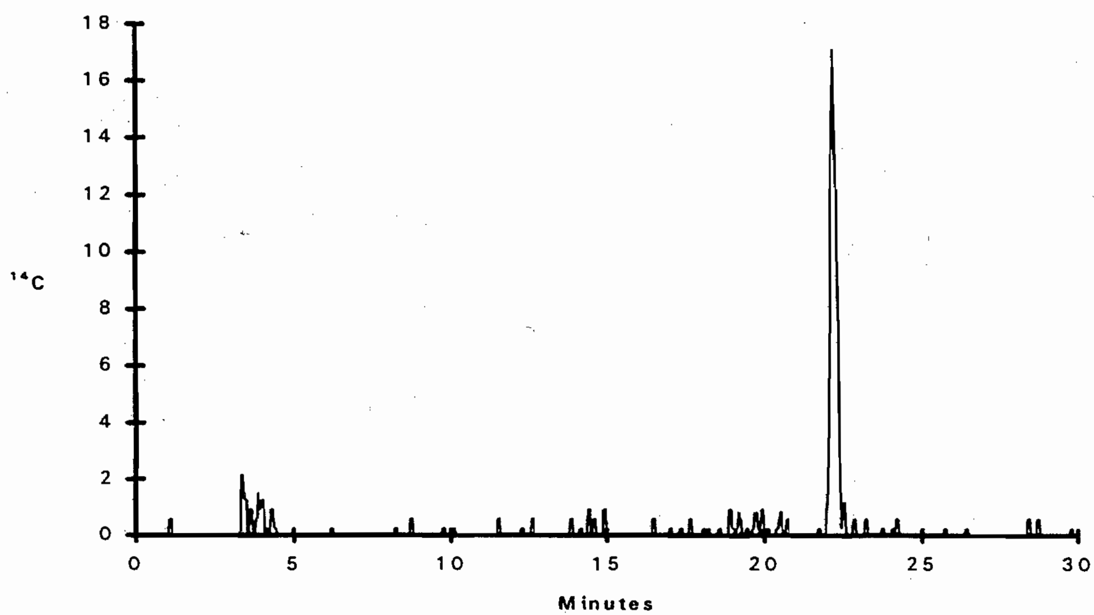


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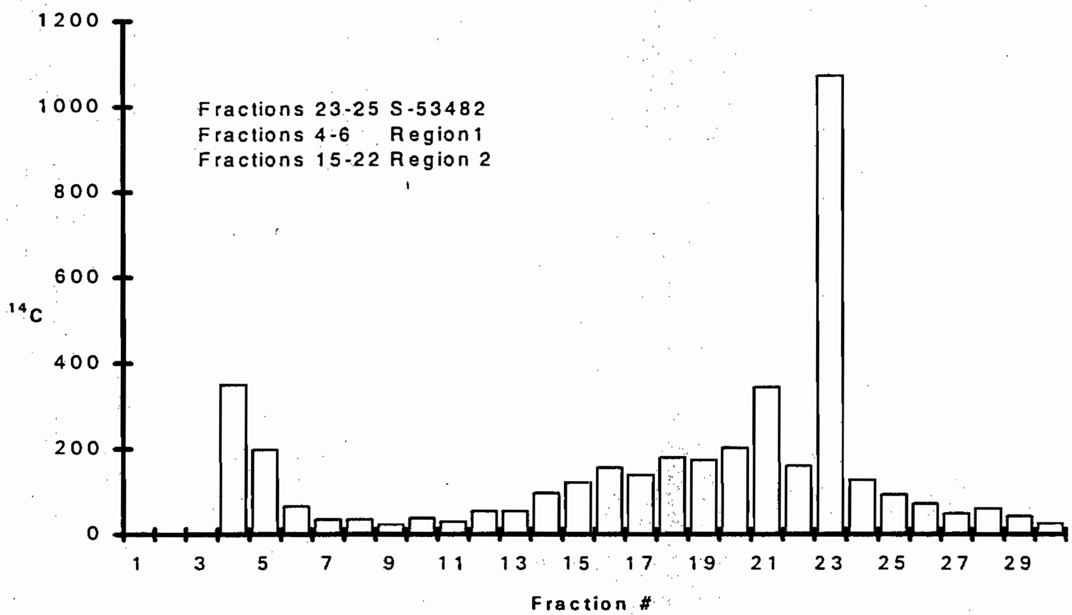
FIGURE 26

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-28-177-1 (DAY 111)

Collection of fractions



Radiochemical Flow Detector

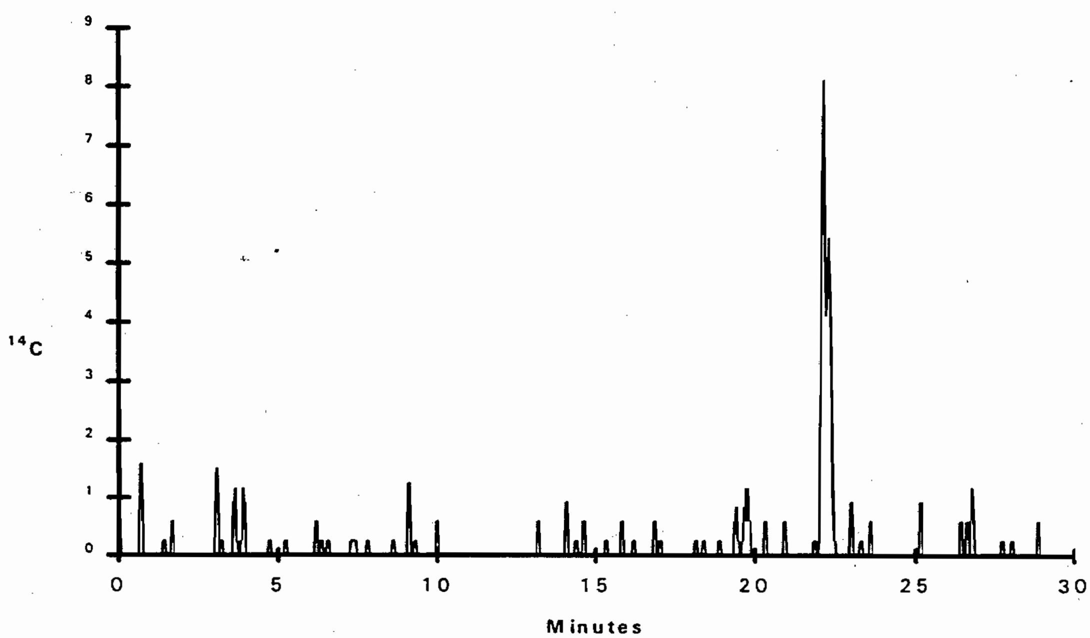


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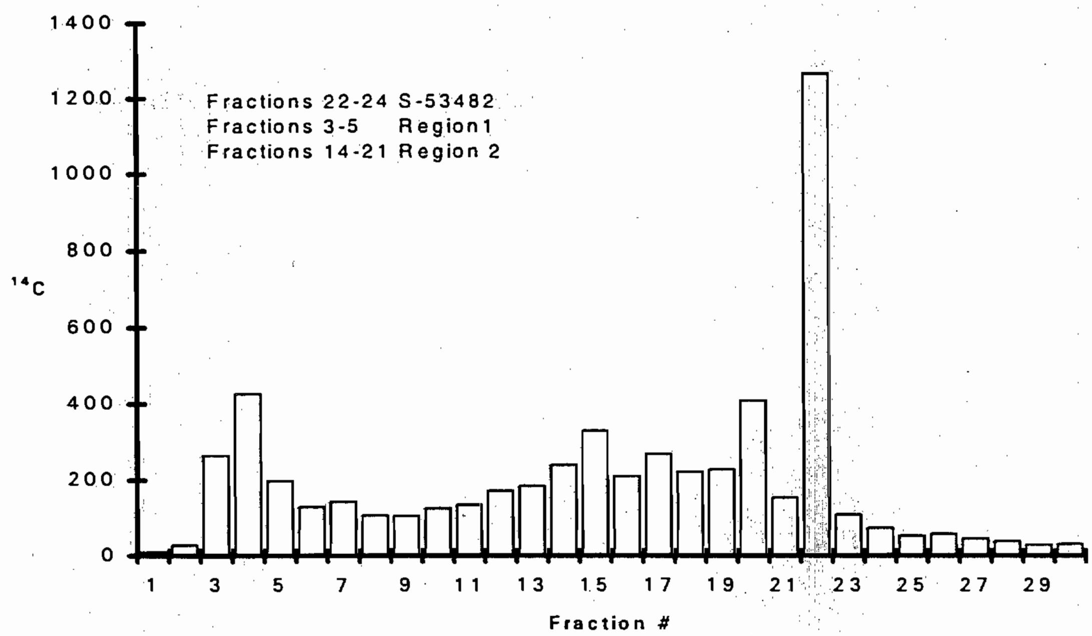
FIGURE 27

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-23-201-1 (DAY 177)

Collection of fractions



Radiochemical Flow Detector

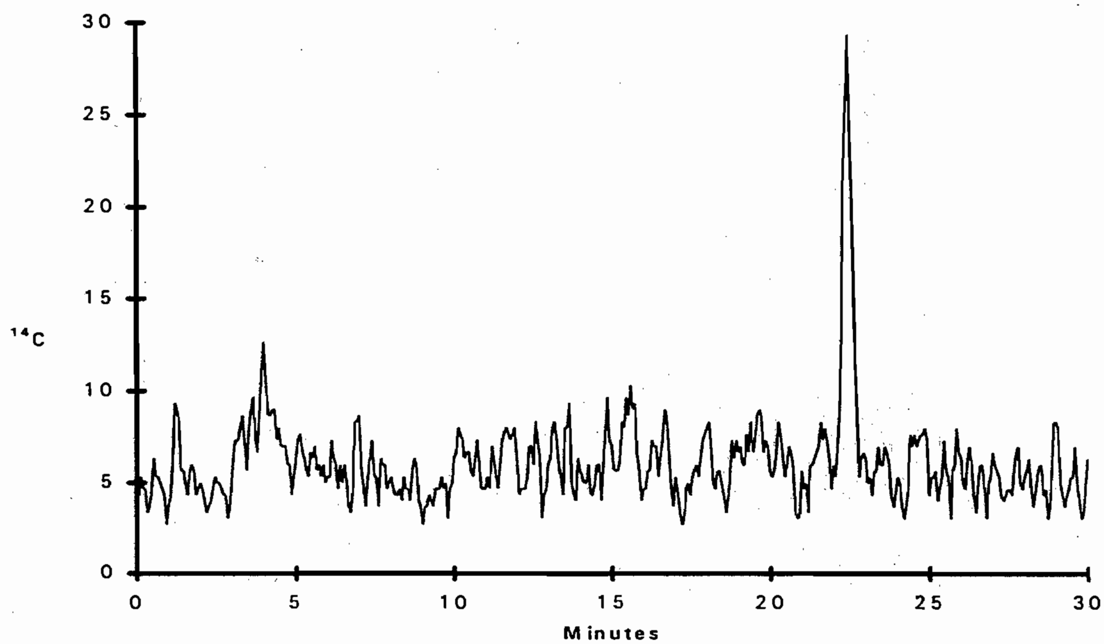


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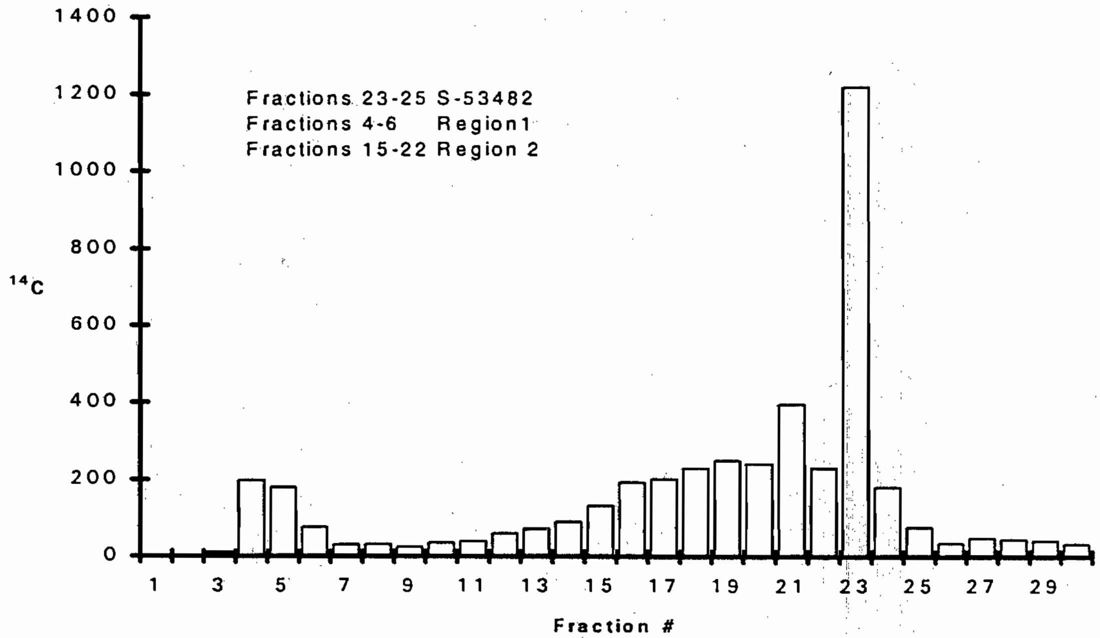
FIGURE 28

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF SAMPLE 767-5-185-1 (DAY 177)

Collection of fractions



Radiochemical Flow Detector

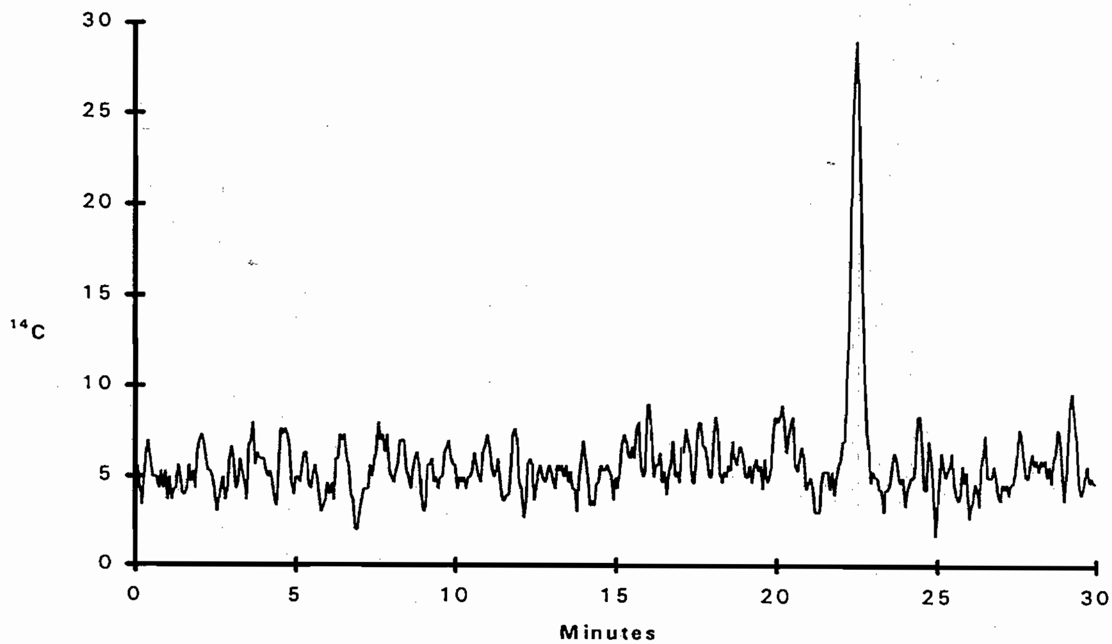


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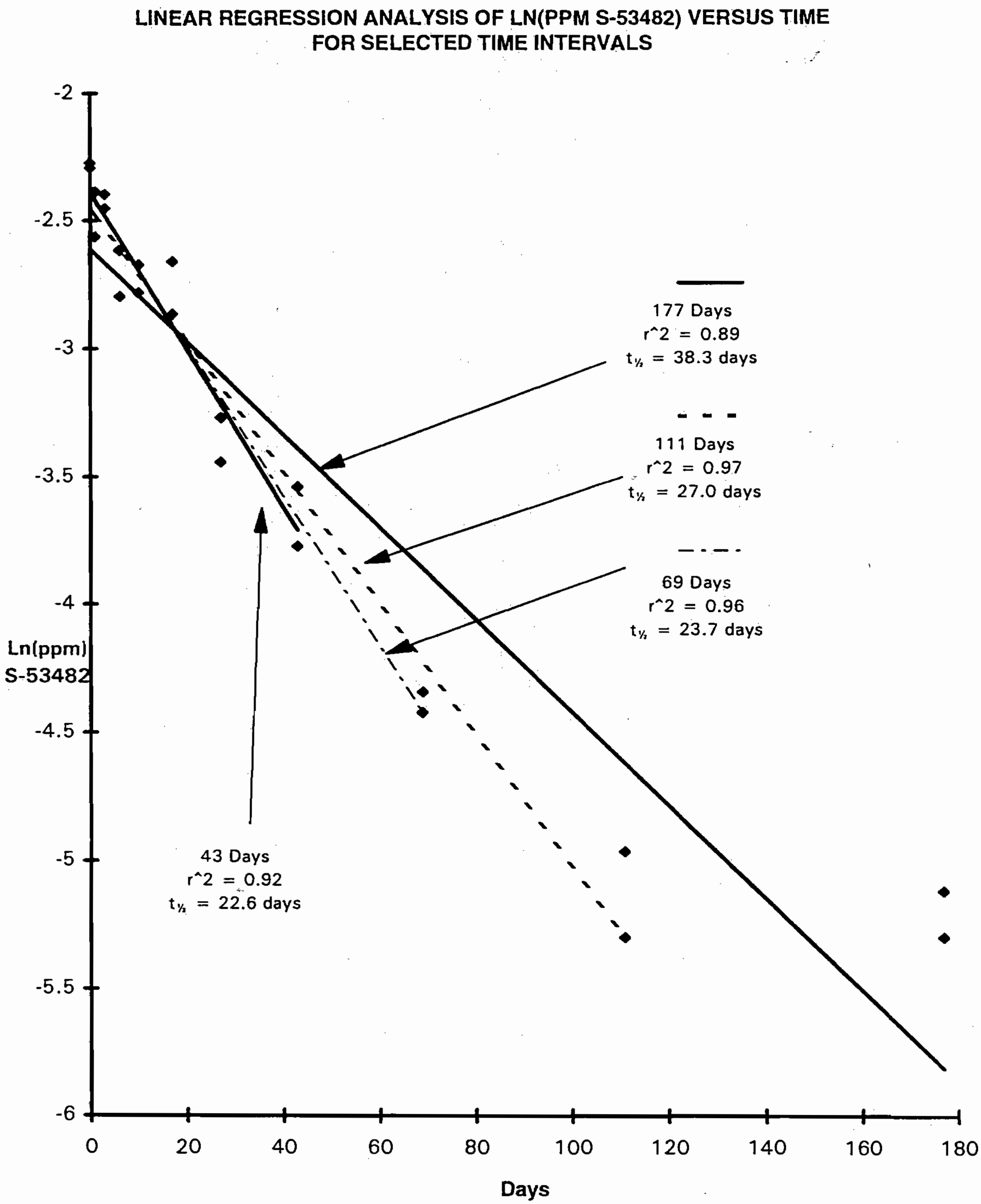
FIGURE 29



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