Investigation of an Animal Mutilation Report in Cache County, Utah

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Background and Investigation

NIDS was contacted on October 31, 2001 by a rancher to report the possible mutilation of a nine-month old Red Angus cross steer. The animal had been found dead the previous evening at feeding time. NIDS alerted the NIDS Utah investigator who in turn alerted the Cache County deputy sheriff who investigated the mutilation and provided NIDS with his report. At the same time, NIDS also contracted a local veterinarian to conduct a necropsy on the animal. The necropsy was successful and samples of vitreous fluid from the animal's eye, liver and a vial of blood were collected by the veterinarian at NIDS' request. The samples were shipped overnight to NIDS.

The following is quoted directly from a deputy sheriff's report of the investigation of a reported calf mutilation in Cache County Utah on October 31 2001. The quote is italicized. In accordance with NIDS policy, all names of law enforcement personnel, ranchers and veterinarians have been redacted.

1. *Summary of the Incident: I received a phone call from an individual in Randlett by the name of —. I have dealt with — in the past on several different cattle mutilations. He was notified today by the rancher that one of his calves in Young ward had been killed and possibly mutilated.*

2. *Premises location and description: Young Ward at about 2200S 4000W*

3. *Other information: I returned the phone call to —. He told me that the rancher had problems with a possible cattle mutilation that occurred out in his property at Young Ward. He asked if I would go and take a look at it, or if another deputy had already investigated what had happened. I checked with dispatch to see if they had record of this incident. They didn't. I contacted the rancher, who met me at Trailside. I drove out with him to Young Ward where the suspicious incident had occurred. Deputy — responded with me and brought a camera. We drove out to the rancher's property and walked into his calf pasture where he had approximately 20-25 head of black calves ranging from 400–600 pounds.*

   There he showed me where he had dragged out a brown calf of about the same weight. It appeared to have been killed in the last 48 hours. He showed me on the calf where the scrotum had apparently been cut. There were sharp edges where someone had cut the scrotum off with a knife. There was no other mutilation that had occurred on the animal. This calf belonged to the rancher and his brother.

Pictures were taken and the local veterinarian, Dr. —, responded (contacted and contracted by NIDS) to assist with the examination of the calf. In the pasture itself was about 25 head of black cows. This deceased calf was the only brown one. There was no visible tire tracks or footprints around the animal. The animal was pointing directly south down a little embankment. It appeared that there could have been a bullet wound to the head of the animal and the mutilation had occurred around the scrotum. There was an incision to completely remove the scrotum area.

I will be doing a supplemental narrative on this if needed. I gave the rancher my card with the case number on it in case any possible leads or suspects are found. As of right now there are no leads to follow.

10/31/01
The veterinarian that responded to the cattle mutilation left me a message to return his call. When I called him, he told me this was pretty unusual. He told me that a calf had the scrotum sack surgically removed in a circular pattern and not only did the scrotum get removed, but the penis in the animal had been removed as well. He could not understand why this had occurred without a loss of blood and was concerned of no struggle marks or blood internally coming out of either the anus area or the nostril area. He also found a small penetrating wound about the size of a pencil head. He did not feel like it was a bullet hole and was concerned if the animal was shot, there would be blood coming from the nostril area, mouth or somewhere in that area which there lack of blood in the area.

He stated he was able to get some samples from the eyes as well as remove the head which is going to be examined by x-ray and would update me as soon as any information came back. I told him if I got any information from my contacts, I would be informing him as well.

END OF DEPUTY SHERIFF REPORT

The animal was photographed after it had been dragged from the place it was found. A careful examination of the crime scene indicated no signs of struggle, no tire tracks, no footprints.

Photo 1. The animal had been dead just over 36 hours when this photo was taken.

Photo 2. The animal's scrotum had been removed in what the veterinarian termed a circular pattern. The bowel is visible protruding from the opening. Surprisingly, the entire penis and urethra had been skillfully removed through the small opening shown. The incisions cut through abdominal muscle layers.

NIDS spoke with the veterinarian following the necropsy and after the x-ray analysis of the animal's head was complete. The veterinarian confirmed his remarks made earlier to the deputy sheriff concerning his mystification about the surgery. It is noteworthy that the veterinarian was impressed with the surgical skill in removing the penis and the urethra in a series of bloodless incisions. X-ray analysis showed an otherwise normal brain with no sign of a bullet or anything metallic. Therefore it was concluded that the animal had not been shot. The veterinarian's necropsy report is included below.

31 October 2001

Necropsy performed for southwest of Logan at approximately 2000 South and 3000 west near the Logan River. 5:00 P.M.

General Exam:

9 month old red angus cross steer. Found dead 30 October by owner at evening feeding time. Dead animal was in a secluded pasture with 30 other same age/size steers and heifers. However all other animals are black in color. Last time animal was observed alive was evening of October 29. Animal is in excellent flesh and body composition is normal. No signs of disease i.e.; nasal discharge, diarrhea, skin disease or trauma externally. Animal was laying with neck and head folded ventrally and posteriorly underneath the body. On close examination there were no external wounds, rope burns or marks, or any signs of struggle. The only abnormality was a 3-4" circular incision directly over the scrotal area. The incision was deep enough to penetrate all muscular layers and bowel was visible in the opening.

Necropsy:

A complete necropsy of all organ systems was performed. No abnormalities were observed except as follows.

1. Reproductive systems: The entire penis and urethra were removed. There was no visible external evidence of such. The excision was accomplished through the circular opening found over the scrotal area. There were no signs of hemorrhage and very little tissue damage.

2. Skull/Nervous System. There was clotted blood on a spot between the left ear and eye. Further exam revealed a penetrating wound. X-rays were negative and the gross examination of the skull and brain are enclosed.

Samples Included:

Frozen Vitreous Humor
Frozen Liver
Blood

Lab Analysis. The eye-fluid, liver and a sample of blood that were collected by the veterinarian were shipped to NIDS where they were immediately frozen. The samples were later shipped to Frontier Analysis, Chagrin Falls Ohio and their GCMS subcontractor, Richard L Wilson.

Procedure conducted by Frontier Analysis and by Richard L Wilson:

Samples

The following samples were submitted in plastic vials surrounded by cold packs. All samples were from the mutilated Utah animal and received 2/27/2002.

- Liver tissue
- Blood
- Vitreous fluid

The liver tissue and blood were extracted with HPLC grade methylene chloride. Solvent was added to the "as received" sample, and it was allowed to soak for 8 days in the refrigerator. The sample was subjected to ultrasonic agitation for approximately one hour a day. The solvent was not completely removed and reduced to 2 mls. Both GC/MS and infrared analyses were then performed on all the extracts to characterize their chemical nature. The vitreous fluid was examined "as received" by GC/MS using the same conditions reported in previous reports (see http://198.63.56.18/pdf/dupuyer_adden.pdf). The GC/MS results of the vitreous fluid were compared to vitreous fluid from a control animal. The control animal had been obtained from a slaughterhouse. It was exposed to environmental conditions expected for mutilated animal carcass. It was laid out for 4 days, and protected from predators and scavengers.

Detailed information regarding the instrumental data acquisition conditions can be found in the appendix.

Results

The results of the individual tests performed on the blood, liver tissue and vitreous fluid follow. All tables and figures referenced in this report can be found in an appendix.

Liver Tissue

GC/MS Analysis. Significant amounts of liver tissue were methylene chloride extractable. GC/MS analysis shows mostly natural products dominated by fatty acids and esters. No unexpected foreign materials are detected. The GC chromatogram of the extract is shown in Figure 1. The MS identifications presented in Table I.

Infrared Analysis. This analysis supports the GC/MS results. The spectrum shows a predominance of fatty acids and some ester (specifically suggested is a glycerol fatty acid ester derivative). Additionally, a minor amount of possibly a phosphorus or sulfonated component is indicated. Some of these materials were not detected by GC/MS because they would not pass through the GC column. The spectrum with pertinent peaks labeled is shown in Figure 2.

Blood

GC/MS Analysis. Only a small amount of material was extracted by methylene chloride from the blood. The GC/MS analysis of the extract detects components that appear to be natural. No oxindole or other unusual materials are detected. Figure 3 shows the GC chromatogram. Table II displays the MS identifications.

Infrared Analysis. An infrared spectrum of the methylene chloride extract shows the extract is primarily long chain fatty acid esters that are probably attached to glycerol. Much of this high molecular weight material will not pass through a GC column, and therefore would not be detected by GC/MS analysis. The spectrum is displayed in Figure 4.

Vitreous Fluid

GC/MS Analysis. Comparison of the analytical results of the vitreous fluids from the mutilated animal and the control heifer expectedly show mostly natural products and putrefaction products. Additionally, the data suggest small, but significant, differences in phenolic type materials. The mutilated cow vitreous fluid contains higher amounts as well as additional phenolic types. Phenol in the mutilated cow amounts to 80 ppm, which is significantly higher than the 15 ppm observed in the control fluid. The GC chromatogram is shown in Figure 5. The chromatogram of the control fluid can be found in figure 6. The MS identifications of the GC peaks of the vitreous fluids from both animals are presented in Table III.

Discussion

NIDS has begun to develop a subtraction procedure in which GCMS analysis of eye-fluid from a mutilated animal is compared molecule by molecule with the GCMS analysis from eye-fluid obtained from an animal that has been left to decompose for a few days and serves as an “unmutilated” control. Table III in the present report is a direct subtractive comparison of the GCMS analysis of the eye-fluid from the mutilated animal in Cache County in the left hand column versus GCMS analysis of the eye-fluid from the control animal in the right hand column. The molecules in the eye-fluid are presented in ascending order according to GCMS retention time. As can be seen from Table III, the GCMS analysis yielded an enormously complex chromatogram, comprising over sixty separate molecules. A careful comparison between the left and right hand areas of Table III shows what appears to be multiple phenolic compounds in the eye-fluid from the mutilated animal that were not in the eye-fluid from the control animal. The “mutilation specific” molecular entities include, but are not limited to: 3-Methoxy-2-methylphenol, 5-Methoxy-2,3-dimethylphenol, 4-(2-phenylethyl)-phenol, 2-Methoxy-4-methylphenol, 3,5-dimethoxyphenol. Whether this family of phenolic compounds, none of which were found in the control animal are breakdown products from narcotic substances (see for example Table IV), or simply metabolic decomposition products from the animal has not been determined. However, the range of multiple phenolic compounds is suggestive. It is therefore speculated that the excess phenolics could originate from decomposition products of drugs and/or controlled substances. Many of these substances have similar phenolic functionalities as part of their structures. The phenolic structures suggested by the MS analysis are singled out and shown along with a few drugs and controlled substances having structural similarities in Table IV. NIDS cannot however be definitive that these compounds are not normal decomposition breakdown products. Such a conclusion can only be derived from multiple additional analyses as well as a much more sophisticated view of the complexity of ruminant decomposition (ruminant decomposition being much more complex than human decomposition).

APPENDIX

Instrumental Data Acquisitions Conditions

Infrared. Both transmittance and reflectance infrared spectra were obtained from the samples using a Nicolet Avatar 360 spectrometer. Transmittance spectra were obtained from smears on KBr crystals. Reflectance spectra were acquired using the Harrick SplitPea® sampling accessory.

GC/MS. A Hewlett-Packard GC/MS (DOS-MSD/ChemStation) employing a 6890 gas chromatography, 5973 Mass selective detector and capillary injection system was used for analysis. Chromatographic separation was accomplished by using a 60m x 0.32mm i.d., 1.0 mm film thickness DB-1 capillary column from J&W Scientific (sn 0433924; Cat # 123-1063). The following GC/MS conditions were used:

Instrument:	GC/MS-4
Injector Temp:	Inj. 300°C
GC Oven Program:	50°C (0.0 min.) to 290°C @ 10.0°C/min. (36.0 min.)
Injection Volume:	1.0 µl, splitless
Run Time:	60.6 min.
MS Run Type:	Scan
Mass Range:	25-600 Da; Scan threshold: 100
Scan Start Time:	0 min.
Sampling:	No.=5
Multiplier Volt.:	Emv offset=200; resulting volt.=1490
Method File:	RWSVM.M
Tune File:	ATUNE.U

Table I
GC/MS Data from Methylene Chloride Extraction of Liver Tissue from a Mutilated Cow

Compound	Match	GC Retention Time (min.)
•Propanoic acid, ethyl ester	94	5.794
•C5 Amine (1-Butanamine, 3-methyl-)	72	5.993
•Butanoic acid	87	6.690
•Butanoic acid, ethyl ester (<20 ppm)	96	7.237
•Butanoic acid, propyl ester	74	8.930
•Benzeneethanamine (<80 ppm)	72	12.714
•M/Z 56 Nitrogen Compound (Aziridine, 1-(2-phenylethyl)-)	64	13.809
•Benzeneacetaldehyde, .alpha.-ethylidene-	96	15.153
•1H-Indole	95	15.402
•5-Methyl-2-phenyl-2-hexenal	94	18.240
•MW= 195 (9H-Carbazole, 9-ethyl-)	35	19.186
•C13-C15 Fatty Acid (Pentadecanoic acid)	90	21.277
•~C16 Fatty Acid (Hexadecanoic acid)	99	23.417
•~C18 Fatty Acid (9-Octadecenoic acid (Z)-)	80	25.259
•~C18 Fatty Acid (Octadecanoic acid)	99	25.508
•M/Z 85 Nitrogen Compound Decanamide, H-(2-hydroxyethyl)-	72	27.848
•Cholesterol	99	53.736

Table II
GC/MS Data from Methylene Chloride Extraction* of Blood from a Mutilated Cow

Compound	Match	GC Retention Time (min.)
•Butanoic acid, ethyl ester	80	7.234
•2-Piperidinone (<10 ppm)	86	13.358
•Indole (<2 ppm)	64	15.449
•M/Z 171, 152		22.120
(Hydrazinecarbothioamide, 2-cyclohexylidene-)	38	
•Cholesterol	70	53.684

*Very small amounts of components were extracted from blood.

TABLE III
GC/MS Data from the Vitreous Fluid of the Mutilated Cow and the Control Heifer

Mutilated Utah Cow			Control Heifer		
Compound	**Match**	**GC Retention Time (min.)**	**Compound**	**Match**	**GC Retention Time (min.)**
•Acetaldehyde	39	3.231	•Acetaldehyde	39	3.191
•Methanamine, N,N-dimethyl- (Trimethylamine)	59	3.480	•Methanamine, N,N-dimethyl- (Trimethylamine)	72	3.480
•M/Z 44, 28 Amine		3.829	-	-	-
2-Butanamine, 3-methyl-	42				
•M/Z 43 Urea Derivative		4.077	-	-	-
Urea	9				
•Acetic Acid (~ 53 ppm)	72	4.725	-	-	-
•Propanoic Acid	23	5.820	-	-	-
•M/Z 56 Possible C6 Nitrile or Protein Fragment		7.861	-	-	-
Pentanenitrile, 4-methyl-	37				
•Methane, sulfonylbis- (Dimethyl Sulfone)	78	8.757	-	-	-
-	-	-	•MW=97 C4H3NO3		10.039
			1H-Pyrrole-2.5-dione (Maleimide)	78	
•2(5H)-Furanone, 3-methyl-	81	10.151	-	-	-
•Phenol (~80 ppm)	90	10.350	•Phenol (~15 ppm)	64	10.369
•Urea	72	10.699	-	-	-
•MW=94		10.998	-	-	-
2-Pyridinamine or Derivative	9				
Pyrimidine, 2-methyl-	9				
•2,5-Pyrrolidinedione (Succinimide) (~80 ppm)	83	12.093	•MW=99 C4H4NO2		12.143
			Succinimide (~21 ppm)	80	
•Pentanamide	10	12.392	-	-	-
-	-	-	•M/Z 44, 98 Nitrogen Compound		12.597
-	-	-	•M/Z 112, 56 (MW=112)		13.793
			1,4-Cyclohexanedione	38	
•W=98 Ketone		14.134	-	-	-
2(5H)-Furanone, 5-methyl-	59				
•Benzenepropanenitrile	87	14.532	-	-	-
-	-	-	•M/Z 70		14.742
			L-Proline	35	
•MW=98		14.931			
1,3-Cyclopentanedione	78				
•MW=114		15.130			
Methylthiofuran	37				

TABLE III (Continued)
GC/MS Data from the Vitreous Fluid of the Mutilated Cow and the Control Heifer

Mutilated Utah Cow			Control Heifer		
Compound	Match	GC Retention Time (min.)	Compound	Match	GC Retention Time (min.)
-	-	-	•MW=114 Parabanic acid	 47	15.154
•1H-Indole (~375 ppm)	97	15.528	•1H-Indole	94	15.608
-	-	-	•M/Z 98 Mepivacaine	 43	15.732
•MW=112 1,4-Cyclohexanedione	 43	15.976			
			•MW=138		16.474
•MW=138 Aromatic Compound 3-Methoxy-2-methylphenol 2,5-diamino-p-benzoquinone Benzene, 1-methyl-2-(methylthio)-	 12 25 12	16.623	-	-	-
•MW=152 Benzaldehyde, 2-hydroxy-5-methoxy-	 43	16.673			
-	-	-	•MW=152 4(3H)-Pyrimidinone, 2-ethyl-3,6-dimethyl- 2-Methyl-3-(2-thienyl)-2-propenal	 38 64	16.763
•MW=131 1H-Indole, 3-methyl-	 90	16.922	-	-	-
•MW=100 2,4-Imidazolidinedione (Hydantoin)	 45	17.022	-	-	-
-	-	-	•M/Z 100 4-Morpholinebutyric acid, .beta.-methyl.alpha.,. alpha.-diphenyl 4,9-Decadien-2-amine, N-butyl-	 42 42	17.052
•M/Z 69, 56, 152 Very Poor Matches (Fragments suggest material with long chain olefinic hydrocarbons.)		17.420	-	-	-
-	-	-	•M/Z 98 Ketone 3-n-Butylcyclohexanone	 32	17.423
•MW=152 Aromatic Phenol, 5-methoxy-2,3-dimethyl-	 22	17.569	-	-	-
•Oxindole (~0.6 ppm)	*	17.82	-	-	-
•MW=166 2-Methoxy-4-dimethylaminoaniline	 43	17.918	-	-	-

TABLE III (Continued)
GC/MS Data from the Vitreous Fluid of the Mutilated Cow and the Control Heifer

Mutilated Utah Cow			Control Heifer		
Compound	**Match**	**GC Retention Time (min.)**	**Compound**	**Match**	**GC Retention Time (min.)**
-	-	-	•MW=166		17.959
			Phenol, 3-methoxy-2,4,6-trimethyl-	30	
•MW=166		18.216	-	-	-
2,6-Dimethyl-4-oxa-endo-tricyclo(5.2.1.0**2,6)decane	64				
•2,4-Imidazolidinedione (Hydantoin)	47	18.366			
•MW=166		18.465			
2-Cyclopenten-1-one, 2-(2-butenyl)-4-hydro-	27				
-	-	-	•M/Z 100, 166		18.496
			Hexahydropyrimidin-2-one	40	
•MW=107 Phenol or Pyridine Derivative		18.764	-	-	-
Phenol, 4-(2-phenylethyl)-	53				
Pyridine, 2,5-dimethyl-	53				
•M/Z 138 Aromatic Compound		18.963	-	-	-
2-Methoxy-4-methylphenol	38				
2-Methoxy-1,4-benzenediamine	43				
2,5-Diamino-p-benzoquinone	43				
-	-	-	•M/Z 138, 180		19.032
			Acetamide, N-(2-nitrophenyl)-	38	
			3-Methoxy-2-methylphenol	38	
•L-Glutamic Acid	64	19.361	•M/Z 84 Glutamic Acid or Derivative		19.321
			L-Glutamic Acid	72	
•M/Z 138		20.258	-	-	-
4,5,6-Trimethyl-2-pyrimidone	52				
1,3,7,7-Tetramethyl-2-oxa-bicyclo(4.4.0)dec-5-ene	9				
•M/Z 138		20.506	-	-	-
-	-	-	•M/Z 138, 70		20.558
			Bicyclo [2.2.1]heptane-2-one, 3,3-dimethyl-	53	
			Endo-6-methylbicyclo[2.2.2]octan-2-one	47	
•M/Z 70 Hydrocarbon		20.755			
Nonane, 3-methylene-	43				
Octane, 3-methyl-6-methylene-	43				
•M/Z 41, 114, 70 Nitrogen Compound		20.905			
1H-Imidazole, 4,5-dihydro-2,4-dimethyl-	27				

TABLE III (Continued)
GC/MS Data from the Vitreous Fluid of the Mutilated Cow and the Control Heifer

Mutilated Utah Cow			Control Heifer		
Compound	**Match**	**GC Retention Time (min.)**	**Compound**	**Match**	**GC Retention Time (min.)**
-	-	-	•MW=154 6,8-Diazabicyclo[3.2.2]nonane-7,9-dione 2,4(1H,3H)-Pyrimidinedione, 1,3,5-trimethyl-	 35 14	20.971
			•M/Z 116, 61 Hexanoic, 2-methylpropyl ester	 12	21.177
•M/Z 116, 61, 99 Glutaminic Acid Derivative Glutaminic acid dimethyl ester	 35	21.254	-	-	-
•M/Z 152 Benzaldehyde Derivative Benzaldehyde, 2-hydroxy-5-methoxy-	 64	21.303	-	-	-
•MW=154 Benzene, 2-chloro-1,3,5-trimehyl-	 64	21.900	-	-	-
•M/Z 154 Possible Phenol Derivative Phenol, 3,5-dimethoxy-, acetate	 53	22.149	-	-	-
•M/Z 130 Indole Derivative (~15 ppm) Tryptophane 1H-Indole-3-acetic acid, ethyl ester	 80 80	22.697	-	-	-
•MW=154 Phenol, 3,5-dimethoxy- 1,2-Cyclopentanedione, 3,3,5,5-tetramethyl-	 25 36	23.095	-	-	-
-	-	-	•MW=154 2,4(1H,3H)-Pyrimidinedione, 1,3,6-trimethyl-	 38	23.157
•MW=154 1,2-Cyclopentanedione, 3,3,5,5-tetramethyl-	 42	23.245			
-	-	-	•MW=154 2,4(1H,3H)-Pyrimidinedione, 1,3,5-trimethyl- Phenol, 3,4-dimethoxy-	 17 27	23.322
•M/Z 186, 117 Indole Derivative Most Probable 4-Fluroro-2', methyldiphenyl 1H-Indole	 83 43	24.141	-	-	-
-	-	-	•M/Z 186, 117 Indole Derivative Probable 1H-Indole 4-fluoro-2', methylbiphenyl	 50 83	24.188
•M/Z 91 Aromatic Benzene, 1,1'-[thiobis(methylene)]bis- Benzoic acid, 2-hydroxy-, phenylmethyl ester, ion(1-)	 38 14	24.340	-	-	-

TABLE III (Continued)
GC/MS Data from the Vitreous Fluid of the Mutilated Cow and the Control Heifer

Mutilated Utah Cow			Control Heifer		
Compound	**Match**	**GC Retention Time (min.)**	**Compound**	**Match**	**GC Retention Time (min.)**
•M/Z 91 Aromatic 1-(p-Tolyl)-3-methyl-pyrazol-5-one	 35	24.589	-	-	-
•M/Z 117, 200 Indole Derivative Most Probable 1H-Indole Benzenemethanol, 3-phenoxy-	 35 25	24.838	-	-	-
-	-	-	•M/Z 200, 117 Indole Derivative 1H-Indole	 43	24.890
•MW=228 3 (paramethoxyphenyl) 4,5,6,7 tetrahydro indazole	 43	25.087	-	-	-
•M/Z 91 .Delta.2-1,3,4-oxadiazolin-5-one, 4-phenyl-2-propyl-	 50	25.435			
-	-	-	•M/Z 91 Aromatic (Phenyl Group) Benzene, 1-nitro-4-(2-phenylethyl)- Benzaldehyde, 2-hydroxy-6-methyl-4-(phenol?)	 35 35	25.467
•M/Z 186 Phenol, 4-phenoxy- Imidazolo (4,5-B) quinoxaline	 46 43	26.033	-	-	-
•M/Z 70 Amine Isomenthylamine Menthylamine	 46 43	26.282	-	-	-
-	-	-	•M/Z 70 Tetramethyl-1,2-cyclopentanedione	 50	26.334
•M/Z 70 L-Alanine, N-methyl-N-(trifluroacetyl)-,butyl ester	 32	26.431	-	-	-
•M/Z 186 Aromatic Phenol, 3-phenoxy-	 36	27.377			
•M/Z 186 Aromatic Phenoxy Phenol, 4-phenoxy-	 53	27.675			
-	-	-	•M/Z 186 Phenoxy Group Phenol, 3-phenoxy-	 59	27.736
•MW=244 Phenylalanine Derivative Phenylalanine-proline diketopiperazine	 50	27.775			
-	-	-	•Phenylalanine Derivative Phenylalanine-proline diketopiperazine	 39	27.860

TABLE III (Continued)
GC/MS Data from the Vitreous Fluid of the Mutilated Cow and the Control Heifer

Mutilated Utah Cow			Control Heifer		
Compound	Match	GC Retention Time (min.)	Compound	Match	GC Retention Time (min.)
•MW=244 Phenylalanine Derivative Phenylalanine-proline diketopiperazine	38	28.372	-	-	-
•M/Z 226 2-Cinnamylidene-6-methylcyclohexanone	22	29.020	-	-	-
•M/Z 97 Possible Amide 1H-Pyrazole-1-carboxamide, 4,5-dihydro-3,5,5-trimethyl-	40	29.269	-	-	-

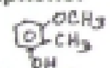
*Oxindole was detected in ion chromatogram scans of ions 104 and 133 between GC retention times of 16.00 – 18.40 minutes.

Table IV

Phenolic Material Suggested by GC/MS Analysis of the Mutilated Animal's Vitreous Fluid and Some Drugs/Controlled Substances Containing Phenolic/Phenoxy Functionalities

Suggested Phenolics in Vitreous Fluid

- **Phenol**

- **3-Methoxy-2-methylphenol**

- **2-Hydroxy-5-methoxybenzaldehyde**

- **5-Methoxy-2,3-dimethylphenol**

- **4-(2-Phenylethyl)-phenol**

- **2-Methoxy-4-methylphenol**

- **3,5-Dimethoxyphenol**

- **4-Phenoxyphenol**

- **3-Phenoxyphenol**

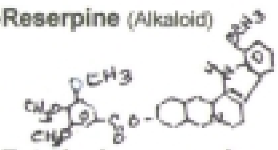

Drugs/Controlled Substances with Phenolic/Phenoxy Functional Groups

- **N-Acetylmescaline** (Controlled Substance)

- **Mescaline** (Controlled Substance)

- **Cannabidiol** (Controlled Substance)

- **3,4-Dihydroxynorephedrine** (Alkaloid)

- **Reserpine** (Alkaloid)

- **Tetrahydropapaverine** (Alkaloid)

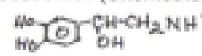
- **Tetrahydropapaveroline •HCl** (Alkaloid)

- **Epinephine** (Chemotheraputic Agent)

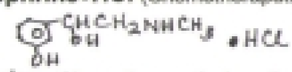
- **Gentisic Acid** (Chemotheraputic Agent)

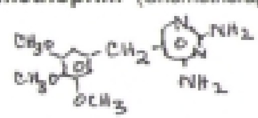
- **6-Hydroxydopa** (Chemotheraputic Agent)

- **6-Hydroxydopamine** (Chemotheraputic Agent)

- **Isoproterenol** (Chemotheraputic Agent)

- **Arterenol** (Chemotheraputic Agent)

- **Mephenesin** (Chemotheraputic Agent)

- **Phenylephrine•HCl** (Chemotheraputic Agent)

- **Synephrine** (Chemotheraputic Agent)

- **Trimethoprim** (Chemotheraputic Agent)


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Instrument : GC/MS #4
Sample Name: Lv Extract (Utah) 3/19/02
Misc Info : Semivol Organic Analysis 1ul Splitless EM+2
Vial Number: 7

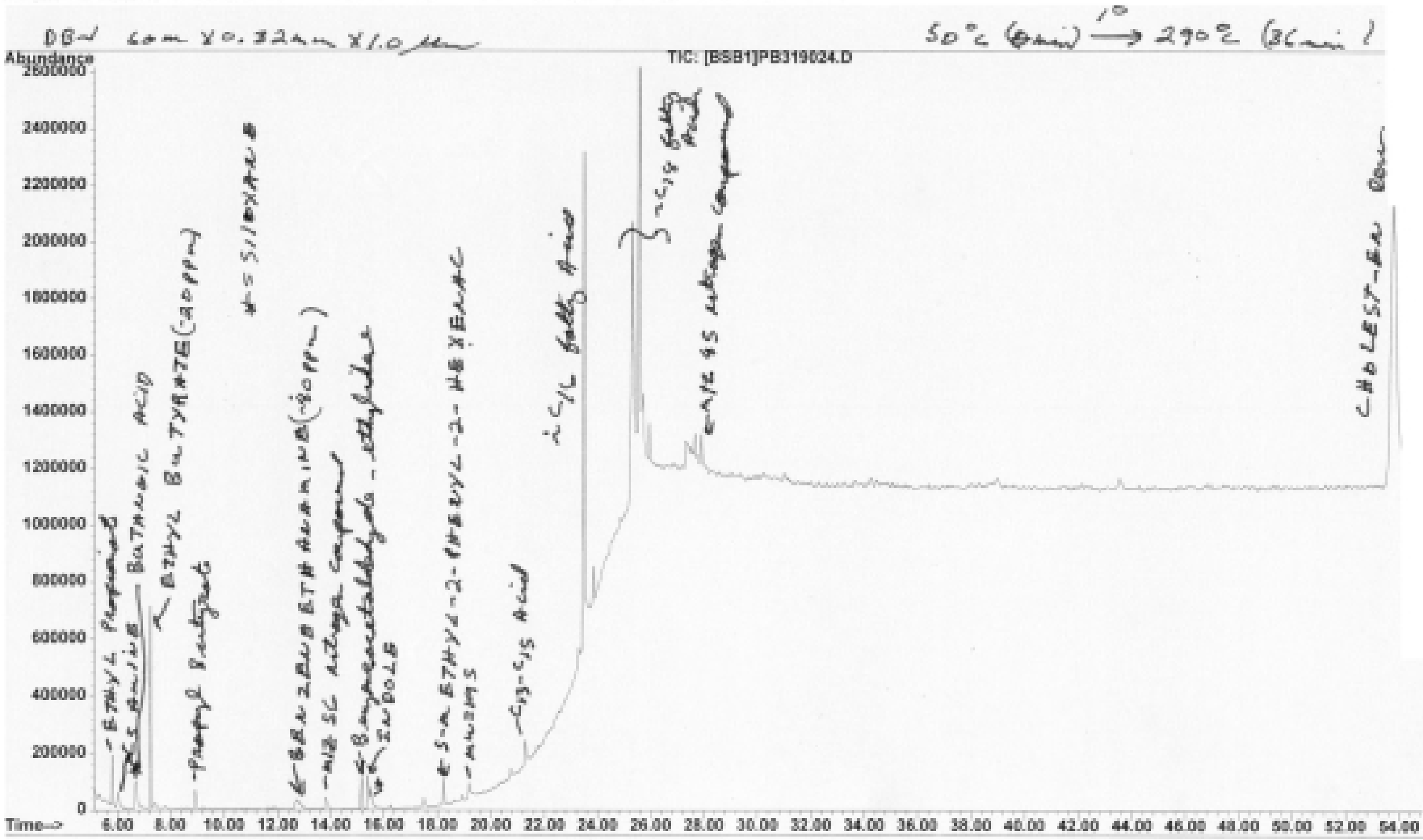

Figure 1. GC chromatogram of the methylene chloride extract from the liver of the mutilated cow.

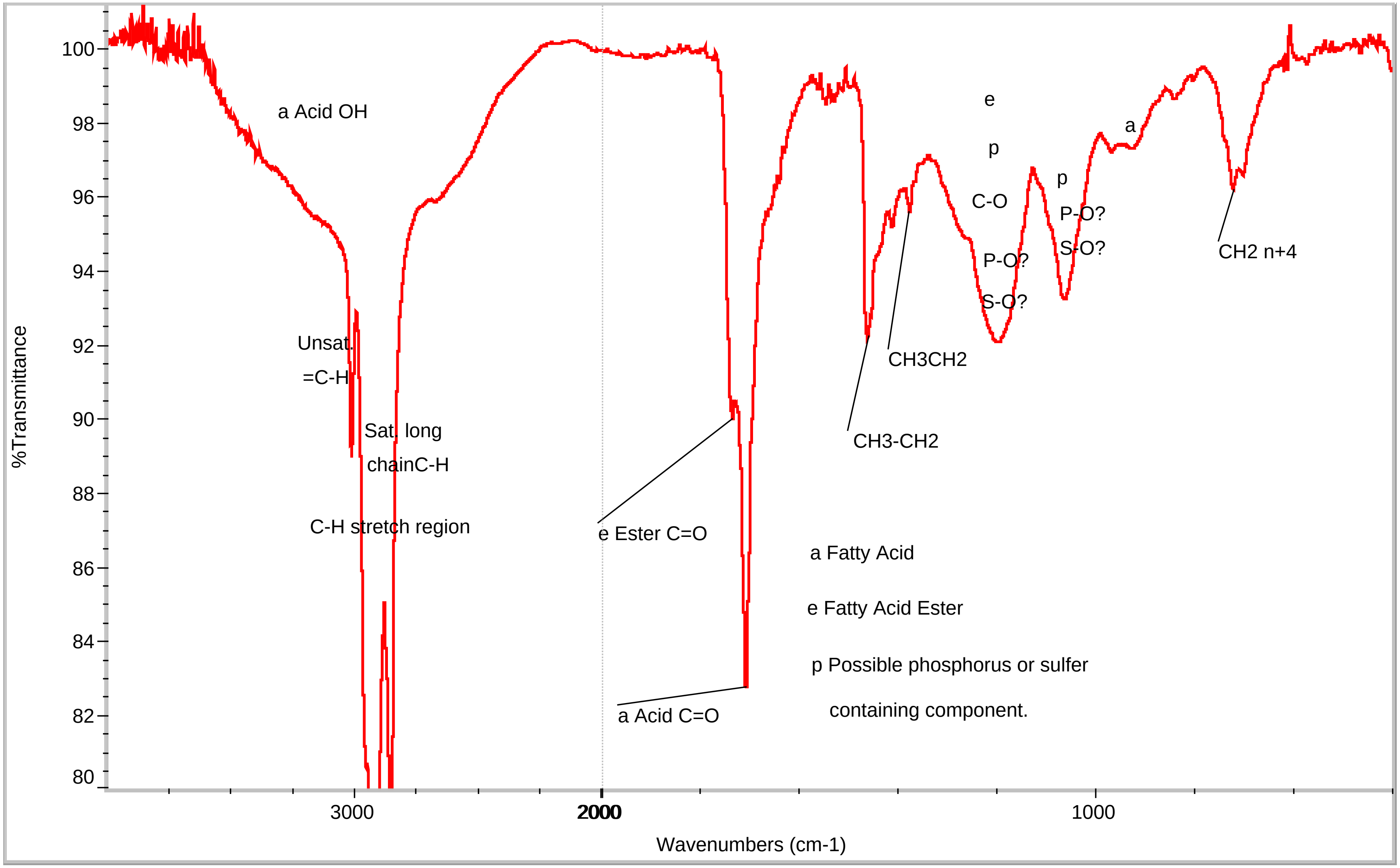

Figure 2. Infrared spectrum of the methylene chloride extract from the liver of the mutilated cow.

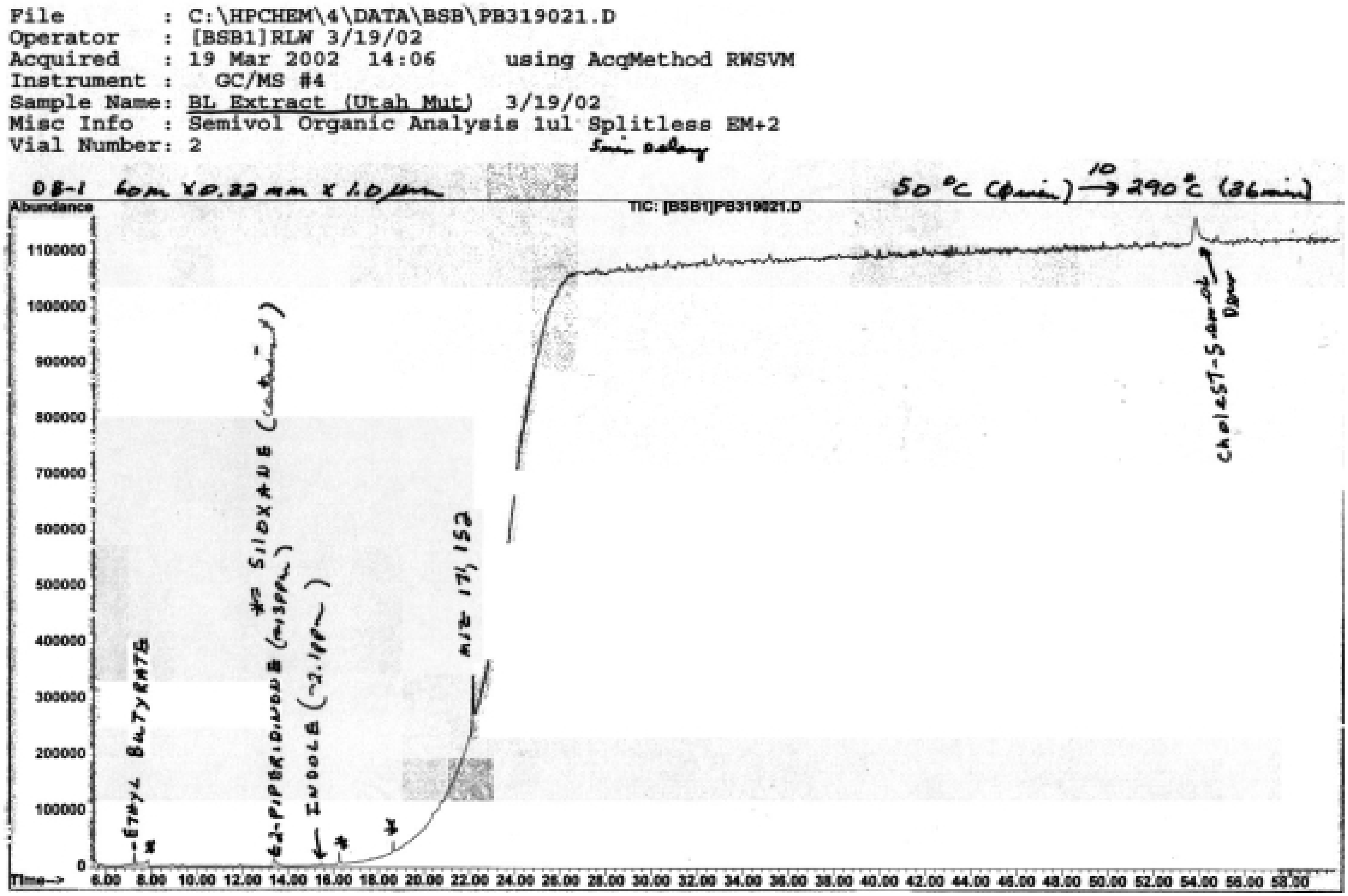

Figure 3. GC chromatogram of the methylene chloride extract from the blood of the mutilated cow.

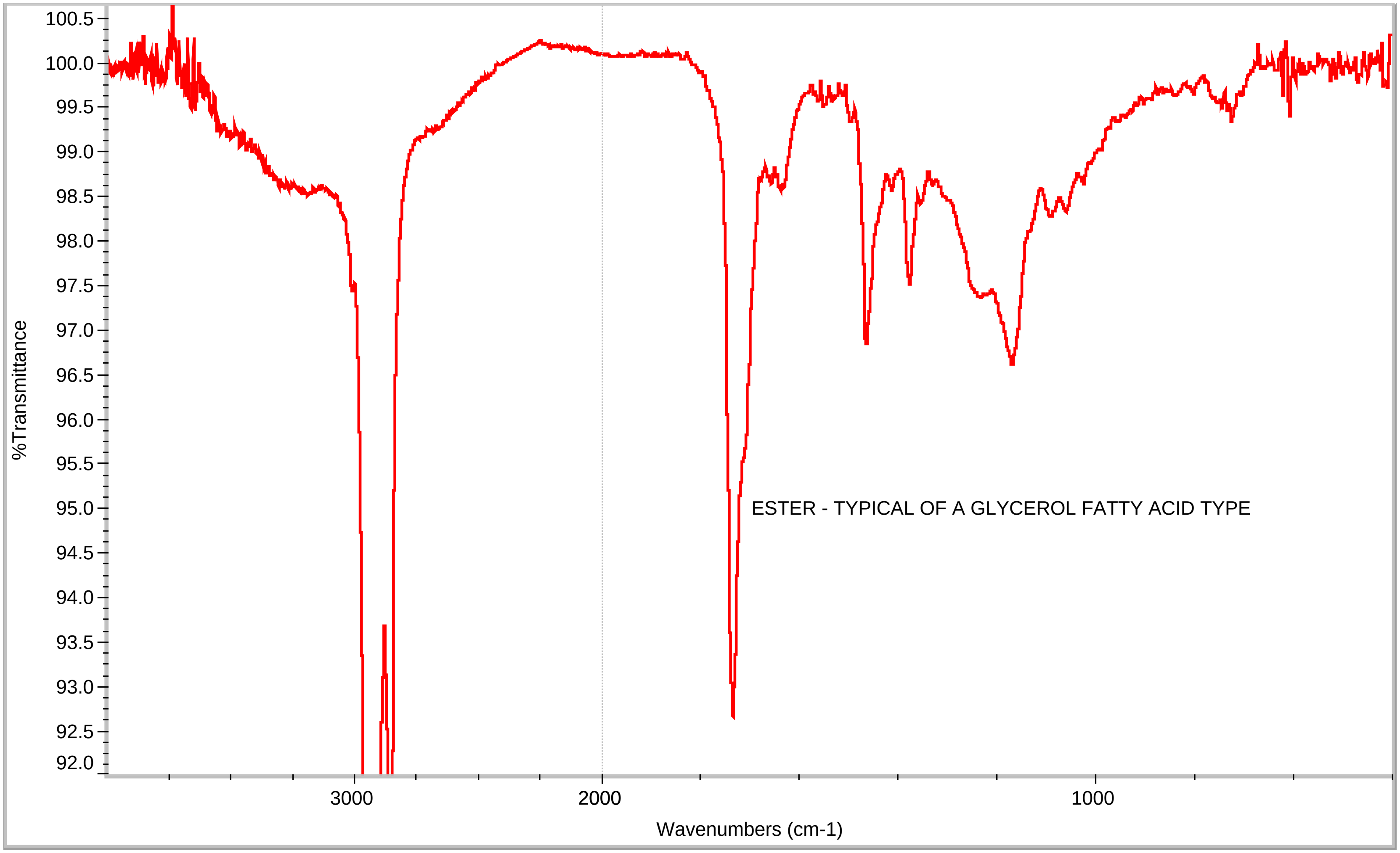

Figure 4. Infrared spectrum of the methylene chloride extract from the blood of the mutilated animal.

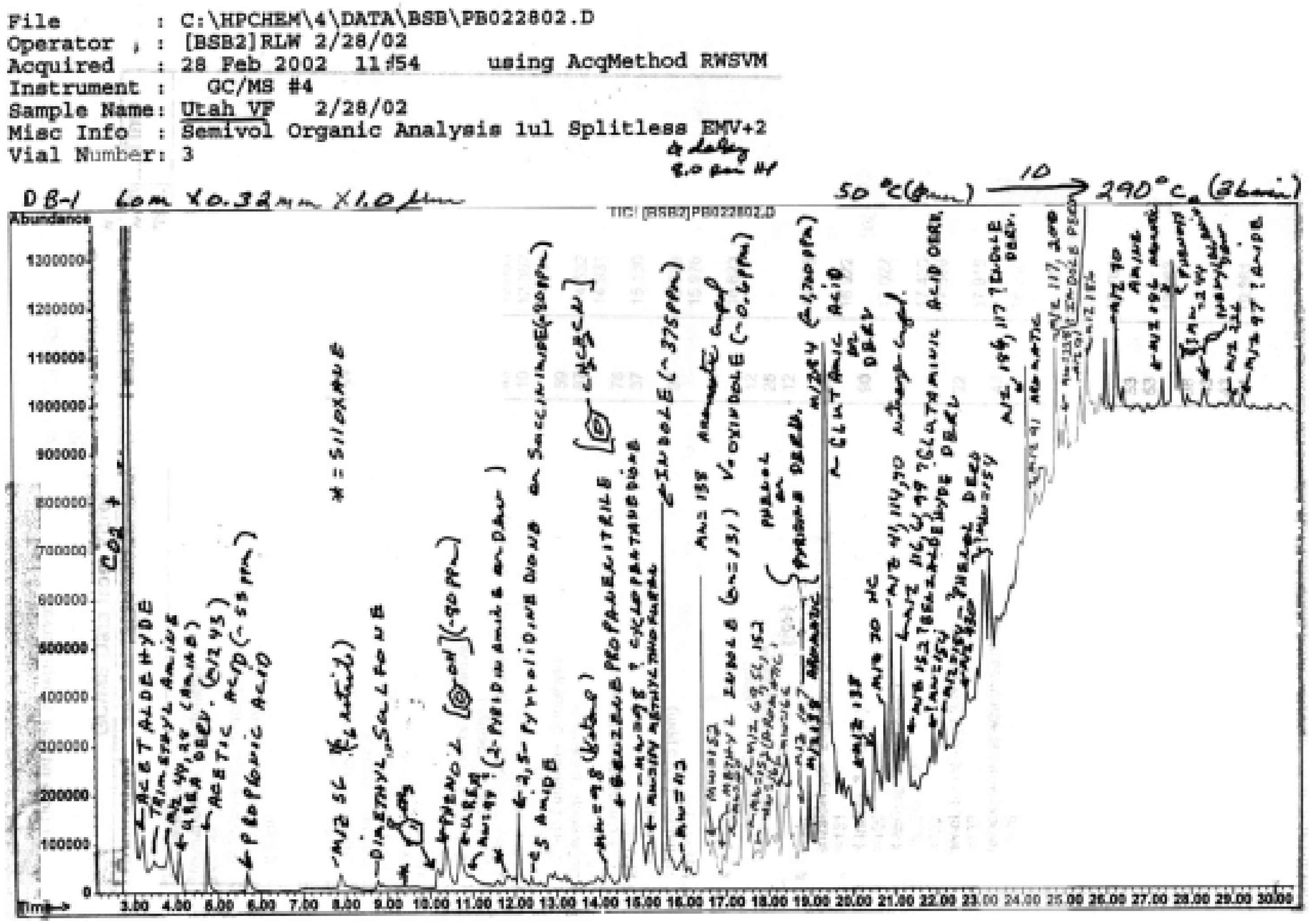

Figure 5. GC chromatogram of the vitreous fluid from the liver of the mutilated cow.

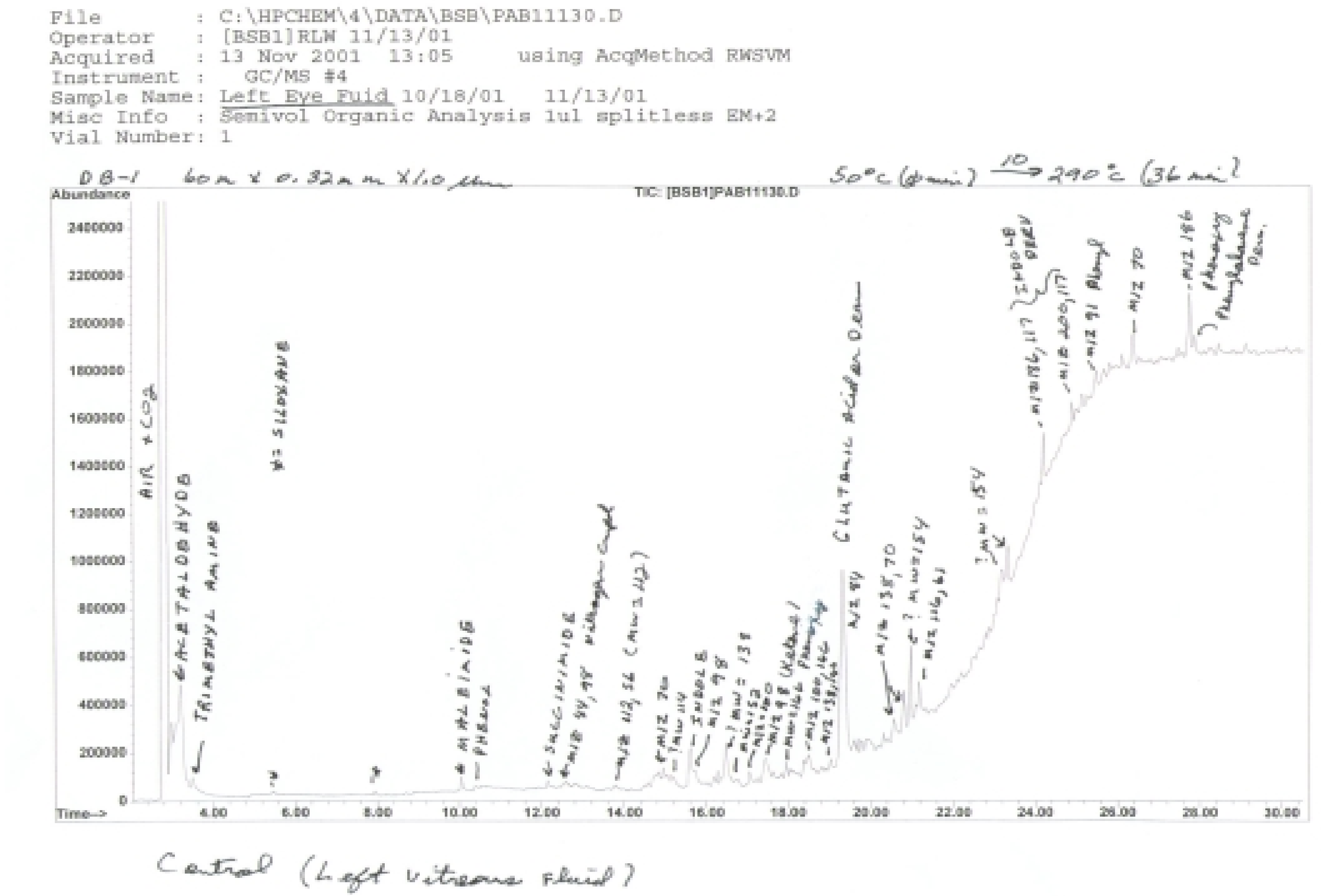

Figure 6. GC chromatogram of the vitreous fluid from the control heifer.