The original article may be viewed at http://www.dorway.com/jcohen.html

****

THE EFFECTS OF DIFFERENT STORAGE TEMPERATURES ON THE TASTE AND CHEMICAL COMPOSITION OF DIET COKE

BY JENNIFER COHEN

Jennifer Cohen is an eleven-year old student in Mrs. Simmons' sixth grade Oradell, New Jersey class. The principal of Oradell Public School is Scott Ryan. He may be reached at 201 261-1181. Jennifer conducted an experiment proving aspartame, the artificial sweetener in diet soda, breaks down into two deadly neurotoxins when stored at room temperature and under refrigeration.

ABSTRACT: The level of aspartame in a can of Diet Coke was found to be 0.06% by a food testing laboratory. The remaining cans from one case of Diet coke were stored under three different heat conditions for 10 weeks.

Seven cans were stored in an incubator (104 degrees Fahrenheit), seven cans were stored at room temperature (68-70 degrees Fahrenheit). At the end of 70 days samples were tested for levels of aspartame, formaldehyde and DKP (diketopiperazine). The refrigerated sample contained 0.058 percent aspartame, 0.001 percent DKP and 53.5 parts per billion of formaldehyde. The room temperature sample contained 0.051 percent aspartame, 0.002 percent DKP and 231 parts per billion of formaldehyde. The incubator sample contained 0.026 percent aspartame, 0.010 percent DKP and 76.2 parts per billion of formaldehyde. In addition 10 human subjects tasted each soda sample plus a new can of Diet Coke and rated each sample for taste on a 1-4 scale with 1 being the best and 4 being the worst. The new can of Diet Coke received an average rating of 2.0. The sample stored in the refrigerator received an average rating of 2.6. The sample stored at room temperature received an average rating of 2.! 5. The sample stored in the incubator received an average rating of 3.8. The effects of heat on Diet coke produced the worst taste and the highest amount of loss of aspartame as well as the greatest increase in levels of DKP. The most pleasing taste was for the new can of Diet Coke. The room temperature sample and the refrigerated sample scored almost the same in the taste test. All samples revealed a presence of formaldehyde. However, the highest level of formaldehyde occurred in the room temperature can. There was also formaldehyde present in the refrigerated sample.

BACKGROUND: Aspartame was discovered in l965 by Searle chemist, Jim Schlatter. He was developing this drug for another use and after accidentally licking his finger found that aspartame was sweet. Today aspartame is consumed by more than 100 million people in the United States. This chemical (aspartame) has been approved by the Food and Drug Administration (FDA) who said that an individual can safely consume 97 packets of aspartame every day. Aspartame is in many products including some that children use such as diet soda, light yogurt, Flintstone Vitamins, baked goods, puddings, and Winterfresh gum. It has been known to cause headaches, nausea, vision problems, seizures and cancer in its users.

The ingredients in aspartame are aspartic acid, phenylalanine, and

methyl alcohol. Methyl alcohol is a chemical that breaks down in high temperatures and turns into formaldehyde and DKP (diketopiperazine), two chemicals known to cause problems in the nervous system. Aspartame's life is 262 days at 77 degrees Fahrenheit, or 25 degrees Celsius. The FDA gets more complaints about aspartame than any other food or drink. The symptoms of aspartame are a lot like the symptoms of multiple sclerosis and Alzheimer's disease. Ever since aspartame was approved in l985, there has been an increase in brain tumors. There is no direct proof that aspartame caused the brain tumors, but there is enough reason to suspect that, and the television show, "60 Minutes" recently did a report linking the increase in brain cancer to aspartame use.

The FDA reviewed Searle's studies of this artificial sweetener in which rats were fed aspartame daily with their meals for one year. There were 12 brain tumors in the 320 rats that were fed aspartame and no brain tumors in the 120 rats that were not fed aspartame.

There was also a study done at the University of Wisconsin on rhesus monkeys. they were fed aspartame daily. After day 200 of a one year study the monkeys developed epileptic seizures. After the study ended, the aspartame was discontinued and the monkeys were fully watched for 60 days. The monkeys had no more seizures.

METHOD: I did my own experiment on aspartame. On January 21, l997, I bought a new case of Diet Coke from the supermarket. I put 7 cans in the refrigerator, 7 cans in my room at room temperature (about 69 degrees) and I put 7 cans in a BOEKEL incubator (80 Watts, 120 AC volts, 0.75 Amps, catalog # 131500) and set the temperature at 40 degrees Celsius which is 104 degrees Fahrenheit. I left them in there for 10 weeks (70 days). I had a thermometer next to each group of cans and I checked the temperatures daily. I took the remaining three cans and brought them to Winston Laboratories in Ridgefield, New jersey to test for a beginning level of aspartame. When I got the test results back, they revealed that there was normally 0.06 per cent of aspartame in the can of diet soda.

I chose that temperature because in l985 the National Soft Drink Association reported a similar experiment in which diet soda stored at that temperature turned into formaldehyde. In that experiment they explained that 104 degrees Fahrenheit was equal to a daytime temperature in Phoenix, Arizona over the summer. The National Soft Drink Association recommended that aspartame not be approved for use by people in soda. They published this experiment and their recommendation in the Congressional Record.

On April 1, I took the cans of aspartame out of the refrigerator, out of my room and out of the incubator. That day I brought the samples to Winston Laboratory for analysis.

I was going to do a taste in my sister's fourth grade class, but the school nurse said that I couldn't because of all the bad things people say about aspartame, so instead I tested the samples on a group of adults.

I performed a double blind experiment. My mother helped to label each sample with a number. I conducted the experiment but I did not know which sample each person was drinking. I put all of the cans in a cooler and covered them with ice sos that they would be served at the same temperature. I gave each person a small cup of the soda from the refrigerator, from the incubator, from my room, and from a new can of soda fresh from the supermarket. I asked them to rate the taste on a

scale of one to four, four being the worst and one being the best. The actual results are to be found in table#1.

Table 1

	ROOM TEMP. SAMPLE #517	COLD STORAGE SAMPLE #502	WARM STORAGE SAMPLE #540	NEW CAN SAMPLE #563
SUBJECT #1	4	4	4	3
SUBJECT #2	3	2	4	1
SUBJECT #3	2	3	3	2
SUBJECT #4	1	2	4	2
SUBJECT #5	2	2	4	1
SUBJECT #6	2	3	4	1
SUBJECT #7	2	3	3	4
SUBJECT #8	3	2	4	3
SUBJECT #9	3	2	4	1
SUBJECT #10	3	3	4	2
AVERAGE	2.5	2.6	3.8	2.0

Table #2 contains the results of the testing conducted on the samples analyzed by Winston Laboratories. In the sample that was in the refrigerator all that was left of the 0.06 per cent of the aspartame was 0.058 percent. That extra aspartame had turned into 0.001 percent DKP and 53.5 parts per billion of formaldehyde In the sample from my room, all that was left of the 0.06 percent aspartame was 0.051 per cent. The extra aspartame had turned into 0.002 percent DKP and 231 parts per billion of formaldehyde. In the sample that was in the incubator all that was left of the 0.06 percent aspartame was 0.026 percent. The extra aspartame had turned into 0.010 percent DkP and 76.2 parts per billion in the formaldehyde.

Table 2

	ASPARTAME %	DKP %	FORMALDEHYDE Parts per billion
BASELINE CAN	0.060%	**	
SAMPLE # 502 (refrigerated)	0.058%	0.001%	53.5
SAMPLE # 517 (room temperature)	0.051%	0.002%	231.0
SAMPLE #540 (incubator)	0.026%	0.010%	76.2
SAMPLE # 563 (new can)	* *	*	

* Sample #563 (new can of Diet Coke was not tested by the lab. It was used for the taste test only. The baseline can was not tested for formaldehyde or DKP because it was assumed that FDA would ban any new product containing poison. The total cost of testing was $1250. This may not be a lot of money to a drug company but it is to me. As it is, I will be baby-sitting for the summer of 1997 to pay for this study. -JC

DISCUSSION: There was an obvious preference for the newly purchased sample of Diet Coke. The scores for the sample in the refrigerator and room temperature were similar but were not as high as the new soda. The score for the incubator sample were very low. Nearly everybody hated the taste.

There are taste differences. Ten people preferred the new soda to the other three samples. With 1 being the best and 4 being the worst, their average score for the new soda was 2.0.

The aspartame contained in diet soda stored over time can break down into formaldehyde and DKP, two very dangerous poisons. Taste tests revealed a noticeable difference among tasters. The higher the heat of storage, the worse the taste.

Diet soda stored for ten weeks loses flavor. Aspartame in that soda breaks down into two products, formaldehyde and DKP. The warmer the temperature, the greater the loss of aspartame and the greater the increase in DKP.

Temperature creates two effects. First, the higher the temperature of storage, the higher the level of DKP in the soda. Second, room temperature seems to create the highest levels of formaldehyde in soda. At very high temperatures, the formaldehyde breaks down. However, even stored in a refrigerator at cold temperature, the aspartame breaks down into formaldehyde.

After diet soda containing aspartame is purchased it should not be stored in the heat or under any condition for a long period of time. Further research should be performed with more samples at different temperatures for different time periods so that safety levels can be determined.

Concerning aspartame, the FDA says, "we believe that based on all the information that we received to date that this is a safe product." I say, "Decide for yourself." Jennifer Cohen

Bibliography

1) Artificial Sweeteners. "The World Book Encyclopedia" 1997
2) Azarnoff, Daniel. "Aspartame" McGraw-Hill. Encyclopedia of Science and Technology 1987
3) Constantine, Alex. "The NutraPoison" http://www.dorway.com/possible.html (items 26 and 27) March 13, 1997
4) Jibrin, Janis. "How Sweet It Is." American Health December 1995: 84-85
5) Jibrin, Janis. "Is Sugar Poison?" Mademoiselle December 1995: 84-85
6) Lepke, Janet. "A Dieter's Guide To Sugar Substitutes." Consumer's Digest May/June 1995: 71-74
7) Rao, K.S., McConnell, R.G., Waisman, H.A. SC-18862 52 Week Oral Toxicity Study In The Infant Monkey
8) Roberts, H.J. Aspartame (Nutra Sweet) Is It Safe? Philadelphia: The Charles Press, 1990]
9) Roberts, H.J. Sweetener Dearest. West Palm Beach: The Sunshine Sentinel Press, 1992

****
****

During the approval process on aspartame the FDA selected 15 of G. D.

Searle's 74 tests calling them "pivotal" to proving the safety of aspartame. One of those tests was the RAO report (SC18862), a year long test of baby monkeys being fed aspartame-laced milk. After day 200 five of the seven had seizures with EACH feeding, and the seventh one died (but the public will never know why because the data on why was "lost"). Dr. Moser, the Nutrasweet spokesman, communicated with Jennifer Cohen concerning her diet coke science report that was published in the prestigious "Food Chemical News" (1100 bucks a year for a subscription) attempting to prove she was "mistaken" about aspartame. When young Jennifer asked about the RAO report Dr. Moser said:

"..the study should never have been undertaken, much less submitted as legitimate observation. This particular (Rao) experiment represents an unpardonable breach in methodology". (H. Moser, Nutrasweet spokesman)

****
********** additional consumer information **********

Per the Nutrasweet Web site (tables, and anything quoted. Editorial (ED) comments by DORway.com WEBmaster)

Product Category	Serving Size	Approx. Aspartame Content
Carbonated Beverage	12 ounces	180 mg
Gelatin Dessert	4 ounces	95 mg
Powdered Drink	8 ounces	120 mg
Hot Chocolate	6 ounces	50 mg
Pudding Dessert	4 ounces	25 mg
Frozen Novelty	2-3ounces	50 mg
Fruit Drink (10% juice)	6 ounces	70 mg
Breath mint	1 mint	1.5 mg
Vitamins	1 vitamin	4 mg
Ice Cream	4 ounces	50 mg
Yogurt	8 ounces	124 mg
Gum	1 stick	6-8 mg

"The FDA does not require the exact amount of aspartame to be listed on a product's ingredient label just as it doesn't require the amount of other ingredients in a product to be listed."

"NutraSweet a brand name for the sweetener aspartame. Aspartame is composed of two amino acids, aspartic acid and the methyl ester of phenylalanine. Aspartame is completely and quickly metabolized to its two amino acids (aspartic acid and phenylalanine) and methanol through normal pathways."

(ED: The aspartic acid and phenylalanine are in unnaturally high concentrations free of bonds with other amino acids. They fail to mention that methanol is converted to formaldehyde. A 1998 study proves that this formaldehyde is retained in the body and even stored in the fat.)

"The amount of methanol produced is approximately 10% by weight. The body then converts methanol to formaldehyde and then to a metabolite called formate. Formate is then quickly eliminated by the body in the form of carbon dioxide and water."

(ED: The only truth is the 10% figure. Methanol conversion to carbon dioxide and water is a blatant exaggeration of facts. See the 1998 Barcelona study.)

"ADI (Acceptable Daily Intake)"

"It is not possible to consume too much NutraSweet brand sweetener."

(ED: They why would anyone give it an "ADI"?)

"No limit is needed. To your body, eating aspartame is like eating anything else that contains these same amino acids. But, it might make you more comfortable to know that the government asked the same question. It calculated that a 132 lb. adult could consumer 3,000 mg of aspartame (i.e. 85 packets of Equal or 18 cans of diet soda) every day of her life and it wouldn't make a bit of difference. Of course, it would be unlikely anyone would do that for a lifetime. But that shows you the level of comfort you can have with NutraSweet."

(ED: Total fabrication. Consumers have had seizures on as little as one stick of aspartame-laced gum or about 8mg.)

"The government actually keeps track of how much of different food ingredients people actually eat. Ongoing market research shows that since 1984, aspartame consumption patterns for the general population and various subgroups are well within the ADI."

(ED: Aspartame is in over 9000 products. There is NO way for anyone, government or otherwise, to venture a guess as to the total amount ingested by any consumer.)

"DEFINITION: An ADI is a shortened term for "acceptable daily intake." ADI's are established by the FDA based on comprehensive animal and human studies. They integrate individual variation based on a person's weight and size. An ADI is a value that is commonly established for many food additives that undergo FDA approval in the United States."

(ED: There is no "ADI" for water, any of the juices, bananas, or other fruits that Monsanto mentions has methanol and phenylalanine. In addition, there are NO mandatory warning labels required for those basic foods. Common senses labels the Nutrasweet Company a liar on this topic, as well.)

(ED: According to the IFIC ... a paid Public Relations firm for the junk food industry, they have the figures for ADI as follows:)

ADI.

50-lb. Child	150-lb. Adult	
7	20	12-oz. containers of carbonated soft drink
		OR
11	34	8-oz. servings of powdered soft drink
		OR
14	42	4-oz. servings of gelatin dessert
		OR
32	97	Packets of tabletop sweetener

(ED: I used, at most, only 32 packets of Equal per day ... the max for a CHILD, and after 15 years my crippling and very painful health problems had fooled 21 of 21 doctors and left me contemplating Dr. Jack Kevorkian as my last doctor. Within three weeks of removing aspartame (Equal) from my diet most of my crippling symptoms were either gone, or greatly diminished. The three major problems that remain (after over three years): massive memory loss, maddening tinnitus, and as of April of 2000

I will be eight years into terminal prostate cancer. This makes me the first among my long-live ancestors to acquire any form of cancer... and I strongly suspect that one or more of the many components/breakdown components of aspartame triggered my cancer... and a life time of heavy cow's milk and dairy with a powerful hormone called IGF-1... think of it as a "cancer fuel cell" made it terminal by the age of 55. Dave Rietz... WEBmaster)

(ED: FDA has 92 compiled symptoms of aspartame poisoning. That list in order of frequency of complaint, as a scanned graphic, can be seen at: http://www.presidiotex.com/aspartame/Facts/92_Symptoms/92_symptoms.gif)

---------- http://www.dorway.com/2toxins.txt (info from Australia)

METHANOL

Methanol (wood alcohol, methyl alcohol) is a common household solvent used in perfume, windscreen washing liquid, duplicating fluid, antifreeze, shellac, paint remover. It is also added to commercial glutaraldehyde for shipping. Methanol occurs naturally in fruit and vegetables along with ethanol (alcohol). Methanol metabolises in the body to formaldehyde, then to formic acid, and then to substances which can be eliminated - including carbon dioxide and water.

The oxidation products of METHANOL/METHYL ALCOHOL [ie methanol => formaldehyde => formic acid] may induce severe acidosis. The amount causing severe effects varies with the individual especially if ethyl alcohol (ethanol) is consumed at the same time. The two compounds share the same degrading enzyme, alcohol dehydrogenase, and competition from ethanol slows the production of the more toxic products of metabolism - ie formaldehyde and formic acid. Oxidation and excretion of methanol is slow; toxic symptoms do not develop for 12-48 hrs. Symptoms involve the visual apparatus (severe degenerative changes occur within the ganglion cells of the retina; the toxicity of methanol appears to relate directly to formic acid), the CNS, and the gastrointestinal and respiratory tracts. Clinical toxicity relates to acidosis as well as the effects of accumulation of toxic products: nausea, vomiting, generalised weakness, severe abdominal pain, vertigo, headache. Symptoms similar to ethyl alcoholism appear: restlessness, incoordination... confusion and memory defects are common. [Paper available: CIIN 0024-GOET-85-014]. The half life of HCHO in rabbits etc is estimated to be one minute. Inhaling the fumes of methanol can cause headache, eye irritation, dizziness, visual disturbances and nausea. It damages the liver, heart, kidneys, and lungs.

FORMALDEHYDE EFFECTS

Skin reactions: ...chemical can be both irritating and allergy-causing...(EPA). A slight sensation of tiny insects crawling over the eyes, nose and pharynx (formication) is felt at 2-3 ppm. (Zurlo N, via OSH, NZ.) Contact with the vapour or solution causes skin to become white, rough, hard and anaesthetic due to superficial coagulation necrosis. With long exposure, dermatitis and hypersensitivity frequently result. Prolonged exposure may also cause cracking of skin and ulceration, especially around the fingernails. Inhalation of HCHO vapours produces irritation to the eyes, nose and throat and frequently results in upper respiratory tract irritation, coughing and bronchitis. Asthma may occur in sensitive individuals. Exposure may cause headache, dizziness, difficulty breathing and pulmonary edema. Acute effects include conjunctival and URT irritation from exposure to 0.1 ppm-5 ppm. Severe exposure to fumes may lead to chemical pneumonia. (EPA

www.epa.gov). Peak expiratory flow rates in med students decreased slightly over a 10 week anatomy course, a trend which reversed after the course finished. But studies of routinely exposed workers, controls, and asthmatics using controlled chamber challenges have frequently failed to show pulmonary changes. However most patients tested for formaldehyde asthma do not react to specific challenge or have demonstrable antibodies present. Inhalation of 10-20 ppm can lead to lower respiratory tract irritation manifested by cough, chest tightness, and tachycardia. Human systemic effects by inhalation.

After ingestion, degenerative changes may be found in the liver, kidneys, heart and brain. Experimental poison by ingestion, skin contact, inhalation, intravenous, intraperitoneal and subcutaneous routes. Human poison by ingestion. A woman drinking 120 mls of formaldehyde died 28½ hrs later - blood analysis showed that sufficient formaldehyde metabolised rapidly to formic acid (large amounts within half an hour distributing to about 70% of body water) to cause metabolic acidosis.

HCHO is involved in DNA damage and inhibits its repair. HCHO is a suspected human carcinogen and has been shown to produce mutations and abnormal organisms in bacterial studies" - (EPA). Carcinogen - (Dorland's Medical Dictionary). An experimental carcinogen, tumorigen and teratogen. Experimental reproductive effects. The chemical has been linked to menstrual disorders and pregnancy problems in women exposed to high levels in nail salons (EPA). A study of lab workers in Finland found a significant association between formalin exposure and spontaneous abortion.

Neurotoxin (see also Formaldehyde Neurotoxicity p 29.) A good reference: Lezak M. Neuropsychological Assessment, 1995, Chap 7).

Other symptoms of sensitivity to formaldehyde, including muscle and joint pain, fatigue, and cross reactivity to other chemicals are similar to those listed for glutaraldehyde p 21. Excessive thirst is noted in The Jeremiah Project literature. John Bower, Director, Healthy House Institute, Bloomington, Indiana: In a new study, March 1999: "One of the most insidious problems with formaldehyde is its ability to sensitise people to other pollutants." <++++++++++++

****

http://www.dorway.com/kilrkola.txt (on diet coke)

****

Recap of congressional record (S 5507 - 5509):

(Feb. 2000 Martini response to Mr. Henry Unger of Coke concerning the layoff of 6000 employees... 1/3 of the workforce and Cokes excuse. See http://www.sightings.com/ufo6/cokefirings.htm for Martini article).

I told them (Coke) they could not rewrite history, they had poisoned the world. Their victims have written their epitaph. Coke was part of the National Soft Drink Association, and part of the protest NSDA wrote in l983 (Congressional record - Senate, May 7, l985, S-5507-S5511).

THEY KNEW aspartame had not been proven safe for soft drinks: "G. D. Searle and Co has not demonstrated to a reasonable certainly that the use of aspartame in soft drinks, without quantitative limitation, will not adversely affect human health as a result of the changes such use is

likely to cause in brain chemistry and under certain reasonably anticipated conditions of use." S 5507 (Monsanto bought Searle in l985)

THEY KNEW it was unstable. Docket No. 82F- 0305 "Aspartame is inherently, markedly and uniquely unstable in aqueous media. In a liquid, such as a soft drink, aspartame will degrade as a function of temperature and pH. Higher temperatures and more acidic liquids increase the rate of degradation." S 5507

THEY KNEW there was not accurate analytical data. "The data and information submitted by Searle in support of its petition to amend 21 C.F.R. 172.804 to permit Aspartame use in soft drinks .. do not demonstrate that aspartame is safe for use in soft drinks. These data are insufficient to establish safety because the petition lacks comprehensive,reliable and accurate analytical data on aspartame and the products "adversely affected" by the issuance of aspartame in soft drinks." S 5507

THEY KNEW inferior analytical techniques were used when the right ones were available. "The unfortunate and inexplicable choice of an inferior analytical technique when superior and recognized methods are available, has resulted in inadequate characterization of aspartame's decomposition products." S 5508

THEY KNEW of the deficiencies in testing. "There are at least 6 significant deficiencies in the HPLC analyses undertaken by Searle to identify and quantify aspartame and DKP in soft drinks. " S 5508 DKP is diketopiperazine, a brain tumor agent that triggered brain tumors in rats in the original studies.

THEY KNEW aspartame would break down with the temperature. "Searle has not characterized the decomposition products of aspartame in soft drinks under temperature conditions to which the beverages are likely to be exposed in the United States." S 5508 (Writer's note: Consider with this knowledge until Coke was exposed they put aspartame laced soda pop in front of service stations and 7-Eleven's to break down in the sun!!)

THEY EVEN KNEW IT WAS AGAINST THE LAW TO PUT ASPARTAME IN POP!!!! "The present record does not contain data which demonstrated that the use of aspartame in soft drinks will not result in the adulteration of the beverages under section 402 (a) (3) of the FDA Act 21 U.S.C. 342 (a) (3) which provides that a food is adulterated if it contains, in whole or in part "... a decomposed substance or if it is otherwise unfit for food." Indeed, the present record strongly suggests that the rapid degradation of aspartame in soft drinks and the consequent loss of sweetness may well result, under certain actual time and temperature conditions in products, which would be adulterated under section 402. Without data which demonstrate that aspartame sweetened beverages will not be adulterated under section 402 (a) (3). Searle has not met its burden of proof under section 409 (c) (3) (B) of the FDC Act 21 U.S.C. 348 (c) (3) (B)." (S 5509)

This file http://www.dorway.com/coke.txt 12/2001