

~~TGS:~~ ~~JOL:~~ ~~MING:~~ RF

VISTA

RF: None

Thomas G. Grumbles

To Environmental Directors

Date 10/24

Safety Directors

RDC

MSR

fyi

Perhaps there is something
amusing about recent regulatory
activity.

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EPA Says Watch Out for the Nicotine Truck

By P.J. WINGATE

The Environmental Protection Agency may have wanted to make a list of the 400 most hazardous chemicals and decided, after much pulling and hauling, that this simply could not be done. It has arrived, for now at least, at 405.

This is all very sad because the list could have been expanded, just as logically, to 4,000 or 400,000. Consequently, during the months to come, critics of the EPA will assail it for not including one, two or 2,000 of their own pet candidates for the list. Also, the list could have been reduced, even more logically, to 40, and this shorter list would have stood a slightly better chance of actually being useful to the public.

Even 40 cries of "wolf, wolf" are sure to confuse the average citizen and cause him to wonder which way he should turn in an effort to protect himself, but 400 are much more likely to make his confusion complete and cause him to simply stand still and tremble.

If this judgment concerning the EPA's new list seems unduly harsh, let it be remembered that the task was an impossible one to begin with and that no group of scientists could have come up with a better list. This is because a good case can be made for removing most of the chemicals on the EPA's list and an equally good case can be made for adding thousands of others not included.

A few specific cases will help explain this apparent anomaly.

First, look at nicotine, which was on the

list. No one denies that nicotine is a deadly poison. A single drop of pure nicotine applied to the tongue of a dog will usually kill the poor test animal, but over 50 million Americans take small amounts of nicotine into their mouths each day and still survive many years of this practice. Still, it is true that if a tank truck full of pure nicotine ruptured on a crowded city street, hundreds of people might be killed. But such a catastrophe is about as likely to happen as Halley's Comet suddenly veering off course and landing in the middle of New Jersey.

More than 99% of the nicotine used in America is shipped neatly packaged in the form of cigarettes, cigars and smoking tobacco. These products have their own hazards, to be sure, but nicotine is one of the lesser ones, taking a seat well behind benzopyrene and the dozens of other chemicals formed by pyrolysis when tobacco burns. Benzopyrene, even though it is one of the most potent carcinogens known, is not on the EPA list, and this is a proper decision because a tank truckload of it is even less likely to rupture on a crowded street than a truckload of pure nicotine is.

Now look at three others on the EPA list: acrolein, crotonaldehyde and formaldehyde. They are indeed all potent poisons in high concentrations and are lumped together here simply because all three are always present in ripe strawberries. It has been speculated that crotonaldehyde—which is a violent stomach irritant, and as such has been used in the compounding of

"Mickey Finns" when the bartender in a rough bar wishes to cause an obnoxious customer to leave the premises—may be the ingredient that causes some people to break out in hives when they eat strawberries. However, this is not firm speculation, because raspberries also contain crotonaldehyde and some people who cannot eat strawberries can eat raspberries without difficulty.

One last example. Mesitylene is on the list while benzene is not, despite the fact that there is much more evidence that benzene can be damaging to human health. Perhaps benzene was omitted because it is well known that it is a constituent of nearly all gasoline and consequently nearly everyone has long been exposed to it. If so, that was a wise decision. But why was mesitylene included in the list? Was it because mesitylene, found in such substances as crude oil and coke from production of steel, is a derivative of benzene, and someone on the list committee was frightened by the three methyl groups dangling from the benzene nucleus of mesitylene?

Does all this mean that the list has no significance or potential? Unfortunately, the answer is no. This list and others like it have the potential for doing great harm. If Sen. Frank Lautenberg (D., N.J.) and others keep insisting that the chemical industry be forced to make endless reports on how it produces, uses and disposes of thousands of chemicals on various lists, then the endless red tape involved will finally tie down the chemical industry, one of the few American industries that still sells abroad more than it imports, and make it as helpless as Gulliver in the land of the Lilliputians.

Rather than coming up with new or modified lists of chemicals, the EPA can render a great service by pointing out that Paracelsus was right when he pointed out, more than 400 years ago, that "the dose makes the poison." Paracelsus lived when chemistry was mostly alchemy, but he was a shrewd observer and knew that toxic materials such as arsenic, lead, mercury, strychnine, belladonna and the many other toxic materials produced by plants to protect themselves against their enemies were scattered all over the world and could kill people if taken in substantial amounts. The key to survival, Paracelsus said, was to keep the dose below the poison level. Paracelsus also probably suspected what we now know—there were many other toxic materials that he knew nothing about. Radon and asbestos, for example.

There are now literally millions of chemicals known to science, and it would be unwise to take a bath in any of them except water. So when a chemical spill occurs, the sensible thing for the public to do is not to study a list but to move out of the area until those who are experienced in the use and handling of chemicals have cleaned it up.

A list will not help, because even a good thing in excess is bad. No one should eat a bushel of raspberries at one time even though they are less likely to cause hives than strawberries.

Mr. Wingate, retired from Dow Chemical Co., lives in Wilmington, Del.

SECOND SUPPLEMENT
TO THE
THIRD EDITION

FOOD CHEMICALS CODEX

COMMITTEE ON FOOD CHEMICALS CODEX

Food and Nutrition Board
Commission on Life Sciences
National Research Council

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fraction, take care to include all saccharides in the standard composition calculation.

Compute the dry-basis concentration (C), in percent, of each individual component in the standard solution by the formula:

$$C = (W_c / \Sigma W_i) \times 100,$$

in which W_c is the weight of the sugar of interest and ΣW_i is the sum of all sugar components. Standardize by injecting 10-20 μ l (about 1.0-2.0 mg solids) of the standard sugar solution. Integrate the peaks and normalize. Sum the individual DP_{4+} responses from the normalized printout to obtain the total DP_{4+} normalized response. Calculate the response factors as follows (see page 476, and page 73 of THIS SUPPLEMENT):

$$R_i = \frac{\text{known concentration, dry basis } \%,}{\text{measured concentration, normalized } \%},$$

in which R_i is the response factor for component i .

Compute the response factor for each component relative to glucose (R') using the following equation:

$$R'_i = R_i / R_G,$$

in which R_G is the response factor for glucose. The R'_i for DP_{4+} should be programmed as a default value (if automated equipment is used) and used to compute the concentration of higher saccharides.

Sample Analysis Determine the solids content (see below) of the sample and dilute to approximately 10% solids with water. Inject a volume (10-50 μ l) appropriate for the specific solids content.

Calculation Calculate the concentration of each component as follows:

$$C_i = (A_i \times R'_i \times 100) / (\Sigma A_n R'_n),$$

in which A_i is the area recorded for that component and $\Sigma A_n R'_n$ is the sum of the product of the areas (A) and response factors (R') for all components detected.

Arsenic A *Sample Solution* prepared as directed for organic compounds meets the requirements of the *Arsenic Test*, using 1 ml of *Standard Arsenic Solution* (1 μ g of As).

Color

Apparatus Use a suitable variable-wavelength spectrophotometer capable of measuring percent transmittance throughout the visible spectrum and designed to permit the use of sample and reference cells with pathlengths of 2-4 cm. The transmittance of all paired cells should agree within 0.5%.

Standard Solution Dissolve 0.10 g of reagent grade potassium dichromate ($K_2Cr_2O_7$) in 1 L of water and mix thoroughly.

Procedure With water in sample and reference cells of 2-cm pathlength adjust the percent transmittance scale of the spectrophotometer to 100%. Leave the reference cell in place and replace the water in the sample cell with the *Standard Solution*; determine the wavelength at which it exhibits exactly 54.5 percent transmittance. This wavelength is defined as λ_c , the corrected 450-nm wavelength. Remove the 2-cm cells from the spectrophotometer and with water in the sample and reference cells of 4-cm pathlength adjust the

percent transmittance scale to 100% with the spectrophotometer set at λ_c . Leave the reference cell in place and replace the water in the sample cell with the sample of high-fructose corn syrup. Measure the percent transmittance (T_{450}). Remove the sample cell, set the wavelength at 600 nm, replace the sample with water, and adjust the percent transmittance scale to 100%; then determine the percent transmittance at 600 nm (T_{600}) with the same sample of high-fructose corn syrup in the sample cell. Calculate the *Color* (C) of the sample with the following formula:

$$C = (\log T_{600} - \log T_{450})/4,$$

in which T_{600} is the percent transmittance at 600 nm and T_{450} is the percent transmittance at 450 nm.

Heavy Metals Prepare and test a 2-g sample as directed in *Method II* under the *Heavy Metals Test*, page 512, using 20 μ g of lead ion (Pb) in the control (*Solution A*) and 500° as the ignition temperature.

Lead Transfer 10 g of the sample to an evaporating dish, add 5 ml of sulfuric acid solution (1 in 4), mixing it thoroughly with the sample, and evaporate most of the water on a steam bath. Char and dehydrate the sample by heating on a hot plate, while heating at the same time with an infrared lamp from above, and then heat in a muffle furnace at 500° until the residue is free from carbon. Remove the dish from the furnace, cool, and cautiously wash down the inside of the dish with water. Add 1 ml of 1 *N* hydrochloric acid, evaporate to dryness on a steam bath, then add 2 ml of 1 *N* hydrochloric acid, and heat briefly, while stirring, on a steam bath. Quantitatively transfer the solution into a separator with the aid of small quantities of water, and neutralize with 1 *N* ammonium hydroxide. This *Sample Solution* meets the requirements of the *Lead Limit Test*, using 10 g of lead ion (Pb) in the control.

Residue on Ignition Ignite 5 g as directed under *Residue on Ignition*, page 533.

Solids Determine the percent solids from the refractive index (see page 533) as directed under *High-Fructose Corn Syrup Solids*, page 84 of THIS SUPPLEMENT.

Sulfur Dioxide Proceed as directed under *Sulfur Dioxide*, page 546, using a 100 g sample.

Packaging and Storage Store in tight containers.

Functional Use in Foods Nutritive sweetener.

Hydrochloric Acid, page 144

Replace the *Description* and *Requirements* with the following:

DESCRIPTION

A water solution of hydrogen chloride of varied concentrations. It is a clear, colorless or slightly yellowish, corrosive liquid having a pungent odor. It is miscible with water and with alcohol. Concentrations of hydrochloric acid commercially

available are usually expressed in Baumé degrees (Be°) from which percentages of hydrochloric acid and specific gravities can readily be derived (see *Hydrochloric Acid Table*, page 514). The usually available concentrations are 18°, 20°, 22°, and 23° Be. Concentrations above 13° Be (19.6%) fume in moist air, lose hydrogen chloride, and create a corrosive atmosphere. Because of these characteristics, suitable precautions must be observed during sampling and analysis to prevent losses.

Note: Hydrochloric acid is produced by various methods that might impart trace amounts of organic compounds as impurities. The manufacturer, vendor, or user is responsible for identifying the specific organic compounds which are present and for meeting the *Requirements for Extractable Organic Compounds*. Methods are provided for their determination. In applying the procedures any necessary standards should be used to quantitate the organic compounds present in each specific product.

The variety of organic impurities that might conceivably be found in hydrochloric acid is such that it is impossible to provide a comprehensive and accurate list here. Therefore, the manufacturer, vendor, or user is responsible for establishing the suitability of such hydrochloric acid for its intended application in foods or food processing in accordance with the provision on *Trace Impurities*, page 3.

REQUIREMENTS

Identification

It gives positive tests for *Chloride*, page 516.

Assay Within the range of Baumé degrees specified or implied by the vendor.

Arsenic (as As) Not more than 1 mg/kg.

Color Passes test.

Concentration of HCl Within the range specified or implied by the vendor.

Extractable Organic Compounds

Total Organic Compounds (Non-Fluorine-Containing)

Not more than 5 mg/kg, including:

Benzene Not more than 0.05 mg/kg.

Vinyl Chloride Not more than 0.05 mg/kg.

Fluorinated Organic Compounds (total) Not more than 25 mg/kg.

Heavy Metals (as Pb) Not more than 5 mg/kg.

Iron Not more than 5 mg/kg.

Nonvolatile Residue Not more than 0.5%

Oxidizing Substances (as Cl₂) Not more than 0.003%.

Reducing Substances (as SO₃) Not more than 0.007%.

Specific Gravity Within the range specified or implied by the vendor.

Sulfate Not more than 0.5%.

TESTS

Extractable Organic Compounds Proceed as directed under *Extractable Organic Compounds* (in Hydrochloric Acid), page 80 of THIS SUPPLEMENT.

Insert the following new monograph to precede the monograph entitled *Iron, Carbonyl*, page 151:

Invert Sugar

Invert Sugar Syrup, Invert

DESCRIPTION

Invert sugar is a mixture of glucose and fructose that results from the hydrolysis of sucrose in accordance with good manufacturing practices. Invert sugar is marketed as a component of invert sugar syrup that also contains sucrose in various amounts as represented by the manufacturer.

Invert sugar syrup is a hygroscopic liquid that has a sweet taste, is very soluble in water, glycerin and glycols, and is very sparingly soluble in acetone and ethanol.

REQUIREMENTS

Identification

Prepare a 10% solution in purified water and inject 7.5 µl into a high-performance liquid chromatographic system equipped with a cation exchange resin maintained at 85° and a differential refractometer detector; the liquid phase is purified water eluting at a flow rate of 0.7 ml per min. The chromatogram of the sample gives appropriate elution times for fructose, glucose, and sucrose when compared to a standard solution containing 1 g of each saccharide in 100 ml of purified water.

Assay Sucrose and invert sugar content shall be as represented by the manufacturer.

Arsenic (as As) Not more than 3 mg/kg.

Heavy Metals (as Pb) Not more than 7 mg/kg.

Lead Not more than 5 mg/kg.

pH Not less than 3 nor more than 5.5.

Residue on Ignition Not more than 0.2%.

Total Solids As represented by the vendor.

Total Sugars Not less than 99.5% of the total solids content.

TESTS

Assay

Apparatus Mount a ring support on a ringstand 1-2 in. above a gas burner, and mount a second ring 6-7 in. above the first. Place a 6-in. open-wire gauze on the lower ring to support a 250-ml Erlenmeyer flask, and place a 4-in. watch glass with a center hole on the upper ring to deflect heat. Attach a 50-ml buret to the ringstand so that the tip just passes through the watch glass centered above the flask. Alternatively, a buret with an offset tip may be used in place of a buret with a straight tip extending through the hole in the center of the watch glass. Place an indirectly lighted white surface behind the assembly for observing the end point.

TO: D. A. Kuhn

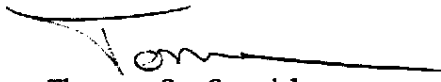
FROM: T. G. Grumbles
DATE: January 24, 1986

Interoffice
Communication

SUBJ: PROGRESS REPORT FOR WEEK ENDING JANUARY 24, 1986

VISTA

1. A meeting was held with Conoco to discuss solid waste site closures at the LCCC and remedial action and cost allocations for the T-405 compliance order at the LCVCM. Conoco has retained liabilities in both cases.
2. The draft report on Baltimore groundwater quality was reviewed with DuPont in Wilmington. The main conclusion of the report is that we need more data. The goal is to present the report to the state in early February.
3. Reviewed COEDS hazardous materials descriptions for Hammond products. Drafted memo detailing proposed changes.
4. Advised plants on DOT requirements for shipments of heavy and light ends.
5. Updated respiratory protection portion of methyl chloride MSDS. Began mailing letters and updated sheets to methyl chloride customers on the mass mailing list.
6. Met with data processing to discuss details of the PCR to automate the mailing of MSDS's to new customers and to old customers purchasing new products.



Thomas G. Grumbles

ajo/8

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