Food and Chemical Priorities

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Which of the following would trouble you most:

1. Food poisoning by unknown agents,
2. Animal excreta in your food,
3. Infinitesimal amounts of different chemicals in your body or
4. Infinitesimal amounts of different chemicals in your drinking water?

Here is some additional information to help you make your decision.

1. Food poisoning - Eric Schlosser in his book, *Fast Food Nation*, notes, "Every day in the U.S., roughly 200,000 people are sickened by a food-borne disease, 900 are hospitalized and 14 die. According to the Centers for Disease Control, more than a quarter of the American population suffers a bout of food poisoning each year."[1]

2. Animal excreta in food - Experts at the Food and Drug Administration (FDA) decide on how much contamination is to be allowed in foods sold for human consumption.[2] There is no question regarding "how much" since it would be impossible to produce food that had no contaminants whatsoever. Table 1 lists FDA guidelines for maximum levels of certain "impurities" in some foods.

With chemicals, we talk about a few parts per million, parts per billion or even parts per trillion. With animal excreta, note that 10 mg per pound is equivalent to 20 parts per million. Serious parts per million!

3. Infinitesimal amounts of different chemicals in your body - Now that new lab techniques allow us to find compounds that occur in mind-bendingly tiny amounts, advocacy groups assert a whole new array of doubts. This, coupled with the fact that the media, unaware of the fact that it is common scientific knowledge that traces of environmental chemicals, both synthetic and natural make their way into our bodies, enter the spin zone of the advocacy groups and present the new information as if it were shocking news.[3]

4. Infinitesimal amounts of different chemicals in your drinking water - As new technology enables detection of infinitesimally smaller doses of chemicals in the environment, Southern California water quality officials have learned that an array of hardy pharmaceuticals are defying even the most sophisticated sewage treatments in use. Although the amounts discovered are in the parts per trillion range (equivalent to one second in 32,000 years) folks still get concerned. And the media adds to the concern, "The contamination raises questions about the safety of reclaimed water consumed by the public and the health of wild creatures that inhabit waterways."[4]

So what would you be most concerned about? Would you ignore the food poisoning which clearly is documented as a real issue, or body parts and turds in food, and accept the present scare tactics that deem that any amount of any newly discovered chemical in food or water is a real problem. If so, I feel sorry for you, since as scientists get more and more clever, you're going to find more and more to worry about. Your "chemophobia" will continue to raise itself to new levels.

Every piece of food we eat, every breath we take, every move we make results in the ingestion of a chemical of some sort. Every chemical has the ability to kill, but only if the quantities are high enough. As the Swiss physician Paracelsus stated: "What is not poison? All things are poison and nothing is without poison. It is only the dose that makes a thing a poison."

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Table 1
Contaminants in Food*

Food	Maximum Defect Action Level
Brussels sprouts	10 aphids per ounce
Shelled peanuts	1 insect per 5 pounds
Golden raisins	20 whole or equivalent insects per pound**
Tomato juice	3 fly eggs per ounce
Whole pepper	1 mg or more mammalian excreta per pound
Popcorn	2 rodent hairs per pound
Fig paste	4 insect heads per ounce
Peanut butter	9 insect fragments per ounce
Sesame seeds	5 mg or more mammalian excreta per pound
Cocoa beans	10 mg or more mammalian excreta per pound
*Food Defect Action Levels, (Washington, DC, Food and Drug Administration, May 1998)	
**A whole insect includes separate head, or body portions with head attached.	

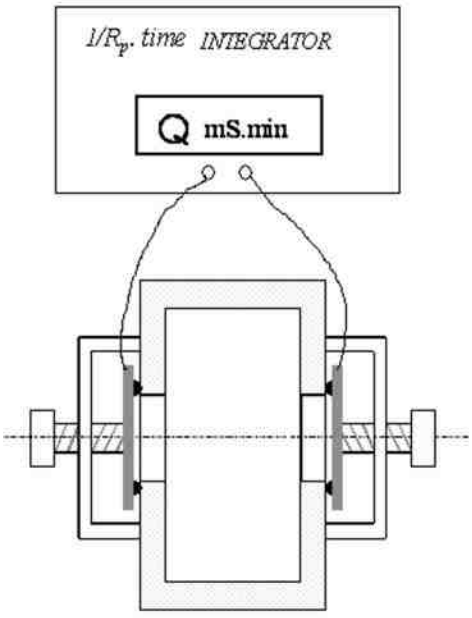

Figure 1—Schematic diagram of porosity measurement equipment.

coatings demonstrated the advantages of deposition at pulse plating conditions that ensure maximum leveling power.

At the same time, by comparing the different pulse plating regimes for metal coating deposition, we came to the conclusion that the (DC+AC) pulse-reverse plating technique had definite advantages. Bright nickel coatings deposited from a Watts electrolyte by unipolar pulses had higher porosity (11%) than those deposited by the application of (DC+AC) bi-polar pulses (6% porosity). *P&SF*

References

1. F.P. Ijsseling, *British Corrosion Journal,* **21** (2), 95 (1986).
2. M. Aroyo & N. Tzonev, *Plating & Surface Finishing*, **90** (2), 50, (2003).
3. M. Aroyo, D. Stoychev & N. Tzonev, *Plating & Surface Finishing*, **85** (9), 92 (1998)

Test Your Plating I.Q. #430

By Dr. James H. Lindsay

Commonly plated alloys

Based on materials from the AESF Foundation Educational Courses, authored by Frank Altmayer, MSF, AESF Fellow

1. Name the individual metals that can be found in the following alloys: brass, bronze and solder.

2. Ammonia is sometimes added to brass plating solutions to improve the _____ of the deposit.

3. Bronze plating solutions employ two complexes for copper and tin respectively. The copper is complexed by _____, while the tin is complexed by _____.

4. The most popular substitute for decorative chromium is an alloy of _____ and _____. Why?

5. For two or more metals to be deposited as alloys, generally, a plating solution where the _____ for deposition of each of the alloying metals are within ____ volts is required.

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Fact or Fiction?

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Perhaps the simplest answer to chemophobia is this. It is based on a misperception. Everything is made of up chemicals. A report by the National Research Council noted that about 5,000,000 different chemical substances are known to exist. Of those 5 million, less than 30 have been definitely linked to cancer in humans, 1,500 have been found to be carcinogenic in tests on animals and about 7,000 have been tested for carcinogenicity. Again, if you missed those numbers, less than 30 out of five million known chemical substances have been definitely linked to cancer in humans.[5] *P&SF*

References

1. Eric Schlosser, *Fast Food Nation*, Perennial Press, New York, NY, 2002; p. 195.
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5. John Adams, *Risk*, University College Press, London, UK, 1995; p. 45.