Sulfite additives' safety is challenged

A family of food additives known as metabisulfites has been used widely for decades as antibacterial agents and as anti-oxidants to prevent the wilting and discoloration of fresh fruits and vegetables. But research now suggests that these additives may trigger potentially life-threatening reactions in perhaps one in 20 asthmatics — or 445,000 Americans — according to the Center for Science in the Public Interest. This assertion is what prompted the Washington, D.C.-based consumer group Oct. 28 to ask the Food and Drug Administration to rescind metabisulfites' "generally recognized as safe" (GRAS) designation.

Over the past 10 years, FDA has impaneled scientists to take part in a systematic safety review of the nearly 500 additives on its GRAS list. Based on the evaluation — completed around 1977 — FDA announced this past July that it intended to reaffirm metabisulfites' GRAS status. A 60-day comment period followed. CSPI successfully petitioned FDA to reopen its comment period, however, after learning that some of the consumer group's members were extremely sensitive to metabisulfites, and after conferring with a researcher at the Scripps Clinic and Research Foundation in La Jolla, Calif., who has encountered asthmatic patients suffering from metabisulfite sensitivity.

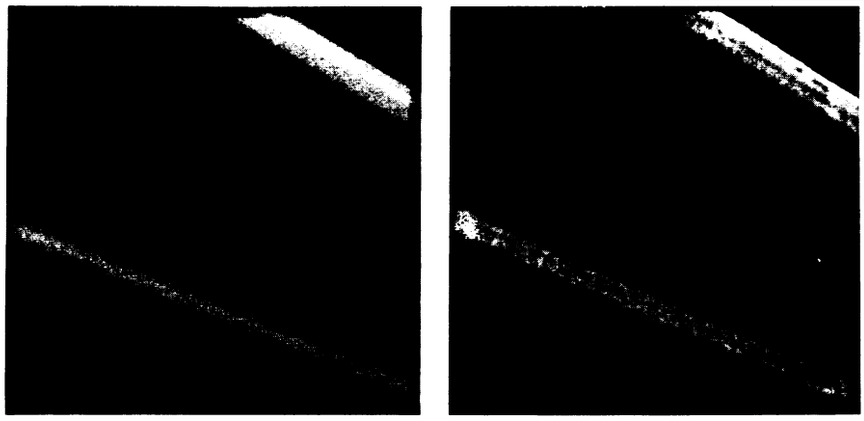
In the formal comments submitted to FDA, CSPI identified data by four groups of researchers — much of it developed or published since the FDA sulfiting-agents panel delivered its findings — indicating certain individuals, especially asthmatics, have shown severe reactions to metabisulfites. The offending chemicals included potassium metabisulfite ($K_2S_2O_5$), sodium bisulfite ($NaHSO_3$), sodium metabisulfite ($Na_2S_2O_5$), and sulfur dioxide (SO_2). Symptoms have included a generalized flush, faintness, weakness, severe wheezing, labored breathing, chest tightness, cough, extreme shortness of breath, cyanosis (blue discoloration of the skin caused by insufficient oxygen in the blood), and loss of consciousness.

Ronald A. Simon, a Scripps researcher who has studied the phenomenon and who has joined CSPI in asking FDA to withdraw GRAS status for the four metabisulfites listed above, has found that as little as 7.5 milligrams of the chemicals can trigger a reaction when taken orally. In the July 1981 JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY, Simon and Donald D. Stevenson reported that the average American probably consumes 2 to 3 mg of metabisulfites daily. Wine and beer drinkers may take in 5 to 10 mg a day more. But the highest consumption, they report, "occurs in individuals ingesting restaurant salads, vegetables (particularly potatoes), and avocado dips, to which are added solutions of potassium metabisulfite. A customer can ingest 25 to 100 mg of metabisulfite in one restaurant meal."

Jim Greene, a spokesman for FDA, said he was not aware of any data linking the additives with adverse effects, but added, "We would like to see that information if [CSPI's] got it." (As of Nov. 1, he had not seen CSPI's formal comments.)

CSPI has recommended FDA ban all unnecessary or cosmetic use of metabisulfites, or that it limit their use to 350 mg per serving and require a warning label disclosing their use. —*J. Raloff*

The ring of Jupiter: Evidence for ringlets



V. R. Haemmerle et al./Caltech

Jupiter's ring, far fainter and more tenuous than the spectacular ring system of Saturn, is barely detectable by earth-based telescopes. Even close-up photos taken by the Voyager 2 spacecraft in 1979 originally revealed little more detail to the Jovian ring than a bright outer portion and a darker region inside. Now, however, special computer processing of the Voyager images has shown the bright portion to be divided into several alternately light and dark bands, like a simpler version of the myriad "ringlets" in the Saturnian system.

The discovery resulted when California Institute of Technology undergraduate Vance R. Haemmerle and a group of colleagues applied a method of reducing the blur in some of the photos due to slight motions of the spacecraft. The technique was possible because the photos of the ring happened also to include a star, whose normally pinpoint image appeared as an extended streak in the 96-second time exposures. Most of the L-shaped streak near the right side of the left photo was caused by movements due to oscillations of Voyager 2's 13-meter-long magnetometer boom, Haemmerle says, while the change in the streak's direction happened when the onboard guidance system briefly lost its view of a different star it was tracking and fired steering jets to restore its visual "lock."

Using a technique of "two-dimensional discrete Fourier transforms," Haemmerle's group was able, in effect, to cancel out the spacecraft motions and produce the "artificially de-smeared" picture at right. The star image is restored to its pinpoint form, while multiple bright and dark bands mark the ring's outer portion. (There are particles of ring material in the dark region bounded by the two groups of bands, but the structure that seems to be there and outside the bands is not real, being an artifact of the reconstruction technique.)

Haemmerle, who described the work at the recent annual meeting of the American Astronomical Society's Division for Planetary Sciences in Boulder, Colo., suggests that the ringlets may be caused by two small moons (one of which has yet to be detected) orbiting along the ring system's outer edge. Alternatively, he says, they could be the manifestation of a propagating spiral density wave. Both ideas have also been proposed in connection with Saturn's rings. The optical properties of the Jovian ring system are now being investigated, as are the possibilities of gravitational resonance effects. —*J. Eberhart*

FDA OK's new insulin

The Food and Drug Administration last week gave Eli Lilly and Co. of Indianapolis the go-ahead to market Humulin, a human insulin produced by recombinant DNA techniques. The action makes Humulin the first gene-splicing product to be approved by the FDA.

The decision came four years after bacteria pumped out the first copies of human insulin, and just five months after Lilly applied for approval (SN: 9/16/78, p. 195). Humulin recently went on sale in the United Kingdom (SN: 10/9/82, p. 230).

Studies in humans have yet to show a clear advantage over the animal insulin diabetics currently use but researchers hope that Humulin will help the handful of diabetics who are allergic to human insulin. The new product, to be available by the end of the year at a higher price than the animal product, will ensure a ready supply of insulin, according to Lilly. □