

# LIFE AFTER ASPARTAME

Aspartame should never have reached the marketplace. But even if the authorities were to remove it from sale tomorrow, how much faith should consumers place in the other artificial sweeteners on the market? **PAT THOMAS** REPORTS

**T**here is not a single artificial sweetener on the market that can claim, beyond all reasonable doubt, to be safe for humans to consume.

Saccharin, cyclamate and acesulfame-K have all been shown to cause cancer in animals. Even the family of relatively benign sweeteners known as polyols, such as sorbitol and mannitol, can cause gastric upset if eaten in quantity.

NutraSweet believes that its new aspartame-based sweetener, Neotame, is 'revolutionary'; but, seemingly, it is only a more stable version of aspartame. This leaves the market wide open for sucralose.

Sucralose, sold commercially as Splenda, was discovered in 1976 by researchers working for British sugar refiner Tate & Lyle. Four years later, Tate & Lyle joined forces with Johnson & Johnson to develop and commercialise sucralose under the auspices of a new company, McNeil Specialty Products (now called McNeil Nutritionals). Sucralose has been approved by more than 60 regulatory bodies throughout the world, and is now in more than 3,000 products worldwide. In the US, Coca-Cola has developed a new diet drink sweetened with Splenda, and other major soft drink manufacturers are expected to follow suit.

Splenda has had to rethink its slogan "made from sugar, so it tastes like sugar" in the wake of a heated US legal challenge and a recent ruling by the New Zealand Advertising Standards Authority that said it confused and misled consumers. While it is true that sugar, or sucrose, is one of the starting materials for sucralose, its chemical structure is significantly different from that of sucrose.

In a complex chemical process, the

sucrose is processed with, among other things, phosgene (a chemical-warfare agent used during WWI, now a common intermediary in the production of plastics, pesticides and dyes), and three atoms of chlorine are selectively substituted for three hydroxyl (hydrogen and oxygen) groups

naturally attached to the sugar molecule.

This process produces 1,6-dichloro-1,6-dideoxy-beta-D-fructofuranosyl-4-chloro-4-deoxy-alpha-D-galactopyranoside (also known as trichlorogalactosucrose or sucralose), a new chemical substance which Tate & Lyle calls a 'water-soluble chlorocarbohydrate'.

Accepting Tate & Lyle's classification of sucralose as a chlorocarbohydrate at face value raises reasonable concerns about its suitability as a food additive. Chlorinated carbohydrates belong to a class of chemicals known as



chlorocarbons. This class of chemicals includes a number of notorious human and environmental poisons, including polychlorinated biphenyls (PCBs); aliphatic chlorinated carbohydrates; aromatic chlorinated carbohydrates such as DDT; organochlorine pesticides such as aldrin and dieldrin; and aromatic chlorinated ethers such as polychlorinated dioxins (PCDD) and polychlorinated dibenzofurans (PCDF).

Most of the synthetic chlorinated compounds that we ingest, such as the pesticide residues in our food and water, bio-accumulate slowly in the body; and many cause developmental problems in the womb or are carcinogenic. How do we know that sucralose is any different?

Tate & Lyle insists that sucralose passes through the body virtually intact, and that the tight molecular bond between the chlorine atoms and the sugar molecule results in a very stable and versatile product that is not metabolised in the body for calories. This doesn't mean, however, that sucralose is not metabolised in the body at all, and critics



like HJ Roberts argue that, during storage and in the body, sucralose breaks down into among other things 1,6 dichlorofructose, a chlorinated compound that has not been adequately tested in humans.

Tate & Lyle maintains that sucralose and its breakdown products have been extensively tested and proven safe for human consumption. The company notes that in seeking approval from the US Food and Drug Administration (FDA), McNeil Specialty Products submitted more than 110 studies that attested to the safety of sucralose.

### BUT CAN CONSUMERS TRUST THIS RESEARCH DATA?

The vast majority of studies submitted to the FDA were unpublished animal and laboratory studies performed by Tate & Lyle itself, and therefore liable to charges of potentially unacceptable bias. Only five involved human subjects, and these were short-term, often single-dose, studies that clearly could not adequately reflect the expected real-world usage of sucralose. After questions were raised by the FDA about the safety of sucralose for diabetics, and prior to approval, a further five human studies were eventually submitted. On 1 April 1998 the FDA approved sucralose for limited uses; one year later it approved it as a general-purpose sweetener.

Some questions about sucralose's safety, arising from the data submitted to the FDA, remain unanswered. These studies included unsettling findings about animals, which, when exposed to high doses of sucralose, experienced:

- shrunken thymus and spleen;
- enlarged liver and kidneys; and
- reduced growth rate in adults and newborns.

In the FDA's 'final-rule' report, several of the studies submitted by McNeil were found to have 'inconclusive' results or were 'insufficient' to draw firm conclusions from them. These included:

- a test that examined the clastogenic activity (ability to break chromosomes apart) of sucralose, and a test that looked for chromosomal aberrations in human lymphocytes exposed to sucralose;

- a series of three animal genotoxicity studies; and
- laboratory studies using lymphoma tissue from mice which showed that sucralose was 'weakly mutagenic' (capable of causing cellular mutations).

Clastogenic, genotoxic and mutagenic substances are all potential risk factors in the development of cancer.

In addition to these, three studies that looked at very specific 'anti-fertility' effects of sucralose and its breakdown products, especially with regard to sperm production were also deemed insufficient; this is particularly worrying, since other 'chlorosugars', such as 6-chloroglucose, are currently being studied as anti-spermatogenic drugs.

Furthermore, the administration observed that McNeil had failed to explain satisfactorily a reduction in body weight seen in animals fed sucralose and that 'additional study data were needed to resolve this issue'. Ironically for a product that 'tastes like sugar', McNeil argued that weight loss was due to the 'reduced palatability of sucralose-containing diets'. FDA reviewers also found that at mid to high doses there was a trend towards 'decreasing white blood cell and lymphocyte counts with increasing dose levels of sucralose'. This was dismissed as having no 'statistical significance' by the FDA; in healthy animals and humans this may be so, but what happens when already immune-compromised individuals ingest sucralose?

Tate & Lyle says that any lingering concerns about sucralose are unfounded and that only a small amount, 15-20 per cent, of sucralose is absorbed and broken down in the human gut. The rest passes through the body unmetabolised and is excreted in urine and faeces. This in itself provokes important questions.

- What happens to sucralose that is flushed down the toilet? Does it remain stable or react with other substances (for instance, the chlorine used in water-treatment plants, or microbial life) to form new compounds?
- Is sucralose or any resulting chemical compound it may form safe for the environment? Is it harmful to aquatic life or wild animals?

- Will sucralose begin to appear in our water supply, in the way that certain drugs have, silently increasing our exposure to it? And would that increased exposure be safe?

### PUBLISH AND BE SUED

In the face of emerging public criticism, lawyers for Tate & Lyle are already gearing up for a battle. According to attorney James Turner, a key player in the aspartame drama, 'there's going to be a huge fight about Splenda in the next few months... [Tate & Lyle's] lawyers are already on the case trying to shut everybody up'.

It's a tactic that worked well for Monsanto, which certainly used legal pressure against anyone who criticised NutraSweet. Recently, the publisher of the local newspaper the *Brighton Argus* considered it prudent to publish an apology composed by Tate & Lyle (or their lawyers) or face a legal action for defamation and loss of sales after printing an article suggesting that sucralose was harmful to humans.

Tate & Lyle's first high-profile victim, however, was mercola.com – one of the world's most visited internet health sites. Run by Dr Joseph Mercola, the site has been a vocal critic of sucralose for years. Instead of carrying freely available information on sucralose that might stimulate spirited public debate, it now carries the following message: 'Attorneys acting on behalf of the manufacturers of sucralose, Tate & Lyle Plc, based in London, England, have requested that the information contained on this page not be made available to internet users in England.'

At this point, concerned consumers should be asking themselves several questions. Does the story of sucralose sound familiar? If sucralose is safe beyond any reasonable doubt, why is there such a fervent need to suppress any criticism of it? Finally, whom do such tactics really serve? Do they serve the consumer and the principles of choice, information, safety and redress? Or do they serve the corporate machine and its need to keep generating profits without taking responsibility for the human cost of doing so?

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