

dye more commonly known as "butter yellow." Butter dyes had been used since the nineteenth century, primarily to achieve the deep golden color of butter from the cream of cattle fed the new sweet grass of May and June ("June butter"). Butter and margarine were colored either by natural dyes, like annatto seed extract from the Americas, or coal tar dyes, the most common being dimethylaminoazobenzene. In the United States, coal tar colors were banned in foods in many states until the 1930s, after which time they were approved (many were banned again by federal laws in the 1950s and 1960s). Germany, though, was where most of the dyes were originally synthesized, and where the first mass campaign was launched to have them barred as carcinogens.

Ironically, evidence of a cancer hazard from food dyes in the aminoazo group was discovered about the same time those dyes were approved for use in the United States. The first hint of a danger came from Japan in the mid-1930s, when Tomizo Yoshida and other Japanese experimentalists showed that rats fed the coal tar dye o-aminoazotoluol (scarlet red) would develop liver tumors.¹⁵³ Other dyes were found to have similar properties, the most disturbing being the widely used "butter yellow," which Riojun Kinoshita of Osaka in 1937 showed to cause liver cancer in rats after two to three months of exposure.¹⁵⁴

German researchers confirmed these results shortly thereafter, showing also that the process of carcinogenesis seemed to involve changes in the cellular nuclei of affected tissues.¹⁵⁵ Hermann Druckrey of Berlin's Pharmacologic Institute spearheaded the scientific effort, showing that much depended on how a particular dye moved through the body. Fat-soluble substances tended to concentrate in local fatty tissues near the point of injection, for example, whereas water-soluble substances like butter yellow tended to travel to more distant sites. Animal experiments showed that it was also important to understand how these compounds broke down in the body: azo dyes were reduced to aniline in the liver, for example, which explained the production of liver cancers.¹⁵⁶ Subsequent research showed that coal tar dyes could cause other kinds of cancers—bladder and stomach, for example—and

that different chemical forms of a dye could induce different kinds of tumors.¹⁵⁷

In June of 1939, the International Congress for Cancer Research issued a unanimous recommendation that cancer-causing colorings should be banned from foods.¹⁵⁸ Thirty different azo dyes by this time had been shown to cause cancer in laboratory animals—some by injection, some by ingestion.¹⁵⁹ The recommendation came to the attention of Reich Health Office president Hans Reiter, who took it seriously. In the fall of 1939, after conversations with Druckrey and others, he began preparations to draft a "new German color law" that would take into account the new cancer findings.¹⁶⁰

Reiter, though, was in a difficult spot. Butter yellow was only one of many coal tar dyes, and food industry chemists were constantly introducing new ones. There was also the problem of how to deal with the public. Reiter worried that if colors were suddenly removed—especially in the middle of the war—people might think they were getting inferior foodstuffs, or worse. Word of the cancer danger was beginning to spread to the public: in 1941, for example, a member of Göttingen's NS-Frauenwerk asked her superiors why "cancer-causing" substances were still allowed in butter and margarine; her superiors doubted this could be true, but passed the query up the chain of command until it reached the regional women's leader (*Gaufrauenschaftsleiter*), who informed Reiter that while women were certainly willing to sacrifice for the war, accepting the presence of cancer-causing agents in food was something else. Reiter tried to calm the Nazi leader, assuring her that the problem was being studied and that there was "no cause for alarm." He also asked that the matter be kept confidential, so as not to alarm the general population.¹⁶¹

The Reich Health Office president tried to resolve the matter by meeting privately with the various groups producing and marketing coal tar dyes, urging each to discontinue or reduce its use of colorings in foods. He got an influential food trade group (*Fachgruppe Nahrungsmittelindustrie*) to agree to cut by half the amount of dyes in some pudding powders, and to eliminate dyes from other foods altogether. The largest garden produce association (*Haupt-*