made only after extensive testing, which would be done at the expense of the interested producer. This is the procedure now in effect in the United States applicable to the certified food colors.

General feeling in the conference was that food colors offered the best starting point for any international legislative approach. Reith pointed out a number of international inconsistencies in this field: in The Netherlands, "harmless" dyes may be added to food, but no list of such dyes is specified. In the United Kingdom the law provides only a list of prohibited dyes; in the United States and Canada a list of permitted dyes is given.

In Germany, since 1949 a special commission has been studying carcinogenic effects of synthetic dyestuffs. After rigorous testing a number of synthetic dyestuffs have now been shown to have no carcinogenic properties, said H. Druckrey, Freiburg University Clinic. On the other hand, there are numerous dyestuffs which now must be rejected as dangerous. The carcinogenic action, according to experience to date, is bound up with specific structure of various kinds. Minor changes, for example a shift in the methyl group, can cause or eliminate carcinogenic action in dyestuffs.

Druckrey predicted that within a short time chemical constitution would be definitely correlated with carcinogenic action. Already it has been determined that, for example, introduction of an acidic group into a basic azo dye practically eliminates carcinogenicity. Sulfation may also have a similar action, but breaking of the azo bridge can produce a toxic compound.

The German professor read a proposal for international restrictive legislation on food additives, that had been unanimously adopted by an international conference on the subject, held in Bad Godesberg in May of this year. An important point in this proposal was the suggestion that an international list of permitted food colors be prepared; 13 synthetic dyes were proposed, together with a number of dyes of natural origin. Specimens of the approved dyes should be exchanged on an international basis. The proposal went on to lay down a procedure for admittance of additional food additives to the approved list.

The Bad Godesberg proposal was unanimously endorsed by the Nutrition Congress, with the suggestion that the matter be referred to the International Union of Nutritional Sciences. A joint committee of the WHO and FAO studying food additives meets in November of this year and will undoubtedly consider the proposal.

German Study Reveals Lead in Yeast from Sulfite Liquor

AMSTERDAM.—Samples of torula yeast produced from spent sulfite liquor have been found to contain toxic amounts of lead, according to Karl-Heinz Wagner, Institute for Nutritional Science, Giessen, Germany. Test animals fed samples of yeast of this type showed accumulation of lead not only in the liver but also in the bone structure. Wagner made his report before the Third International Congress on Nutrition, held here Sept. 13 to 17.

At Giessen, biological evaluation of different kinds of yeast indicated that animals fed torula yeast showed slower growth rates than animals fed dry brewers' yeast. Although histological examinations gave the impression of a poisoning, the first assumption was that the difficulty was due to action of unknown protein compounds in the yeast. However, when human beings were fed samples of the yeast, changes took place in the blood chemistry analogous to changes observed in heavy metal poisoning. The degree of poisoning paralleled the quantity of yeast ingested.

On analysis, the torula yeast samples were found to contain arsenic, antimony, lead, and iron. The presence of lead in the blood of humans who had consumed the yeast samples was established by polarographic methods.

Wagner made an urgent plea for rigid control of commercially produced torula yeast. A determination of heavy metal content should be required for cattle feed as well as human food, said Wagner.

In the discussion following his lecture, Wagner's findings were sharply criticized by a representative of Zellstofffabrik Waldhof. Waldhof is probably the world's largest producer of torula yeast. Many feeding tests have been carried out over a number of years without any injurious effects, said the Waldhof spokesman. While admitting that higher contents of lead were possible in yeast samples produced shortly after the war, he indicated that important processing changes had been made since then and that recent production contained completely harmless quantities of heavy metals. He suggested that yeast for feed purposes should have a lead content not exceeding 10 to 20 p.p.m.

The torula yeast process, utilizing spent liquor from sulfite pulp mills, was perfected in Germany just prior to and during the last war. Zellstofffabrik Waldhof was the most successful of the German firms working on the process and has evolved a unique aeration technique for the fermentation. The first commercial feed yeast plant to use spent sulfite liquor in the United States started production in 1948 at Rhinelander, Wis. Since that time, several other yeast plans of similar design have gone into production.

Carbohydrates as Chemical Raw Materials?

NEW YORK.—Sooner or later, as petroleum, natural gas, and other fossil sources of basic organic chemical raw materials are consumed, the chemical industry will have to turn to replenishable raw materials, such as carbohydrates. To many the day when this will become necessary is something for treatment in science fiction by those who dream of the far distant future, but others feel that even now we should be working to find more industrial uses for carbohydrates.

Probably the foremost proponent of research on industrial applications for carbohydrates is Henry B. Hass, Sugar Research Foundation, whose interest is in sucrose and its by-products. At the symposium on sources of carbohydrate raw materials at the 126th National ACS meeting here recently, he said that what has already been done with starch should now be done with sugar. He was, of course, referring to starch's many industrial applications which consume greater volumes than food uses.

Sugar is the pure organic chemical produced in greatest quantity. Its chemical structure and the behavior of its chief functional groups are well known yet very little sugar is used as a starting point for chemical manufacturing processes, with the exception of sorbitol.

Hass said research could turn up other useful sugar derivatives, such as a synthetic detergent derived from sugar which has already been prepared on a laboratory scale. Sugar's great solubility and the fact that it is taken up by living organisms at a rapid rate suggest