

## Antibiotics in Feed Have Little Effect on Pork Quality

CHICAGO.—So far there has been no evidence that antibiotic feeding of hogs to increase their growth rate has any effect on the quality of pork. This was the substance of a report by R. W. Bray, University of Wisconsin, at the meeting of the council of research of the American Meat Institute here March 26 and 27.

The ultimate measure of the quality of meat is the tenderness, juiciness, and flavor as judged by the American housewife. An exact quantitative definition is difficult. Most studies thus far have been on a comparison of the ratio of lean to fat. The results from various institutions conflict to a certain extent, but any differences which have been observed are rather slight. It is difficult to segregate the effects of antibiotic feeding from the effects of other variables, such as protein level of the ration, type, and breed of hog and the length of time the antibiotic was administered.

In Iowa work was done with several different antibiotics in varying quantities. It was found that antibiotics improved growth rate, but had no detectable effect on meat quality. In Minnesota a comparison was made between feeding anti-

biotics at only the early stages vs. feeding antibiotics until the animal was ready for market. The withdrawal of the antibiotic had little, if any, effect on the quality of the meat. There seemed to be some trend towards thicker fat back in the antibiotic fed hogs, but these data have not yet been completely analyzed.

A group of Canadian researchers set up a scoring system to compare meat quality. They found a decrease in the score when B<sub>12</sub> and the antibiotics were used in combination.

Work remains to be done on the effect of residual antibiotics on the microflora of the meat. More knowledge of the lability of antibiotics is needed.

**By-Products.** For many years the profit of the meat packers has come, not from the beef, but from the by-products produced. Recently the value of the by-product in relation to the cost of the live animal has been decreasing sharply, according to H. R. Kraybill of the American Meat Institute Foundation. In 1947 by-products represented more than 11% of the total value of all products produced by the meat packers. This amounted to over \$1 billion. The price

of by-products has been declining steadily. Increased competition from synthetic detergents, nonleather shoe soles, and hydrogenated vegetable oils has cut into the market for these products. More research is needed to develop new uses for the products and to convert them into more valuable materials, according to Dr. Kraybill.

**Canning.** C. A. Greenleaf, National Canners Association, presented a review of new canning methods. Present canning methods have the undesirable feature of excessively cooking the products. Use of antibiotics and ionizing radiation have been proposed as means of eliminating heat entirely. Subtilin was investigated at Western Regional Research Laboratory. Results were questionable, and, moreover, the Food and Drug Administration has recently outlawed the addition of antibiotics to food.

More effective use of heat is the goal of several new canning methods. Radio frequency dielectric heating offers a means of heating the entire mass simultaneously. At present this procedure is not commercially practicable.

Agitation during sterilization has been used to obtain a more uniform heating of canned goods. This ordinarily is practical only for liquids or liquid-containing products. However, new equipment makes it possible to apply agitation to such a preparation as cream style corn.

## Increasing Knowledge of Carbohydrates Changing Food Preparation from Art to Science

THE LAST DECADE's research on carbohydrates has given chemists more and more control over the properties of these most plentiful of the food materials. This theme dominated the symposium on use of sugar and carbohydrates in the food industry, sponsored jointly by the Division of Carbohydrate Chemistry and the Division of Agricultural and Food Chemistry at the ACS meeting in Los Angeles. Ability to manipulate the chemical and physical properties of the carbohydrates plus the extreme versatility of the materials themselves is helping to make food preparation a science.

The choice of a carbohydrate and the physical form of it to be used in particular food products is becoming more and more conditioned on what is known about its chemical and physical properties. For example, sugar's wide range of uses and its flexibility depend on its capability of being completely or partially hydrolyzed to dextrose and levulose. The properties of most native starches are dependent on the linear or branched-chain structure of the poly-

saccharides. Modified starches, which have permitted many new and varied uses of starch in food can be traced in large part to alterations of molecular size and shape. Modern starch hydrolyzates can be virtually custom-tailored to fit exact requirements of the end use.

Candymaking is perhaps an outstanding example of the control of sugar's properties and its versatility, a characteristic required by the candy industry to turn out its more than 2000 varieties of candy. To the confectioner, the most important chemical and physical properties, in order of their importance are: relative sweetness, solubility and crystallization characteristics, density of liquid sweeteners and moisture content of solid sweeteners, hygroscopicity, flavor, fermentation and preservative properties, molecular weight, and osmotic pressure and freezing point depression.

The relative sweetness of maltose, dextrose, and corn sirups, using sucrose as a standard, varies directly with concentration and combinations of these sugars give sweetness values that are

additive if calculated in dextrose terms.

Sucrose has the highest rate of solution and forms super-saturated solutions with the desirable physical property, for candymakers, of withstanding super-cooling—important in the manufacture of hard candy. Invert sugar sirups, high-inversion corn sirups, enzyme sirups, and invert sugar can be used interchangeably on a solids basis to control sucrose crystallization in such grained candies as fondants and fudge. Corn sirups affect cane sugar crystallization to a greater degree than invert and without the attendant handicap of introducing excessive hygroscopic qualities. Dextrose is used to change solubility characteristics and modify the relative sweetness of confections. It also tends to crystallize more slowly than sucrose and, at the same concentration, is less viscous. Sorbitol seems to have plasticizing effects on confections and, besides its low humectant range, keeps candies soft for extended periods of time. New methods of improving the shelf-life and quality of candies, adding to the complexity and