

# FOOD AND DRUGS

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**Gas Storage of Fruit**—In an attempt to prolong the storage life of fruit by storing in an atmosphere rich in carbon dioxide, with or without temperature control—apples alone being studied—the fruit was stored in closed chambers, restricted ventilation being controlled by opening and closing air ports. The respiratory processes of the apples result in a rise of temperature and an increase in the carbon dioxide content of the atmosphere with a corresponding diminution in that of oxygen. The principal difficulties encountered in storing under restricted ventilation were an increase in humidity to 90–98 per cent and an accumulation of various volatile organic products in the stagnant atmosphere. A high humidity as such has not been proved to be deleterious, but the actual deposition of water on the fruit encourages growth of fungi. The use of oiled paper wrappers for the apples, or embedding in sawdust or oiled sawdust, removes the ill effects of the stagnant atmosphere, which otherwise encourages superficial scald. An atmosphere of approximately 10 per cent of carbon dioxide and 11 per cent of oxygen was found to be the most suitable; higher concentrations of carbon dioxide led to a danger of wastage due to brown heart. With this atmosphere, increases in storage life of 50–100 per cent were recorded. Rise in temperature due to self-heating was an important factor, and some form of temperature control was found to be desirable. A temperature of about 10° is believed to be the most suitable. At this temperature an increase in storage life of 100 per cent on a semi-commercial scale has been recorded, but at higher or lower temperatures the efficiency of the methods falls off. This is ascribed to variations in the concentration of oxygen and of carbon dioxide in solution in the tissue fluids. At too low temperatures the carbon dioxide concentration in the tissue fluids becomes too high and may lead to brown heart; at too high temperatures the oxygen content is insufficient to support respiration. The preservation of the color, firmness and juiciness of the apples is associated with the prolongation of the storage

life. The preserving action of the atmosphere used is found to be proportional to the reduced respiratory activity of the fruit. Discussing overseas transport of fruit, the authors ascribe the varying success of transport in unventilated holds to variations in the extent of accidental ventilation.—F. Kidd, C. West, and M. N. Kidd, Dept. Sci. Ind. Res., *Food Investigation Special Rep.*, 30:87, 1927. Abstract, *Brit. Chem. Abst. B.*, 46:426 (June 10), 1927.

**Vitamin B in Canned String Beans**—Experiments were conducted to determine the vitamin B content of string beans canned in plain and in acidified brine. Young albino rats averaging 50 g. each were used. The basal diet consisted of butterfat, casein, dextrin, agar and salt mixture. The string beans were canned in citric acid brine of pH 2.4 and in plain brine of pH 7.0 respectively. The animals were divided into four groups—normal, control, preventive and curative. It was found that string beans canned in either plain brine or citric acid brine when fed to young albino rats contained vitamin B of sufficient potency to act as a preventive or as a curative. A dosage of 5 g. per day of canned string beans equivalent to 0.4 g. of dried was found sufficient as either a preventive or curative in the case of rats suffering from vitamin B deficiency while a dosage of 10 g. per day brought about a much more rapid recovery. The minimum dosage was not determined.—W. Y. Fong, *Am. Food J.*, 22:197 (June), 1927.

**The Effect of Ethylene on the Enzymes of Pineapples**—It was noted that pineapples ripened with ethylene not only tasted sweeter but apparently seemed to dissolve the mucosa of the mouth more readily than untreated fruits. The proteoclastic enzyme activity was tested on 4 pineapples of the same size and degree of ripeness which were treated with ethylene or propylene (1:1000) once a day for 4 days then sampled for texture and flavor by a tasting squad. The general agreement was that ethylene treated fruit was superior to untreated,

and propylene was superior to ethylene. The juice of the pressed fruit was tested for enzyme activity on a substrate consisting of 10 per cent suspension of repurified casein in ammonium hydroxide, the activity being determined on 10 c.c. portions removed at intervals and the alpha-amino nitrogen estimated in the Van Slyke apparatus. The graph indicates that the ethylene treated sample maintained a higher degree of enzyme activity. Chemical analysis of samples from the same lot showed a decrease in total sugars and an increase in direct-reducing sugars, both experiments indicating that the activity of proteolytic enzymes and invertase of pineapples is increased by either ethylene or propylene.—L. O. Regeimbal and R. B. Harvey, *J. Am. Chem. Soc.*, 49:1117, 1927.

**Effect of Manganese on Growth**—McCarrison concludes that the growth-promoting properties of whole wheat are in part due to the content of manganese in this cereal. However, a concentration of 1 part manganese to 12,600 parts of food exercises a progressively increasing and retarding influence on growth; whereas a concentration of 1 part manganese in 617,700 parts of food exercises a markedly favorable influence on growth. R. McCarrison, *Indian J. Med. Res.*, 14:523 (Jan.), 1927. Abstract, *J. A. M. A.*, 88:2000 (June 18), 1927.

**Bacteria Prevalent in Sweetcorn Canning**—In a study of the bacteria prevalent in sweet corn canning, 65 strains were isolated from freshly cut ears of corn, samples of corn as it passed through the canning, and stored corn. These organisms were considered representative of the types present upon sweet corn during the processing and handling, and also during spoilage.

On the basis of cultural study, these organisms were divided into 18 types, 11 of which produced spores. Four were organisms allied to *B. subtilis*; of the remaining strains one resembled *B. mesentericus*; another *B. cereus*; a third *B. Agri*; a fourth *B. cohaerens*, and a fifth *B. aerogenes*; 2 others were aerobic Gram negative, non-spore-forming organisms; 2 were non-spore-forming pigment-producing organisms; and 5 were not readily identifiable. *B. subtilis* was present on fresh corn at every step in the process of canning and was found in large numbers in "heating" corn. Certain strains of this type were moderately heat-resistant.

The preheating of corn destroyed over 99 per cent of the organisms growing at 30° C. but

did not affect the numbers which grew at 55° C. Thermal death point determinations of 46 strains which produced spores revealed only 6 which withstood in the tubes tested a temperature of 240° F. for 15 seconds. The thermal death points of the most resistant organisms isolated in this study were considerably below those of strains isolated from canned products by other workers. Comparison of the thermal death points determined at 250°, 245° and 240° F. with the curves of heat penetration into corn when processed for about 75 minutes at 250° F. indicated that none of the organisms obtained would withstand the ordinary commercial process. The author concludes that corn handled with care and dispatch and, when canned, given the full process recommended, would not contain highly resistant thermophilic bacteria.—Lawrence H. James, *J. Bact.*, 13:409 (June), 1927.

**Effect of Dietary Deficiencies on the Growth of Certain Body Systems and Organs**

—A study was made on rats stunted by quantitative and qualitative inadequate diets, the deficiencies being (1) calorie deficiency, (2) protein deficiency, (3) mineral deficiency. At the end of the experimental period of 40 days during which time the animals were kept as nearly at constant weight as possible, the stunted animals were killed and data obtained for body and tail lengths and the weights of hearts, livers, kidneys and testes. Comparative figures for normal rats were obtained from rats bred in the laboratories. Skeletal growth occurred on all diets, and body length increased from 8.7 to 19.5 per cent of the normal gain. The increased growth was least on the low salt diet. The weight of the leg bones of stunted animals on the low calorie, protein and gliadin rations was 50 to 60 per cent greater than that of the bones of normal animals of the same body weight. The weight of the leg bones of rats on low salt diets was 30 to 40 per cent below that of animals stunted in other ways although the same increase in the animals was observed. This persistent increase in skeletal growth did not take place at the expense of the other organs studied. The most significant change noted was the consistent increase in the kidney weight on food low in salts—55 per cent of the estimated weight at the start of the experiment and 63 per cent of the normal gain. There was a variation in the effects of low protein and salt diets, the animals on the latter increasing in body and tail lengths greater than did those on the low

protein. Kidney and testes weights increased on the gliadin diet but not on the low protein. The liver and heart increased on the low protein diet without a corresponding increase on the gliadin diet. In none of the experiments was there an increase in any part of the body comparable with the increase found in the normal control.—Jet. C. Winters, Arthur H. Smith and Lafayette B. Mendel, *Am. J. Physiol.*, 80:576 (May 1), 1927.

**Decaffeinated Coffee**—The author discusses the increasing use of decaffeinated coffee in the manufacture of which the first industrial process was elaborated in 1907 by Wimmer and Meyer at Bremen, and consisted in agitating the moistened coffee under pressure of hydrochloric acid gas or ammonia, then extracting caffeine with hydrocarbon or other volatile solvents. For a long time one well known brand, Kaffee Hag, contained traces of the solvent and a persistent odor of benzene. Other methods and improvements followed, such as aqueous extractions, the use of acids and alkalis, salicylic and other organic acids and their esters. For a long time it was considered that coffee with 0.2 per cent caffeine was the ultimate limit of possible extraction. Coffees containing more than this amount were not considered decaffeinated or free from caffeine. Wide discrepancies were found in various analytical methods and as these improved in hand with the improvement in manufacture, coffees were obtained containing not more than 0.08 per cent of caffeine. The author gives a method for the determination of caffeine by which are analyzed brands of decaffeinated coffee purchased in France, Germany and Switzerland which vary from 0.078 to 0.093 per cent caffeine. Apparently some varieties of coffee are more easily decaffeinated than others, for example, Mocha is superior in this respect to Santos. It is contended that the decaffeinated coffee is not exactly identical with coffee which has lost merely its caffeine. The extract as a result of decaffeination contains a black material of a waxy, resinous character with melting point at 56° and saponification number of 159. The point is also raised as to whether the caffeine alone is responsible for activating the heart in coffee drinkers.—M. Louis Weil, *Ann. des Falsif.*, 221:269 (May), 1927.

**Vitamin A Content of Skimmed Milk**—Ex-

perimental rats were fed whole milk in order to determine the minimum amount necessary to supply the vitamin A to the basal diet. This was found to be from 1.7 g. to 2.8 g. per day. The animals with the exception of the controls which had the basal diet with the addition of cod liver oil, were fed the basal diet and skimmed milk *ad libitum*. The whole milk averaged 2.8 per cent fat and the skimmed milk prepared from the whole milk contained an average of 0.18 per cent fat. If the vitamin A were exclusively in combination with the fat the amount of skimmed milk to be adequate should be 15 times as great or 28 g. per day. The largest amount of skimmed milk which any one animal consumed during the experimental period was 20 g. per day which was inadequate for producing an increase in growth. It is concluded, therefore, that if any part of the vitamin A in milk is in combination with other elements than the fat it must be an insignificant amount.—J. Birger Platon, *Biochem. Ztschr.*, 185:238 (June), 1927.

**The City of Birmingham's Milk Supply**—Birmingham, Ala., in 1920 with a population of 200,000 was dependent for its milk supply upon dairymen who peddled milk in the raw state in the city with only two small concerns attempting to pasteurize milk. In 1921, the city consumed less milk than any city in the United States of which statistics were available, the consumption being less than one-fifth pint per capita. One milk-borne epidemic was estimated to have caused over 700 cases of typhoid, and Birmingham had the highest death rate in America both in typhoid fever and colitis of children under 2 years of age. The bacterial count for the 3-year period prior to 1921 was in excess of 700,000 per c.c., and most of the milk contained visible sediment. In a little more than five years as a result of the activities of the Department of Health, by education of the public and the dairymen and with the coöperation of the latter, the consumption of milk has been increased over 100 per cent while at the same time the increase in population was 30 per cent. The typhoid death rate decreased from 65 to less than 8 and the death rate from colitis of children under 2 years has decreased from 182 to 33. The average bacterial count of market milk is well under 50,000 per c.c. and adulteration has been practically eliminated.—L. C. Bulmer, *Milk Dealer*, 16:62 (June), 1927.