FOOD, DRUGS AND NUTRITION

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Cereals and Rickets. III. The Comparative Rickets-Producing Properties of Corn, Wheat, and Oats, and the Effect of Irradiation and Mineral Supplements—This records an extensive series of experiments on use of activated cereals on rats begun in 1924 and in which a total of 230 rats were employed. Preliminary experiments indicated that untreated cereals were definitely rachitic and at this time a report of an investigation was received stating that cereals do not produce rickets in proportion to their calcium and phosphorus deficiency, and further that oatmeal was the most rachitic and white flour the least, contrary to the evidence found in the preliminary experiments. In these experiments in 1924, young rats were getting an experimental ration of a single cereal for 5 weeks; the rats were then killed and the femurs analyzed. The percentage of ash in the femurs was highest for wheat and lowest for corn meal, rolled oats being intermediate. The experiment definitely indicated that all cereals were ricket producing.

In 1925, experiments were conducted to compare corn, wheat, and oats. The cereals for controls were irradiated in thin layers for 30 minutes by a quartz mercury vapor lamp. In this experiment, the growth on non-irradiated cereals was practically the same, while on the irradiated ration the wheat was superior. Yellow corn was the least favorable. In both these experiments, calcium carbonate at 3 per cent level was included in the feed.

In 1925 and 1926, corn, wheat, and oats, both irradiated and non-irradiated, were fed with 0, 1, 2, and 3 per cent calcium carbonate addition. In this experiment some rats were fed a ration in which the phosphorus intake was equalized by the addition of \( \text{H}_3\text{PO}_4 \). In this experiment vitamin A deficiency was manifested. In spite of this, good rate of growth and maintenance prevailed through the 5-week period. Growth on rolled oats was less than on wheat and corn in which the poor consumption of this cereal was a factor. Calcium deficiency of the cereals was evident since when \( \text{CaCO}_3 \) was added up to 1 per cent, growth increased but did not increase with additional calcium. Phosphorus addition made no material change. Wheat was superior in bone production followed by rolled oats and yellow corn in the same relation with the ash in the femurs.

In the experiments in 1926 and 1927, an attempt was made to measure carefully the rations consumed by limiting the intake to that which was all entirely consumed by any one individual. Corn, wheat, and oats were ground to an impalpable powder and fed with wheat gluten and sodium chloride and calcium carbonate. In the rolled oats it was found that these were not consumed readily and the uniform intake could not be insured. The wheat increases were found uniform in untreated cereals without carbonate additions. Irradia tion, as in other experiments, made definite growth increases. With calcium carbonate addition there was less increase in weight on the corn diet. In general, the effect of irradiation was to equalize the calcification, but without calcium supplements the percentage of
ash was not increased. Supplementary experiments were run to account for the poor consumption of rolled oats, which seem to preclude the vitamin A deficiency and indigestibility as factors. The opinion is offered that a deficiency of vitamin G may be involved.—H. Steenbock, Archie Black, and B. H. Thomas, J. Biol. Chem., 85: 585 (Jan.), 1930.

The Effect of Vitamin D and of Reaction of Diet upon Response to Parathyroid Extract—Recent investigators have reported the prevention or postponement of tetany by cod liver oil or irradiated ergosterol in parathyroidectomized dogs. Others have found that even massive doses of irradiated ergosterol afford little protection. Milk, lactose, calcium lactate, acetate, or carbonate and ammonium chloride, as well as parathyroid extract, have been found to prevent tetany in these cases. In the absence of records as to the effect of parathyroid extract on animals deprived of vitamin D this work was undertaken on young vitamin D-free dogs.

Pups 5 weeks of age were placed on a low phosphorus normal calcium diet. Two in each litter received vitamin D. All grew, but the other animals developed signs of rickets. At the fourth month parathyroid injections were begun when definite rachitic symptoms including lowered serum calcium and phosphates were evident.

One of the dogs receiving the vitamin D complement (1 mg. irradiated ergosterol daily) succumbed to hypervitaminosis D. There was great increase in serum calcium while the corresponding vitamin D-free dog, with neutral urine, showed only slight increase in serum calcium. A dog, vitamin D-free, urine acid, showed less response, but the dog with urine alkaline, vitamin D-free, died of overdosage, indicating the alkaline reaction of the urine as contributing to susceptibility which was confirmed by supplementary experiments.

Single doses of parathyroid extract had the same effect on young dogs which had been given vitamin D either as cod liver oil or irradiated ergosterol. With a diet producing Ca : P ratio of 1.64 with irradiated ergosterol insufficient to prevent rickets, dogs succumbed to parathyroid extract injections but on a lowered vitamin D-free diet showed no ill effects. The increased response to parathyroid administration with sodium carbonate sufficient to make the urine alkaline was observed both in young and adult dogs. The amount 0.5 gm. per kilo per day of sodium carbonate is sufficient for this purpose. With ammonium chloride substituted for sodium carbonate only slight response is noted. In view of the reports of the use of cod liver oil or ergosterol and calcium salts in the treatment of hyperparathyroidism the authors conclude that these experiments would indicate caution in such treatment.—Agnes Fay Morgan and E. Alta Garrison, J. Biol. Chem., 85: 687 (Feb.), 1930.

Irradiated Products and the Public Health—This is a report of the recommendations adopted by the Conseil Superieur d'hygiene publique, of which the authors are members. The report is divided into two parts—a discussion of the adverse effects encountered in the use of ultra-violet rays, and the use of irradiated food products. In the latter case, there is quite a complete summary of all of the recent work both in Europe and America on the danger of hypervitaminosis by the administration of irradiated ergosterol.

Reference is made to the warning of the Council of Pharmacy and Chemistry of the American Medical Association relative to the care which should be taken in recommending this new treatment. Reference is also made to the
reports of the toxic symptoms demonstrated by the use of irradiated foods, in particular irradiated milk.

In conclusion, in view of the diversity of the origin and preparation of irradiated products and the changes that take place on aging, it is considered indispensable that the medical profession be exactly informed on the following points: the procedure employed in obtaining the irradiated product, the antirachitic power of the drug, and finally, the date of manufacture. It is important that this information appear on the label and circular and that the date of the manufacture be printed on the case containing the boxes or bottles of irradiated products.

These irradiated preparations should only be distributed by pharmacists.—D. F. Bordas and Jules Renault, *Ann. des Falsifications et des Fraudes*, 233: 37 (Jan.), 1930.

The Escherichia-Aerobacter Group as an Index to Proper Pasteurization—The coli bacillus, because its thermal death-point closely approaches the pasteurization temperature, has been often used as an index to the efficiency of pasteurization. This paper reports experiments to ascertain whether or not there is a relationship between counts of *E. coli* and *E. aerogenes* and the efficiency of pasteurization. One hundred samples of milk were inoculated with pure cultures of *E. coli* and heated for 30 minutes at temperatures used in commercial pasteurization. It was found that *E. coli* survived the heating process in 32 per cent of the samples. As a result of experiments on the acclimatization of *E. coli* to higher temperatures by using resistant individuals selected on successive heatings it was possible to raise from 145° F. to 148° F. the absolute death-point of a culture of *E. coli* the usual or majority death-point of which was 144° F. for 30 minutes.

It is concluded that organisms of the Escherichia-Aerobacter group may survive in milk that has been properly pasteurized and that, therefore, the coli test cannot be used as a true index to proper pasteurization.—E. Arthur Beavens, *J. Dairy Sci.*, 13: 94 (Mar.), 1930.

An Outbreak of Food Poisoning Caused by *Salmonella Enteritidis*—An outbreak of food poisoning following the ingestion of cream puffs infected with *S. enteritidis* is reported. Ninety people who were made ill displayed typical symptoms of acute gastroenteritis. The average time of appearance of the clinical symptoms was 10 hours after ingestion of the pastry. Delayed symptoms were noted in three of the cases which were mild, illness appearing 24 hours after ingestion. In one case symptoms appeared within 4 hours while in 4 other cases within 6 hours. Subnormal temperatures were noted during the acute stage of the illness followed by slight temperature later in the illness (100–101° F.). All patients recovered.

*Salmonella enteritidis* was recovered from the cream filling of the pastry; from excreta of mice in the bakery as well as from the intestinal contents of mice trapped in the bakery. Intraperitoneal injections of the recovered organism into mice and guinea pigs cause the death of the animals. Similar injections of killed cultures and culture filtrates both heated and unheated cause death to these animals. Feedings of viable and killed cultures of a number of rabbits and guinea pigs were negative.—Rigney D'Aunoy, *J. Infect. Dis.*, 45: 404 (Nov.), 1929.