soluble in the presence of soluble manganous compounds, and the catalytic activity of iron and copper together is much greater than the additive effects of iron and copper separately.

The loss of iodine from iodized salt depends upon the oxidizing impurities in the salt, chiefly chlorate, nitrate and ferric chloride. Iodized salt for animal feeding, which contains large amounts of potassium iodide, loses iodine with great rapidity. Iodized salt for human consumption, which contains 0.02 per cent. potassium iodide, loses 40 per cent. or more of the iodine in eighteen months. If the salt is freshly prepared, approximately 15 to 20 per cent. of the iodine is lost during the first month.

Stabilization by the use of alkaline agents and reducing agents has been recommended and extensively used. But this treatment has not been entirely successful because of the inability to obtain adequate contact between the reacting components in a dry powder. The employment of a reducing agent in conjunction with a soluble pyrophosphate is more effective. Pyrophosphate forms an inactive complex with oxidized iron; it also destroys the synergism between iron and copper.

A new and simplified procedure for stabilizing the iodine reinforcement of comestibles has come from our work. The process consists of milling 100-mesh alkali iodide with a small portion of a non-toxic metallic soap. The milling of 92 parts of potassium iodide with 8 or more parts of calcium stearate in the form of an impalpable powder is recommended; the powder density of the calcium stearate should be as low as possible. The resulting product is a stable free-flowing powder, coated with calcium stearate and practically insoluble in water. The coating is rapidly emulsified in the presence of bile. Calcium stearate is non-toxic and may be ingested in reasonable amounts with complete physiological safety. Various grades of the impalpable powder are available commercially.

A mineralized salt, containing 10 per cent. ferric oxide, 2 per cent. copper sulfate, and 4 per cent. potassium iodide coated with calcium stearate, has lost only 0.9 per cent. of its iodine content during storage for four months, while the same formula without calcium stearate has lost 15 per cent. of the iodine. An iodized livestock mineral containing 0.21 per cent. stearate-coated potassium iodide lost 0.5 per cent. of the original iodine content during two months, while an unstabilized mineral containing the same ingredients lost 14 per cent. of its iodine content. Absorption of the stearate-coated potassium iodide by cardboard, paper or fabric containers does not occur.

Calcium stearate also functions to prevent caking in table salt. As iodized table salt contains 0.02 per cent. potassium iodide, it is necessary to employ 0.2 per cent., or ten times as much calcium stearate as potassium iodide, to be effective in preventing caking. The cost is comparable to that of present methods.

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A NEW FACTOR OF THE VITAMIN B COMPLEX REQUIRED BY THE ALBINO MOUSE

IN view of the wide use of the albino mouse as an experimental animal, particularly in medical research, it is surprising that so little is known about its dietary requirements. The work that has been done[1,2,3,4,5] indicates that the nutrition of the mouse differs markedly from that of the rat. It was stated by Birch, György and Harris[6] that mice on the Goldberger black-tongue diet supplemented with 5 International Units of thiamin and 15γ of riboflavin injected twice a week failed to grow and developed skin lesions and loss of hair, whereas rats on the same diet grew normally.

In the study of the requirements of the albino mouse for the several factors of the vitamin B complex, a basal diet consisting of purified casein, 18 per cent., sucrose, 75 per cent., cod liver oil, 1 per cent., butter fat, 2 per cent., and Osborne and Mendel's salt mixture, 4 per cent., is being used, supplemented with known factors of the B complex.

When crystalline pyridoxin, thiamin, nicotinic acid and riboflavin are injected at various levels up to 10γ, 25γ, 25γ and 15γ respectively per day, failure of growth results in every case, and a characteristic skin lesion develops in from 30 to 40 days. If the crystalline supplements are fed with the basal diet at levels of 100γ of pyridoxin, 250γ of thiamin and nicotinic acid and 150γ of riboflavin daily, the same results are observed as when the B factors are injected.

The addition of liver or yeast, or the water or dilute (30 per cent.) alcohol extract of liver or yeast to the diet produces normal growth and maintains healthy skins in mice. However, feeding the basal diet supplemented with pyridoxin, thiamin, nicotinic acid and riboflavin with the addition of the filtrate from a fuller's earth adsorption of either yeast or liver extract neither produces growth nor prevents the appearance of skin lesions in mice when feeding amounts of filtrate equivalent to 0.1 gram and 0.2 gram of yeast daily or 0.5 gram of liver every other day. In only one case[7] have skin lesions been described on a diet adequate in thiamin, pyridoxin, nicotinic acid, ribo-

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[2] H. H. Beard, *Am. Jour. Physiol.*, 75: 668, 1925.
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[4] E. Pomerene and H. H. Beard, *Am. Jour. Physiol.*, 92: 282, 1930.
[5] J. M. Wolfe and H. P. Salter, *Jour. Nutrition*, 4: 185, 1931.
[6] T. W. Birch, P. György and L. J. Harris, *Biochem. Jour.*, 29: 2830, 1935.
[7] P. György and R. Eckhardt, *Nature*, 144: 512, 1939.

flavin and the "filtrate" or "rat growth" factor fed to rats. The symptoms described are similar to those reported here, but differ in certain essentials.

The skin lesions observed in the mouse differ in several respects from conditions of dermatitis described in the literature.[8] The paws, ears, nose and tail, and in most cases the eyes appear normal. In a few cases a sticky exudate is observed about the eyes. The lesions are preceded by loss of hair on the abdomen, closely followed by the appearance of shiny dry skin in the inguinal region. This in turn is soon followed by a scaly dandruff-like appearance beginning almost simultaneously on the back of the neck and in the inguinal region. If the animal survives this stage of the deficiency, the pelt frequently begins to come off in large plaques, particularly on the back, leaving a dry but otherwise normal-appearing hairless skin. In some cases it has been possible to keep the animals alive until they became completely denuded except for a slight amount of fuzzy hair around the head. In some cases, the peeling off of the pelt does not occur, but instead the dandruff-like appearance spreads over the body and the hair gradually falls out, leaving the animals covered with dry white scales. Early in the course of the deficiency the animals usually assume a hunched position with the hind feet drawn far up underneath the body. Histopathological examination of all organs and sections of the skin is now being made. At autopsy, the animals are found to be emaciated, but otherwise normal in gross appearance.

Mice require a water-soluble factor other than thiamin, nicotinic acid, pyridoxin, riboflavin and the "filtrate factor."[9] The required factor is present in yeast and liver. A study of the properties of this substance is now in progress.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SUBSTITUTE FOR EDESTIN

EDESTIN, the globulin of hemp-seed, has been regarded as a standard example of the seed globulins for many years. Osborne[1] subjected this protein to more detailed and extensive study than any other globulin, and his demonstration with Mendel[2] of its adequacy as the sole source of protein in the diet of animals has led to extensive use of edestin in certain types of animal experimentation. It serves, for example, as a convenient protein relatively free from phosphorus.

In recent years, many amino-acid determinations[3] have been made upon edestin, with the result that the composition of this protein is better known than is that of any globulin in its molecular weight class; in the cases of only a few other proteins are higher summations of amino-acids available. Furthermore, much attention has been given to its physical properties,[4] and the preparation of a sample of this protein has long been a standard exercise in laboratory courses in biochemistry.

The passage of the Marihuana Law of 1937 has placed restrictions upon trade in hemp-seed that, in effect, amount to prohibition. The seed may be purchased only under license, and transfer is subject to a tax of one dollar an ounce (if illegal, one hundred dollars an ounce). On application to the Collector of Internal Revenue, properly accredited persons may obtain exemption from this tax, and provisions are made in the law so that scientific research on marihuana (the legal definition of which includes all parts of the plant, and all products, save fiber, oil and seed cake prepared from it and from its seed) shall not be impeded.

Hemp-seed is produced only in small quantities in the United States, chiefly in Kentucky, and the plant may be grown only under license. Most of the hemp-seed is imported from the Orient, and there are only a few importers in the country who are licensed by the Federal Narcotics Division to engage in this trade. The seed is devitalized by heat treatment on receipt by the importers and may then be sold without restriction. It is used chiefly in various special feeds such as bird-seed.

The general effect of these restrictions is to render the purchase of hemp-seed for the preparation of edestin a time-consuming and troublesome process. The devitalized seed is useless, since the yield of protein is reduced to less than one twentieth of that from untreated seed. Although some laboratories may be willing to face the difficulties involved, the licensed

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