

temperature. The fluffy solid produced by evaporation of the eluate was obtained in 77% yield from sodium cyanide-C¹⁴ (radiochemical yield, 76%).

Diazomethane was prepared by treating an ether suspension of the nitrosomethylurea with 50% potassium hydroxide for a short time and then codistilling the ether and product into dry-ice cooled traps containing reactants. The yield was 54% from sodium cyanide-C¹⁴ as determined by radiochemical analysis of methyl-C¹⁴ 3,5-dinitro-2-methyl benzoate (chemical yield, 60%). The radiochemical analyses were accomplished by oxidation of aliquots of the radioactive substance to carbon-C¹⁴ dioxide, the activity of which was determined by means of a vibrating Reed electrometer (5).

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Removal of Thiamin and Riboflavin from Milk for Dietary Use¹

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In planning palatable experimental diets low in riboflavin and thiamin it is difficult to include adequate amounts of protein, calcium, and phosphorus from natural food sources. Recommended diets for children and adolescents, in particular, ordinarily contain large amounts of milk with its accompanying B vitamins.

Moody, Hauge, and Lundquist (1) have reported treatment of milk with florisl² in order to obtain a low-riboflavin milk for calf feeding. The same principle was used in this laboratory for removal of most of the riboflavin and thiamin from whole milk. The method uses florisl as an alternative to procedures involving irradiation of dry or whole milk (1, 3, 4). Main advantages of the florisl method are (1) treatment is rapid, (2) removal of thiamin and riboflavin is fairly complete, (3) there are no irradiation products, and (4) the taste of the milk is unaltered.

Two cotton gauze milk filter pads, such as are used by milk producers, are placed in a 6-in. Buchner fun-

nel and sealed with water. Three hundred g 60/100 mesh florisl suspended in 2% acetic acid is poured into the funnel and allowed to drain (without suction). The florisl is washed three times by filling the funnel with water. This washing serves to remove both the excess acid and the florisl dust which cannot be retained by the filter pads.

Three gallons of whole, homogenized milk is then delivered from a separatory funnel into the Buchner at the rate of filtration. A small circle of glass should be laid on the florisl below the end of the separatory funnel to avoid formation of a hole in the florisl. Collection is begun as soon as all the water appears to have been expelled.

Filtration of 3 gal milk without suction requires 90 min; 87-91% of the riboflavin and 95-100% of the thiamin are removed. Removal of calcium, phosphorus, and protein was found to be negligible. Adsorption in absolute amounts of these substances may well be as great as or greater than that of riboflavin and thiamin, but, as the calcium, phosphorus, and protein concentrations in milk are of a much greater magnitude, the fraction of the whole which is removed is not enough markedly to impair the value of the treated milk as a source of these nutrients. Only the thiamin, riboflavin, calcium, phosphorus, and nitrogen contents of the treated milk were investigated. The possibility that certain of the other vitamins present are also removed to greater or less extent is recognized. The treated milk should not be assumed to be a source of any nutrient until this assumption is justified by analytical results.

Either aseptic procedures should be used throughout, or the treatment of the milk should be followed by pasteurization.

Because of the cost of florisl, it may be desirable to recover and reuse it. After the florisl has been washed free of milk, it is washed with 20% pyridine in 2% acetic acid, in order to elute the adsorbed vitamins. The pyridine solution is washed away with water, and the florisl is then heated overnight at 600° C (5). It is not necessary to remove the pyridine exhaustively by washing. In the course of the high-temperature treatment, the florisl will be freed of all pyridine and of any other residual materials that can be distilled or carbonized. Adsorptive power of the reclaimed florisl was found not to differ from that of the unused product. It has not been determined whether the florisl loses its adsorptive properties after being repeatedly reused and reactivated.

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² Florisl is a synthetic magnesium silicate obtainable from the Floridin Company, Warren, Pa. Particles which might conceivably remain in the treated milk would not make the milk unfit for human consumption. This compound and other fuller's earth-type materials are used for purification of pharmaceuticals and medicinally as antacids and for treatment of peptic ulcers, etc. (2).