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Iowa Butter- Vitamin Rich

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FOLKS WHO eat Iowa butter in generous amounts are rather sure to be getting a great deal of that important vitamin—vitamin A.

This is shown by the first year of a 2-year study under way at the Iowa Station—part of a national survey now in progress. The study reveals that in almost any month, from any part of Iowa, you can depend on Iowa butter having not less than the 9,000 international units per pound which has at times been considered an average vitamin A content of butter. In the best months of the year, Iowa butter has shown over twice this amount.

The vitamin A value is found in butter not solely as vitamin A, but also as beta-carotene which the human body can change into vitamin A. The carotene is a plant pigment which gives most of the yellow color to the fat of cows' milk and which is more noticeable in milk and butter produced when cows are on green pasture or good green, leafy hay than when they are on dry grain rations with poor hay.

Varies With Season

The vitamin A value varies with the season, our study here at the Iowa Station has shown. The butter richest in vitamin A during the first year of our study was produced during July, August and September when the potency ran from 16,500 to 21,400 international units per pound of butter. That's about twice what was formerly considered a good average value. The vitamin A value was moderately high during May, June, October and November, then dropped sharply from November to January and was lowest during January, February, March and April. (See accompanying chart.)

One of the interesting and important things to note in this rise and fall in vitamin A values is that they are highest during some of the months when the most butter is made and stored. The bulk of the storage butter is produced in May, June and July.

This study should point to the need on the part of dairymen of trying to correct the fall in vitamin value during the winter months. The cow produces vitamin A from the orange-colored pigments (chiefly alpha-, beta-, and gamma-carotenes) of plants. Some of these carotenes the cow turns into vitamin A for her own use and part of them she passes on in her milk either as vitamin A or as beta-carotene. Then when the cream is skimmed from the milk, the vitamin A and carotene go with the cream and end up in butter when the cream is churned.

When cows are on green pasture, milk and the butter produced when cows are on green pasture or good green, leafy hay than when they are on dry grain rations with poor hay.

During the months when cows were getting green pasture grass Iowa butter showed its highest vitamin A value. Values were lowest in January, February, March, April.

The Vitamin Measure

Vitamin A value is measured in micrograms and these are expressed in the term international units, commonly abbreviated as IU. While the value of both carotene and vitamin A are expressed in the term international units, in a given weight of each, vitamin A has more international units. To convert vitamin A into international units, each microgram is multiplied by a figure tentatively fixed at 4, and each microgram of beta-carotene is multiplied by 1.67. Then by adding together the values for each, the total international unit value is determined.

You may wonder, “How much is a microgram?” It is equal to 1/28,350,000 of an ounce! Not very heavy. But when you consider that each one of these tiny weights yields 4 I.U.'s in vitamin A then you can see that an ounce of this material would really provide many people with what is considered the average need of 5,000 international units for each person per day.

For this study the state was divided into seven areas as shown in the accompanying map of Iowa. Into each area were grouped the creameries that were producing butter of about equal grade or score. No one has ever shown that there is any connection between score and vitamin A po-
tency, but this means of dividing the state did provide a method of getting similar areas and creameries together to give a representative sample. By getting butter from each area, then, an over-all picture for the state was obtained.

The number of creameries which were drawn for each area was in accord with the production of butter for that area. In other words, an area producing much butter would have more creameries providing samples. The whole attempt was to try to get a fair view of vitamin A value in Iowa butter.

Those in charge of the study concluded that 60 creameries furnishing samples of butter once each month would be about the number that could be handled satisfactorily. These creameries were then selected from each area by a random sampling method (random sampling may be likened to drawing names or numbers from a hat when all of the names or numbers are in the hat—each has as good a chance to be drawn as another).

Iowa was divided on a butter score basis into seven districts for the study of vitamin A value of butter.

The sampling method used seemed to give a fairly representative picture of the vitamin A value of Iowa butter. The second year's results of the study are not yet available, but they are expected to correspond fairly well with the first. It might be that the vitamin A value will rise at an earlier period than in the first year because pastures got off to an earlier start this spring.

Need for More Study

This report is concerned chiefly with the vitamin A value of Iowa butter, but it does clearly point to some avenues of study and to some things which dairymen may well be thinking about. First, can Iowa dairymen "lift" the vitamin value of butter that comes from Iowa during the non-pasture season?

Experiment stations have shown, and it is fairly generally known, that the way hay is cured has much to do with how much of its vitamin value is preserved or lost. We also know that the leaves of hay are much higher in vitamin value than the stems. So we need to do much thinking about the way we cure our hay to preserve the leaves and to prevent the hay from severe weathering.

A new project is being started at the Iowa Station on artificial drying of hay in the mow. Other stations have done some work on this problem and are continuing their study of the best way to get the hay cured so that it will have the highest possible feeding value—and that includes its value for production of vitamin A in the fat of the dairy cow. Turning crops into silage may be a partial answer to preserving the vitamin A content. The plant breeder's job is to try to bring high carotene content together with good yielding ability and other desirable qualities.

Conclusion

This study has shown that to date that Iowa butter is a rich source of vitamin A. This agrees with the long accepted fact that butter is the natural food with the highest vitamin A value. The study indicates the need for more research on winter feeding of our dairy herds to see what can be done to increase vitamin A in Iowa winter butter to make it more nearly reach the very high value it has during the pasture months.

Various hybridization studies are under way at the Iowa and other experiment stations in trying to produce superior soybean varieties. One of these crosses between Richland and Mukden seems rather promising. In 1943 in 17 locations in 9 states, this cross yielded about the same as Lincoln, which has been superior to any other variety with which it has been compared. In addition, this new cross in 1943 matured about 7 days earlier than Lincoln and was slightly superior to Richland in lodging resistance, a thing for which Richland is particularly prized. This new cross was high in oil content too.