# LOSS OF NUTRIENTS FROM BEET TOPS

## DURING STORAGE IN PILES IN THE FIELD

(Demonstration Paper)

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Drying of beet tops has been recommended to prevent loss of nutrients from beet tops during storage in the field. The test herein reported was executed to determine the magnitude of the storage loss.

Beet tops were collected very soon after the beets had been topped. They were immediately distributed in piles containing one hundred tops each, each pile resembling all others as nearly as possible. Each pile was placed on a piece of burlap to permit recovery of 100% of the contents of the pile when time for sampling arrived. Weights or original tops in each pile were determined and the piles were placed in the field. The weights of tops in the piles averaged 51 pounds each.

Immediately after building the piles, two of them were rolled, quartered and the samples were weighed and taken to the laboratory immediately and dried. Crowns were cut from the leaves, chopped into small pieces and dried in an oven. The leaves were dried in a rotating drum drier, through which a stream of heated air was passed, and were practically completely dried in three hours. The loss of nutrients between the time the beets were topped and the time the tops were dried could not have been appreciable. Crowns and leaves were analyzed separately and the analyses were calculated to original tops.

The composition of each pile was calculated from the weight of original tops placed in the pile and the average analysis, on original tops, of the two original samples. That the piles were not perfectly uniform was shown by the fact that ash content of the original samples varied by 20%, protein varied 7%, and crude fiber and nitrogen free extract varied less than 1%. The large variation in ash was probably the result of varying quantities of soil in the leaves.

Periodically a previously untouched pile was weighed, rolled, quartered and the sample was weighed. After analysis of the sample the content of the pile in the various components was calculated.

Most of the effort was directed toward determination of loss in piles under climatic conditions as they existed during the test. Three special tests were also carried out. In one, the piles were protected from precipitation by covering them with water-proofed duck cloth during threatening weather. In another, the piles were sprinkled periodically in an effort to simulate conditions existing during a wet season. The storage tests were carried for nine weeks, during which less than 2 inches natural precipitation fell. The watered piles received approximately 12 inches during this period. A third test was made to determine roughly the effect of allowing the beet tops to lay, unpiled in the field until well cured, before piling. These tops laid in the field five weeks before piling. They were then piled and sampled four weeks later.

The results are given in condensed form in Fig. I. The composition of the original tops in pounds of the various constituents per ton of tops are shown at the extreme left. The remainder of the chart shows the percentage of components originally present remaining after storage of 1, 2, 4, 6 and 9 weeks. In the three special tests only the results on nitrogen free extract and protein after nine weeks storage are shown. Sampling error probably accounts for most of the variations shown in nitrogen free extract and protein, though there was evidently a slow loss in nitrogen free extract. The protein loss was unimportant. Crude fiber tended to increase, probably because of contamination of the samples by much unburned coal dust from the factory near which the piles were stored. The high ash content after nine weeks storage resulted from excessive dirt accumulation, blown from the field while the pile was a mass of ice and snow. In the special tests the piles protected from precipitation lost more than the standard and the watered piles gave the same results as the standard. Sprinkling the piles had negligible effect, because in the dry air the water evaporated very rapidly. What little remained stayed frozen most of the time. Apparently curing in the field before piling retains most of the nutrients, but mechanical loss of the brittle leaves would cause pronounced loss in practice.

The conclusion is that under conditions normally existing in this territory, loss of nutrients from piled beet tops is not serious. Possibly if piles were made sufficiently large to permit heating and prevent access of air, compositing would occur with attendant large loss in nitrogen free extract.

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Figure 1