

Latta ~ Feeding value of ensilage.



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The French-German method of curing green fodders in pits has but recently made its advent into this country.

Altho. perhaps the first silo was built only six years ago, ^{*} hundreds are now in existence in the United States. Silos are now found in all the New England states - with the possible exception of Rhode Island - in New York, New Jersey, Pennsylvania, Maryland, Virginia, North Carolina, Alabama, Georgia, Kentucky, Tennessee, Michigan, Wisconsin, Iowa, Missouri, Nebraska, Kansas, California, and, perhaps, in other states.

The rapid increase in the number of silos cannot yet be taken as a true indication of the real merits of this

* Dr. J. M. Bailey thinks there are now in the United States 2000 to 3000 silos built and building.

newly introduced feed, as some have been built for experiments, and many others, under the strong stimulus of extraordinary claims that will never be realized. It is worthy of note, however, that, almost without exception, those who have tried ensilage—both private feeders and public experimenters—pronounce in its favor. And the decreasing opposition to ensilage, as well as the more steady current of public sentiment in its favor indicates that it will have a permanent place among foods for our domestic animals.

While its great bulk adapts it to ruminants especially, ensilage has been fed with good results, and no observed ill effects, to horses, swine

and poultry. Ensilage has been fed to cattle of all ages and conditions, and the results obtained may be summed up as follows: It is a palatable and wholesome food; is, alone, hardly sufficient for maintenance, but, when supplemented by nitrogenous foods, produces excellent results in growth, milk, butter, etc.

As present data warrant the conclusion that ensiled crops have a certain food value, attention is here directed to the nature and effects of this feed, its rank and function as an aliment, and its comparative cost as an ingredient in feeding ration.

Physical Properties of Ensilage.

Ensilage retains the moist juicy condition of the green fodder, and the

fermentation of the silo, imparts an agreeable vinous smell and pleasant acid taste. Hence, as a food, ensilage is easily masticated and very palatable. The slight mechanical resistance of ensilage to the organs of mastication, enables the animal with a minimum of muscular exertion to reduce it to that fine condition promotive of good digestion and complete assimilation.

Chemical Composition of Ensilage.

When green fodder is secured in the silo, under proper conditions, there is only a slight change in its chemical properties. There is a loss of water, mostly due to evaporation at the time of filling the silo. The carbohydrates are reduced somewhat by the fermentation,

but there is practically no loss of other nutrients. The woody fiber is increased a little, and there is a ~~very~~ considerable apparent increase of fat, due, probably, to organic acids and other products of fermentation soluble in ether.

Effect of Ensilage as a Food.

1st When fed alone.

Cattle subsisting wholly on ensilage have an irregular, capricious appetite. At times the full allowance is eaten eagerly. Frequently the animals eat sparingly, and, now and then, one-third to one-half the feed remains uneaten. They will sometimes pick over their own bedding and, if allowed to do so, will eat considerable quantities of the stained litter of the horse stable. They generally lose a trifling weight, and occasionally seem a little

defected, though generally in good spirits. The eyes are bright, skin soft, coat glossy, bowels open and regular, and the excreta appear to be normal.

2nd When given with other feeds.

When ensilage constitutes one-third to two-thirds in bulk - of the rough feed of a mixed ration, the animals are exceedingly well nourished, and have a very gratifying satisfied look.

The appetite is keen and regular. Young stock grow rapidly, older ones take on flesh readily, the milk is rich, abundant and wholesome, and the butter is improved in color and flavor. To the close observer, the unmistakable verdict of cattle is in favor of ensilage as an ingredient in a mixed ration.

Comparative Food Value of Ensilage.

Ensilage must take a new rank as an independent food, for the following reasons.

- 1st It is an incomplete food, not having the various nutrients in the right proportions.
- 2nd It is so bulky - ensilage of the legumes excepted - that stock cannot eat it in quantities sufficient for more than maintenance.
- 3rd Stock soon tire of an exclusive diet of ensilage, and will not eat it in paying quantities.

Although ensilage is almost without value, when fed alone, it is, nevertheless, an exceedingly valuable ingredient in mixed rations. Feeding experiments show that, with mixed foods, one pound of maize ensilage is fully equal, in feeding

value, to a pound of roots or cornstalks, and to one third of a pound of hay - third of one cwt. Assuming the digestibility of ensilage to be equal to green fodder - and it can hardly be greater - the nutritive value, according to German authority, is still too low to compare with the results of feeding trials. The difference in the theoretical and practical values is doubtless due to the

Dietsic Effect of Ensilage.

It is a well-known fact, among feeders, that ensilage "spices up" a dry feed ration, and thus stimulates the appetite of the animal. As a result, the food is not only eaten with greater relish, but consumed in larger quantities, while the healthy action of the digestive organs, induced by ensilage,

insures a good use of the food eaten.

Retation of Ensilage to Health.

Grave fears have been entertained that ensilage would prove inimical to the health of animals feeding upon it. Some have argued that the alcohol of ensilage would predispose stock to pneumonia and consumption. Others have compared it to brewers' slops, claiming that it would loosen the teeth, impair digestion and injure the quality of milk.

Thus far, the feeding of ensilage has been attended with only good results, as regards health. The symptoms of disease have failed to appear. Cows heavy with calf, at time of parturition, and,

while suckling their young, have been fed largely upon ensilage with no observed injurious effect. either

on dam or offspring. The alcohol, of ensilage made under proper conditions, is present in far too small quantities to be injurious. The cry that ensilage is too watery to be wholesome ought to be silenced by the fact that pasture grasses - the natural food of our domestic animals - have a like per cent. of water, and by the other fact that stock subsisting on ensilage, will still drink some water. Crops, ensilaged at the proper time, are free from dust, ergot and rust. When mixed with dry feeds, ensilage will very probably mitigate the evils arising from dust and fungoid growths. While it is probably true that a continued exclusive diet of ensilage would derange the digestive functions,

and injuriously affect the milk, no great harm will arise from this source, as financial considerations alone, dictate the mixing of ensilage with other foods.

It has been urged against ensilage that it will preserve the poisonous properties of noxious weeds, and the germs of malignant diseases: but the same may be said of our pastures.

The danger from noxious weeds would be obviated by the clean culture which every enterprising farmer is bound to bestow on all his crops.

Granting - what is by no means yet established - that the silo offers favorable conditions for the preservation of the germs of disease, the objection has no special force, because, in the light of present knowledge, it would be extremel.

hazardous to feed even dessicated crops from disease-infected fields.

Advantages and Disadvantages of Ensilage.

The chief advantage of the silo is that it furnishes an abundance of succulent food to give variety and flavor to dry feed rations.

It may be urged that root crops will accomplish the same purpose. If this be admitted, there are still five points in favor of ensilage, to wit: 1st cheapness, 2nd freedom from earthy matter, 3rd ease of mixing with other foods, 4th safety of feeding, 5th absence of unpleasant flavors in milk and butter.

Another important advantage of ensilage is that it is available in summer, and will prevent losses

from drought. A third advantage is that, in skillful hands, ensilage of uniformly good quality can be secured almost regardless of weather.

Ensilage will stand more frost than other succulent foods, yet it is liable to freeze in extremely cold weather. This, however, can be almost wholly obviated by close underground silos and proper covering. The average farmer will hardly bestow sufficient care to secure ensilage of the best quality; and this may be regarded as a disadvantage.

Other points might be mentioned, both for and against; but the aim of this paper is to present only those which affect the feeding value.

Comparative Cost of Ensilage

It is clearly impossible to give an

estimate that will apply to different sections of the country. It is believed, however, that the following prices will closely represent the cost of feeds to farmers in this locality.

* Hay, \$5. per ton; corn stalks \$2.25; oat straw \$1.50; ensilage \$1.50; roots \$2.50; corn meal \$12; oat meal \$15; wheat bran \$15; and oil meal \$30.

Setting aside, for the time being, the peculiar benefits of succulent foods, the following rations have been compounded, according to German standards, on the basis of actual content of digestible nutrients. The amounts of protein, fat, carbohydrates, and number of pounds dry substance about the same in all.

The rations are for milk cows, per dayrd per 1000^{lb} live weight.

* The market value of wheat bran and oil meal is given.

Feeding Rations and Their Cost.

No.	Ingredients of Rations.	Cost.
1	Clover hay 18 [#] , oat straw 6 [#] , oil meal 2 $\frac{3}{4}$ [#] , oat meal 4 [#] ,	= .12075
2	Clover hay 10 [#] , corn stalks 10 [#] , oil meal 2 $\frac{1}{2}$ [#] , oat meal 5 [#] , wheat bran 4 [#] ,	= .1412
3	Corn stalks 10 [#] , oat straw 10 [#] , oil meal 5 [#] , oat meal 8 [#] ,	= .14007
4	Clover ^{hay} 20 [#] , rutabagas 30 [#] , oil meal 2 $\frac{1}{2}$ [#] , wheat bran 2 $\frac{1}{2}$ [#] ,	= .14375
5	Corn stalks 10 [#] , clover hay 7 [#] , rutabagas 30 [#] , oat meal 3 $\frac{1}{2}$ [#] , oil meal 4 [#] ,	= .15245
6	Maize ensilage 35 [#] , ^{clover} hay 10 [#] , oil meal 4 $\frac{3}{4}$ [#] ,	= .13375
7	Maize ensilage 40 [#] , oat straw 10 [#] , oat meal 4 $\frac{1}{2}$ [#] , oil meal 4 $\frac{1}{2}$ [#] ,	= .13875
8	Maize ensilage 40 [#] , ^{clover} hay 5 [#] , corn stalks 5 [#] , oil meal 4 $\frac{3}{4}$ [#] , wheat bran 4 [#] ,	= .14935
9	Clover ensilage 35 [#] , oat straw 9 [#] , wheat bran 5 [#] , oat meal 7 [#] ,	= .123
Whenever ensilage can be had for		

\$1.50, and the other feeds do not cost less than the estimates above given, the former can be fed without loss, at least, even if we suppose the dry feed and ensilage rations to have the same practical feeding value. But the above method of comparison is evidently unfair to the succulent foods, as feeding trials clearly show.

With due deference to the results of Agricultural Chemists, it is but just to say that the practical feeding value of ensilage can only be determined in the stall.

* Warrington says; "There is finally a condition which we can never hope to express by figures, but which has a considerable influence on the effect of any diet; this is flavor. An agreeable

* Chemistry of the farm p. 94.

Flavor stimulates appetite and probably promotes digestion. This part of the question belongs, however, rather to practice than science."

Although the relative feeding value of ensiled crops can be fully settled only by much careful and patient experimentation, the results, already obtained, justify the expectation that ensilage, in judicious combinations, will prove itself to be a cheap, healthy and very valuable form of food for cattle and sheep.

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