## Pelleting Dried Molasses Beet Pulp

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The processing of dried molasses beet pulp into small sized pellets suitable for mixing with grain to feed in troughs to cattle or sheep has proved to be a sound and worthwhile development.

This pelleting operation compresses dried pulp to approximately onefifth and dried molasses beet pulp to nearly one-fourth its original size. It converts this extremely bulky concentrate into a compact, pelleted product which is easy to handle and convenient to store, to haul and to feed.

More than twenty thousand tons of these small, three-eighths inch diameter molasses pulp pellets have been produced and sold to cattle and sheep feeders in Great Western Sugar Company territory during the past two years, and the pelleted product, which is free from fines and dust, has proved extremely popular with the farmers and livestock feeders who have used it.

While the larger three-quarter inch diameter beet pulp pellets, composed of a mixture of several ingredients, to provide a balanced concentrate for wintering range livestock, have been produced by this company at its Billings, Montana, plant for the past 18 years, the processing of dried molasses beet pulp alone with no added ingredients into these small pellets suitable for bulk feeding is a comparatively new venture. For this reason, there are still certain production and feeding problems involved which will require solution before their most effective production and universal acceptance can be assured.

For some time attempts have been made to process dried beet pulp into a more compact product. The object has been to get away from its extreme bulk, to eliminate need for the large sacks and excessive storage space required in handling it, and also to eliminate its tendency to blow when fed in open bunks.

It has been demonstrated conclusively that the high absorptive capacity of dried pulp, which is a nutritional factor with recognized physiological value, is not impaired by increasing the density of the product, either by grinding or compressing it.

At one location today, the entire production of dried molasses beet pulp is being rolled through corrugated steel rolls to reduce its volume by breaking up the crinkly, dried cossettes into shorter lengths; in other words, "by taking the crinkles out of it." This process has made possible the reduction of burlap bag requirements for packing 100 pounds of this dried molasses beet pulp by about 25 percent, or from 54-inch material cut 72 inches to 45-inch material cut 66 inches, and with no appreciable difference in the quality or physical consistency of the product.

In some few instances, dried beet pulp has been milled; that is, ground up or hammered to a powdery consistency to save storage space where it

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has been destined for future use as an ingredient in pelleted commercial mixed feeds.

It is interesting to note that during the past season blocks or briquets of dried molasses beet pulp have been produced at the Wissington factory of the British Sugar Corporation. (1)<sup>2</sup> These blocks,  $12^{1/2}$  inches by 9 inches by  $4^{1}/_{2}$  inches in size, with an approximate weight of  $8^{\prime}/_{2}$  to 10 pounds, naturally occupy less space than bulk pulp. They weigh approximately 31.5 pounds per cubic foot. They are generally soaked before being fed and are said to disintegrate in water after only ten minutes soaking, absorbing about three gallons each.

While such briquets might prove suitable for use in some dairy rations or in purebred beef cattle or sheep rations where it is customary to soak the dried beet pulp before feeding it, they would not seem to be very satisfactory for use in dry grain-beet pulp, self-fed mixtures which are at present the general rule in fattening cattle or sheep in this western area.

The significant advantage derived from pelleting dried beet pulp is shown in Table 1 comparing weights per cubic foot and average weights per bushel of the various dried beet pulp products containing approximately 20 percent dry substance Johnstown feeder molasses, and manufactured by the Great Western Sugar Company.

Table 1.

	Weight per Cubic Toot Pounds	Average Weight per <b>Bushel</b> <b>Pounds</b>
Plain dried beet pulp	8 to 10	11.2
Dried molasses beet pulp	11 to 13	14.9
Dried molasses beet pulp (Rolled through corrugated steel rolls)	16 to 18	21.1
Dried molasses beet pulp (Milled with hammer mill)	24 to 28	32-4
Molasses pulp pellets (Mi_inch_diameter)	42 to 48	56.0

The most recent and satisfactory development in producing a compact dried pulp product, and one which can be produced and sold locally and entirely in bulk, has been the production of these 3/8 inch molasses pulp pellets.

This operation was conducted in Great Western Sugar Company territory at the Loveland, Colorado, plant during the 1950 and 1951 campaigns, and at the Ovid, Colorado, and Gering, Nebraska, plants during the 1951 campaign.

While the company has produced an average of some 3,000 tons of range pellets annually at its Billings plant during the past 18 years, these large pellets made in  $3/_4$  inch diameter size and composed of a mixture of dried beet pulp, molasses, protein concentrates and bone meal, have been compounded as a balanced concentrate, primarily for use as a supplement to be fed to cattle and sheep out on winter range, and while they have

<sup>2</sup> Numbers in parentheses refer to literature cited.

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proved successful in competition with other range concentrates, they have proved too large for general acceptance in feed lot rations. Sold mostly to range stockmen, they have accomplished little in stimulating livestock feeding or the increased production of fertility in beet growing areas.

On the other hand, these much smaller molasses pulp pellets produced from dried molasses beet pulp alone, with only the addition of enough moisture and steam required to moisten the pulp for the pelleting operation, and sold on the basis of a bulk dried pulp price plus the cost of pelleting, have proved well adapted for use in grain mixtures for the trough or bunk feeding of fattening cattle and sheep, and for dairy cows. Up to the present time these pellets have been sold only to beet growers and commercial livestock feeders in beet growing areas and entirely in bulk.

They weigh as much as shelled corn per bushel, and can be handled and stored as easily as bulk shelled corn. They should eliminate the need for sacks, and because of the economy in handling them they should facilitate a much wider distribution of this dried pulp product within the beet growing areas.

The average beet grower, who at present can haul only about  $1^{1}/_{2}$  tons of bulk dried pulp in his beet rack, and who must cover even this small load to prevent excessive blowing enroute, will now be able to safely haul some five to six tons of these pellets with the same equipment. He will be able to store this product in much less bin space, and will no longer need to worry about feed losses from blowing when he mixes and distributes this feed in his troughs.

One criticism of these beet pulp pellets which has been rather frequently heard when they are first used has been that they are extremely hard. As a matter of fact, they are about twice as hard as ordinary grain or meal pellets, but in this case this hardness is not a disadvantage. It is due principally to the extremely yielding character of the crude fiber in dried beet pulp which is as highly digestible as nitrogen free extract in grain, and to the very low pressure required to compress and compact it when in a moist condition. These pellets are easily crumbled when they first come hot through the dies, but in the course of a few minutes they become very hard as they cool and dry.

It is a well established fact, however, that ruminants do not chew their food when they first ingest it, but instead simply swallow it and only masticate it thoroughly later on when they are ruminating or chewing their cud. Under such circumstances, these beet pulp pellets absorb moisture in the paunch, quickly soften up and disintegrate, swelling to some 17 times their original size, and exert their characteristic beneficial effect on general digestion.

However, the production of straight molasses pulp pellets seems fraught with operating difficulties which cause excessive wear on expensive dies and uncertain production rates. What are some of these production difficulties and how may they be overcome? What is sound policy as to size and constituency in the production of beet pulp pellets? These are questions which need more careful study at the present time. In the first place, molasses beet pulp as it comes from the drier tends to be more corrosive and abrasive than ordinary grain by-product feeds which are milled and pelleted. This may not be due to the pulp itself, but rather to foreign material which has not been thoroughly excluded from the beet pulp, or to fly ash from coal used in the dehydration process, or to both these factors. If this problem cannot be overcome by elimination of these impurities, then the matter of including some other feed ingredient of a sirupy or oily nature needs consideration.

It has been generally conceded that the processing of straight dried molasses pulp into small enough pellets to be mixed with grain for bunk feeding would be most advantageous, and that the use of available beet by-products such as beet molasses or saccharate filtrates would be most efficient in this pellet production. However, the mixed feed manufacturer and pelleter uses molasses high in sugar, or oily protein concentrates to control the hardness of his pellets, and consistently mills all ingredients through hammer mills to insure minimum wear on expensive dies. He is not faced with the 24-hour around-the-clock production required by the sugar producing "campaign."

Then, too, the very character and physical consistency of the fiber in dried beet pulp is distinctly changed by the condition of the sugar beets at the time they are sliced. Early in the fall when fresh beets are being sliced, this fiber is spongy and resilient, while later on the same fiber has often lost these characteristics and becomes greasy and non-resilient, requiring more heat for drying and different techniques for pelleting.

These factors all add up to the necessity for more rigid controls all along the line if uniform size and quality pellets are to be produced on a definite schedule; but the goal is worth the effort—a product which can be handled like shelled corn, and which has approximately the same weight per cubic foot or bushel as shelled corn. Such a product could be stored and sold in bulk from upright concrete storage bins, eliminating the need for bags, sacks and large dried pulp warehouses.

## Literature Cited

(1) Anon.

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