

## PELLETIZING OF COARSE GROUND ALFALFA

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For many years we, as well as a number of other alfalfa pellet mills, have made numerous attempts to make coarse ground hay into pellets by running it through conventional ring die pellet mills. As far as I know, all of these attempts were unsuccessful. In fact, prior to our recent success with feeding coarse ground material into conventional pelleting equipment, I considered it economically unfeasible, if not physically impossible, to accomplish. Now, however, I can say without equivocation that we can, within reason, make any size and any shape compacted hay product from hay ground through a one-inch hammer mill screen.

The main obstacle which our research had to overcome was that of positively controlling the coarse bulky hay with a very low density factor and poor flow characteristics until it lay in an even layer on the face of the die as it rotated. This we accomplished with a feeder with specially arranged flightings and picks and by turning this feeder considerably faster than the die and in the same direction.

Another problem was determining die speeds that would allow sufficient centrifugal force on the inside of the die to facilitate feeding of the light bulky material and yet not too much centrifugal force on the outside of the die to cause the pellets to come apart as they are extruded. We feel that approximately 380 to 400 feet per minute die speed is about right.

We also had considerable difficulty in handling coarse ground hay as well as 1 1/8 inch diameter pellets, or ruffets as we call them, through our present mill equipment. Our mill was built to handle fine ground material and small pellets, so you can imagine some of the problems we ran into. None the less, we have made surprisingly few changes in our equipment to accomplish the necessary flow of the coarse hay prior to pelleting and the large ruffets subsequent to pelleting. The only major change that was necessary was building a live bottom tank above the pellet mill. We have been able to produce 1 1/8 inch pellets at the rate of 8 tons per hour. However, a more realistic day to day constant figure would be 6 tons per hour through a 250 horsepower machine.

The main advantage we find in ruffets over cubes is better flow characteristics and a better density factor. Animals seem to be able to handle them better and less fines are generated in handling and shipping. Of course, you can make them any size you want.

There is however still a problem regarding keeping the moisture low enough for safe storage and, at the same time, high enough to facilitate cohesion during extrusion. This problem, however, is quite complicated and involved and too lengthy to go into now. Because of the large diameter of our ruffets we have found a longer cooling with a tempering period between.

Most of our product has gone overseas in bulk, in containers, and is fed to dairy cattle or beef cattle. We have developed some domestic market interest in our ruffets, particularly with horse people. We box and sell 70 pound cardboard boxes and we also sell ruffets in bulk.

In closing, we feel that this innovation will change the feeding methods presently used for dairies and beef feeding operations in that they can now incorporate an animal's complete ration into one compacted form. This will allow the nutritionist to better control exactly what each animal gets. In other words, each mouthful or bite will be a scientifically balanced ration as there can be no separating or picking by the animal. Furthermore, dust lost in feeding as well as rain damage should be minimized.