

Development and Performance Evaluation of a Bone-Milling cum Pulverising Machine

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Abstract: A process machine for milling and pulverising animal bone into bonemeal was developed. The machine consists of a hopper, a milling chamber with hammers assembly, a pulverising chamber with two abrasive surfaces, a screw feeder, belts and pulleys, hammer mill-shaft, pulveriser shaft as well as an electric motor for power transmission. The design concept integrated the milling and pulverising of animal bones into one machine. Animal bones are milled to a maximum size of about 12mm in the milling unit and then delivered through an auger to the pulverising unit. As one of the two abrasive surfaces of the pulverising unit rotates against the stationary surface, the milled bones are fed between them by the screw feeder through the center of the stationary abrasive disc which is mounted concentrically with an identical high speed rotating abrasive disc. The design calculations were done using existing machine design theories to obtain relevant design parameters of the components for the machine. Based on the calculated design parameters the machine was fabricated. Materials were selected primarily based on strength, availability and economy. Initial performance evaluation of the machine showed good results, although there is room for improvement. The machine pulverises raw and cooked bone at an average rate of 4.68 g/s.

Keywords: Development, Evaluation, Bone, Milling, Pulverising, Machine