DEVELOPMENT OF A SOLID FEED BLOCK FORMING MACHINE FOR CATTLE

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Thesis submitted in partial fulfillment of the requirements for the degree Master of Engineering in Manufacturing Systems Engineering

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

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The above candidate has carried out research for the Master’s thesis under my supervision.

Dr. H.K.G.Punckihewa

Signature : …………………… Date : ……………………
Development of a solid feed block forming machine for cattle

Abstract

Livestock statistics show that there are 1.2 million milking cows and 0.4 million buffaloes in Sri Lanka and the Department of Census and Statistics shows an annual per capita consumption of milk and milk products of about 4.6 kg/year. However, these values are comparatively low compared to the developed countries. Therefore, achievement of the self-sufficiency levels in dairy industry of Sri Lanka needs significantly both in growth and productivity. The issues which are slowing down or hampering the growth and productivity can be categorized on milk production related, distribution and marketing related, extension and support service related, consumer concern related, policy related and feeding related. Although, the nutrition is a key factor for the performance, health and welfare of dairy cattle, the prevailing cattle feeding has become an issue today for growth and production became of mostly primitive nature of practice, which is a challenge for the increased commercialization of dairy industry. Consequently, it has been identified that the well-recognized method of feeding cattle in commercial dairy industry is solid nutritious feeding blocks which are made of hygienically prepared agricultural residues.

Aim of this research were producing suitable feed block and developing block making machine for the cattle in Sri Lanka. The objectives of this research were to identifying the requirements for cattle feed blocks and their manufacturing, to examine suitable shapes and sizes for feed blocks, and to design and manufacture a feed block machine and to test the machine for verifying the results.

Suitable block forming methods, technologies and the suitable machineries were recognized through literature survey, brainstorming sessions and experimental procedures. Accordingly, design and fabrication of a novel block making machine was successfully completed. Suitable size and weight of the block, recommended recipes, production capacity of the machine, block forming method and type of power source were identified. Finally a machine was fabricated to suit the parameters identified above and was tested. Results revealed that the fabricated machine can address the design requirements of the machine. The production capacity of the machine was 100 blocks/h with 200 mm × 200 mm ×110 mm size and 2 kg weight.

The solid cattle feed blocks can be used to fulfill the nutritional requirements of dairy cattle under safe conditions with affordable cost. Further, adoption of this technology supports to make an easy feeding mechanism and enhance milk production through available agricultural residues and available technology in Sri Lanka. Adding automatic raw material preparation system and the automatic feeding system to the compaction machine are proposed as further improvements.

Keywords: Agriculture, dairy development, cattle feed, feed blocks, feed block machine
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