

THESIS TITLE : DESIGN AND EVALUATION OF MANURE COMPRESSING MACHINE

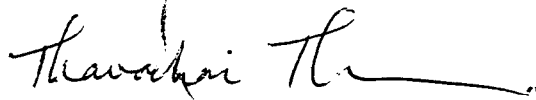
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ABSTRACT

The purpose of the this research project was to design, build and evaluate a manure compressing machine. The procedure used was: initial evaluation of manure compression using a screw extrusion compressing machine, study of the factors affecting the design and construction of a prototype and evaluation of the manure compressing prototype using capacity and percentage reduction of manure volume as indicators of performance. The following are the important results:

1) The principle of compression using the new screw extruder without heating is suitable for manure compression because it has a simple operation and can operate continuously. But the use of Green Fuel Compressor for manure compression is inconvenient because of not having mixing and feeding equipment as well as not being able to cut the compressed manure.

2) Mixing of tapioca starch with manure increases the ability of the compressed manure to better stand bending moment and impact forces that cause breaking. However it makes the manure bar swell which makes the reduction of volume after compression less than required, makes

the manure bar crack as well as increasing the bending of the manure bar. Although mixing with bagasse reduces the volume after compression better, it increases greatly the bending of the manure bar while the fraction of manure decreases. Thus to solve the above problems other materials should not be mixed with the manure when making compressed manure.

3) Whether feeding manure once for compression or splitting the feeding does not affect volume after compression.

4) Manure which has water mixed with it can shrink more than manure with less water mixed in but the amount of shrinkage is only slightly different when using pressures greater than 116 kg/m^2 , with an average shrinkage of 63%.

5) The prototype manure compressor used the principle of continuous compression with a screw extruder without heating. It was designed to be controlled for continuous use, with the process consisting of mixing the manure, feeding the manure for compression, compressing the manure, and cutting compressed manure respectively. The prototype machine consisted of the following main components: mixer, feeder, manure compressor and compressed manure cutter. The machine has an average capacity of 51.68 kg of dry manure per hour or approximately 491 compressed manure bars/hour and is capable of reducing the volume of manure by 43.24% on average.

6) Compressed manure containing more than 10 % soil results in better capacity to withstand bending moment and impact compared with that without soil. But the capacity is significantly reduced, while the reduction in volume and bending of manure of bar is approximately the same. Thus, it is recommended to avoid mixing soil with manure for compressing, especially when the capacity for compressing pure manure is taken into consideration.