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Modification and evaluation a local thresher machine to suit chopping and grinding different crop residual

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Abstract: To achieve a safety healthy life for Egyptian farmers and to reduce environmental pollution and provide animal feed and provide organic fertilizer to the soil to improve the physical and chemical properties as well as increase its ability to retain water as long as Possible, especially with limitation of water resources in Egypt. Many agricultural machines most be devolved to be suitable for different areas. The current study sheds light on the development of domestic made machine to mince and chop agricultural residues such as corn and rice straw, which operates at the lowest possible energy. So the aim of the present work is to develop a local thresher machine, that combine shear and hammer mill theory. Developing was operated by the addition of two types of knives (knives sharp free + serrated discs) to the original knife existing already in the machine. This machine is evaluated in terms of production capacity and operating efficiency rotation of the machine on the three operating speeds (1200 - 1600 – 2000 rpm) and at different moisture content ratios (8 - 10 - 12%). The output evaluation was conducted on two different crops (corn stalk and rice straw). The experiments of this study were carried out in Privet Company meanwhile evaluating of production was done at the agriculture engineering institute, Gimaza research station. The output result showed that, minimum net power requirement obtained at 1200 rpm cutting drum speed for corn stalk were (3.1, 3.62 and 4.52kW) and rice straw were (3.34, 3.87 and 4.56 kW) at moisture contents (8, 10 and 12%). The maximum machine production for corn stalk was 0.72 ton/h at 2000 rpm cutting drum speed at 8% moisture content. It was 0.49 ton/h for rice straw at 2000 rpm cutting drum speed at 8% moisture content. The optimum cutting efficiency for corn stalk and rice straw were 95.8 % and 91.6%, respectively. It is achieved at 2000 rpm cutting drum speed and moisture content 8%. It can be commended that, throw out the addition of the disc mills and the other flail knives supports the process to the cutting force.

Key words: Modification, chopping machine, power requirement, knives shapes and agriculture resides

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