AN INVESTIGATION ON THE EFFECT OF MOISTURE CONTENT, CROP DIAMETER AND CUTTING SPEED ON CUTTING FORCE OF FINGER MILLET STEM

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ABSTRACT

Cutting force was one of the important parameter for optimized design of harvesting machines. The effect of moisture content, crop diameter and cutting speed on cutting force and cutting energy for finger millet were investigated using a cutter bar test rig. Experiments were carried out on a high yielding ruling variety CO (Ra) 14 at four levels of cutter bar speed (1.0, 1.25, 1.5, 2.0 ms⁻¹), three levels of stem diameter (6, 9 and 12 mm) and three levels of moisture content (62 to 63, 70 to 71, and 77 to 80 percent). It was observed that with increase in moisture content from 62 to 80 per cent, cutting force and energy decreased by 16.2 per cent. With increase in stem diameter from 6 to 12 mm, cutting force and energy increased by 7.3 percent. The cutting force (190.63 N) and energy (1.14J) was minimum at the cutting speed of 2 ms⁻¹ for 6 mm stem diameter at 78 percent moisture content and they were maximum at a cutting speed of 0.5 ms⁻¹ (370.97 N and 4.45J) for 12 mm stem diameter respectively.

KEYWORDS: Finger Millet, Harvesting, Cutting Force & Cutting Energy

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