

Quality of oats harvested by impact type forage harvester

■ SANJAY KHAR

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CORRESPONDENCE

AUTHOR FOR :

SANJAY KHAR

Krishi Vigyan Kendra
(S.K.U.A.S.T.J.) RAJOURI,
JAMMU (J&K) INDIA
Email :
sanjaykhar2007@gmail.
com

■ **ABSTRACT** : A self-propelled flail type flail forage harvester was evaluated for effect on quality of oats fodder at three levels of forward speed of the machine, three levels of flail speed and three levels of rake angle of flail. The minimum loss of moisture (%), maximum crude protein (%) and minimum neutral and acid detergent fibre (%) were obtained with the forward speed of 3.00 km/h, flail speed of 26.86 m/s and flail rake angle of 45°. At this setting corresponding values of loss of moisture (%), crude protein (%) and neutral and acid detergent fibre (%) were 0.57, 8.12, 55.28 and 36.90 per cent, respectively.

■ **KEY WORDS** : Forage harvester, Flail, Fodder quality, Nutrition, Moisture, Crude protein

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Oats is an important *Rabi* forage crop and widely cultivated in monoculture or in mixture with berseem, ryegrass or mustard (Gupta *et al.*, 2004). Intensive forage production system deals with the efficient utilization of limited land resources and other inputs for obtaining maximum harvests of nutrition's herbage per unit area and time. These crops are generally harvested by hand or power operated chaff cutter before feeding it to the animals. The harvesting of forage crop is one of the most important farm operations. The critical period of forage growth, when the nutritive value and dry matter of the fodder maximize, is very limited and any delay in its harvest results in tremendous loss in terms of its feeding value (Chattopadhyay, 1997). Moreover, the genetic potentialities of high yielding animals can only be realized if they are fed with quality fodder. This is particularly true in the case of dairy animals. Hence, to meet the requirements of fast developing dairy industry, fodders of good quality will have to be produced in sufficient quantity to replace the concentrates. Green fodders are 30 per cent cheaper source of total digestible nutrients as compared to concentrates (Saran and Jackson, 1967).

Hence, it is prudent to mechanize the time and labour consuming operation of fodder harvesting not only to overcome labour shortages but also to remove drudgery, hard labour and to enhance labour productivity. The paper deals with the quality of oats fodder harvested by self-propelled flail type forage harvester.

■ METHODOLOGY

A self-propelled forage harvester fabricated in the

department of Farm Power and Machinery was used for harvesting of oats fodder. The treatments consisted of three levels of forward speed of the machine (1.5, 2.25 and 3.00 km/h), three levels of flail speed (26.86, 32.51 and 40.26 m/s) and three levels of flail rake angles (25°, 35° and 45°). Oats was sown as per the standard package of practices and was harvested at the optimum stage of harvesting as recommended by Gupta *et al.* (2004). The parameters evaluated for fodder quality were loss of moisture, crude protein, neutral detergent fibre, acid detergent fibre and total ash. The procedure given by Anonymous (1995) and Sastry *et al.* (1999) was used for evaluating the quality of fodder samples. Data collected during experimentation for the evaluation of self propelled forage harvester was statistically analyzed using experiment in randomized block design to see the effect of independent variables on dependent variables. Statistical analysis package named "CPCS 1", developed by Punjab Agricultural University, Ludhiana was used for the data analysis.

■ RESULTS AND DISCUSSION

The effect on the quality of oats fodder as harvested by the machine at various operational and design parameters are given in Table 1 and are discussed as under.

Loss of moisture :

The loss of moisture decreased with increase in forward speed of the machine and flail rake angle, whereas it increased with the increase in the flail speed. The main effects of the forward speed, flail speed and rake angles were statistically