

## CORRELATION BETWEEN SPECIFIC ENERGY CONSUMPTION IN MILLING PROCESS AND SOME PHYSICAL AND MECHANICAL PROPERTIES OF ALFAALFA GRIND

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### ABSTRACT

The objective of this study was to determine the relationship between physical (bulk density) and mechanical properties (cohesion, coefficient of internal friction, adhesion, coefficient of external friction on polished steel and specific energy consumption) of alfalfa grind. Alfalfa chops passed through sieve sizes of 18, 15 and 12 mm were ground using a hammer mill with three screen sizes of 2.38, 3.36 and 4.76 mm at moisture content of 8% (wet basis). The energy consumption during grinding in hammer mill was measured with a watt-hour meter. According to the correlation coefficients (Pearson's matrix), it was found that all the physical and mechanical properties significantly ( $P < 0.001$ ) correlated together. Coefficient of internal friction and coefficient of external friction on polished steel was negatively (-0.84 and -0.59 respectively) correlated with the specific energy consumption. The highest correlation coefficient (0.99) was observed among bulk density and coefficient of internal friction. Principle component analysis identified one component that explained 0.78 of the total variation among physical and mechanical properties

**Keywords:** Alfalfa grind; Specific energy consumption, Coefficient of internal friction, Coefficient of external friction.

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