

# PROCEEDINGS



## ANIMAL SCIENCE:

### Challenges in Production and Sustainability

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# ANIMAL SCIENCE: CHALLENGES IN PRODUCTION AND SUSTAINABILITY

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**Title: horse feed pellet quality and energy consumption in different corn grinding granulometry standards**

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Producing horses pelleted feed, grinding corn is one of the most costly factors for the industry and can also compromise pellet quality, a very undesirable fact as it is expected a whole pellet without fines. The present study aimed to evaluate the pellet quality and the energy expenditure in corn grinding process according to three different corn grinding standards. Feed rations production and collection was carried out in a feed mill with individual grinding, where only the corn was grinded, in Leme/SP city, and the other analyzes were carried out in FMVZ nutrition and production department bromatology laboratory at University of Sao Paulo, Fernando Costa Campus. The treatments consisted of three corn grinding sieves in a hammer mill: 3 mm (P3), 5 mm (P5) and 8 mm (P8). All other feed ingredients were used without grinding. Then the rations were pelleted and subsequently analysed to pellet durability index test (PDI), as well as their diameter was measured. Granulometry of grinded corn, in its different grinding standards, was measured for geometric mean diameter (DGW), and productivity and energy consumption results of the mill were evaluated. Data were analysed by analysis of variance (ANOVA) using GLM Procedure of SAS software (SAS Institute, 1990). When the model was significant, Tukey's test was used to separate treatment means. Differences between treatment means were considered significant at  $P < 0.05$ , in ten repetitions per treatment for the PDI, thirty repetitions per treatment for pellet diameter and two repetitions per treatment for DGW. No significant differences ( $P > 0.05$ ) were observed for pellet quality parameter, with results indicating an average PDI of  $98.04 \pm 0.56\%$  for P3,  $97.83 \pm 0.78\%$  for P5 and  $98.24 \pm 0.41\%$  for P8. Likewise, no significant differences ( $P > 0.05$ ) were observed for pellets diameter, with average values of  $4.79 \pm 0.08$  mm for P3,  $4.79 \pm 0.08$  mm for P5,  $4.81 \pm 0.06$  mm for P8. For DGW, significant differences were observed ( $P < 0.05$ ) between treatments P3 and P8. Results indicated an average DGW of  $1047 \pm 33$   $\mu$ m for P3,  $1235 \pm 56$   $\mu$ m for P5 and  $1363 \pm 9$   $\mu$ m for P8. Regarding the mill's productivity, under constant corn grain flow to grind, the following average productivity was observed:  $1.588$  kg h<sup>-1</sup>, and energy consumption was  $8.15$  kWh ton<sup>-1</sup>,  $6.11$  kWh ton<sup>-1</sup> and  $4.07$  kWh ton<sup>-1</sup>, respectively, for sieves grinding P3, P5 and P8. Granulometry difference in corn grinding did not interfere in pellets quality produced and corn grinding, in larger diameter sieves, provides a lower energy consumption per ton of ground corn, under constant corn feed flow to grind, doing more efficient feed production process.

**Keyword:** DGW, industry, mill, PDI, processing