

# Partially replacement of wheat factory sewage for barley grain on performance of Holstein steers

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## Introduction

Feeding the by-products in livestock production has been recently received great attention by Iranian dairy and beef producers and nutritionists in order to reduce the dependence of livestock on grains that can be consumed by humans as well as to diminish environmental pollution. Wheat factory sewage (**WFS**), a by-product of starch and wheat gluten meal producing factories, consisted of (DM basis) high NFC (61.9%) but very low starch (10%) and low NDF (3%) with moderate CP (15%), seems to be a good source of rumen fermentable energy and protein source for ruminal microbes. The most proper condition to use this by-product in steers' diets is not known and needs to be evaluated.

## Objectives

The objective of this study was to determine whether **WFS** (a by-product of starch and wheat gluten meal producing factories) can effectively replace part of grain in steers' diets by measuring DMI, body weight changes, gain, and feed conversion rate.

## Materials and methods

Fifteen steers (416 ± 35 kg initial weight) were used in a replicated 3 × 3 Latin square designed experiment with three 22-d periods. Each period had 16 d of adaptation and 6 d of sampling. The basal diet (**WFS0**) was formulated with 40% forage, 0% WFS and 42.5% (DM basis) barley grain, which was partially replaced with 10% WFS (**WFS10**) or 20% WFS (**WFS20**).

Average initial and final body weights were based on the average of weights measured on two consecutive days. Initial weights were determined following a 10-d diet adaptation period. Daily feed consumption was recorded to monitor

feed intake performance and was adjusted daily to ensure that all feed was consumed.

Data were analyzed using the MIXED model procedure of SAS. The effect of increasing levels of WFS in the diet was examined through linear and quadratic orthogonal contrasts using the CONTRAST statement of SAS.

**Table 1. DMI, BW changes, average daily gain (ADG), and feed conversion rate as influenced by partially replacing barley grain with wheat factory sewage**

Item	Treatment LSM				Contrast <i>P</i> -value	
	WFS0	WFS10	WFS20	SE	Linear	Quadratic
DMI, kg/d	10.01	9.23	9.17	0.31	0.007	0.15
BW changes, kg/period	30.6	30.2	30.9	0.66	0.19	0.002
ADG, kg	1.39	1.36	1.38	0.03	0.24	0.01
Feed/gain, DM basis	7.12	7.09	6.50	0.26	0.01	0.16

## Results

DMI linearly decreased with increasing the WFS in the diets. Body weight changes was quadratically changed to be higher for WFS20 (30.9 kg/period) than for other two diets which was lower in WFS10 compared with WFS0 (30.2 vs. 30.6 kg/period).

Average daily gain showed a quadratic response to adding WFS. Furthermore, feed conversion rate linearly decreased with increasing amount of WFS in diets.

## Conclusions

Results indicated that partially replacing 23.5 and 47% of barley grain with WFS in steers' diet reduced DMI, but improved feed conversion rate. It suggests that WFS can be used as alternative to grain to feed steers.