

Comparative Evaluation of Maize Bran, Wheat Bran and Rice Bran on Milk Production of Holstein Friesian Cattle

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ABSTRACT

The effect of feeding concentrate based on different brans on the performance of Holstein Friesian cows was studied. Twelve Holstein Friesian cows of second and third lactation were randomly distributed into three equal groups. The animals of group A were fed on a concentrate mixture containing 30% maize bran, group B animals on a concentrate mixture containing 30% de-oiled rice bran; whereas, the animals of group C on a concentrate mixture containing 30% wheat bran. Maize fodder was given ad-lib to the cows of all groups. The feeding trial lasted for 60 days. The intakes of dry matter (DM), crude protein and TDN were same in all groups. The milk fat and total solids were not affected by experimental rations. Significant variation was determined in solids-not-fat of milk produced by animals fed on different experimental rations. The average daily milk yields were 18.05, 12.87 and 14.65 L in groups A, B and C, respectively. The animals of group A showed statistically better milk production which indicates the maize bran feed was nutritionally better and can be successfully utilized in the dairy cattle ration to sustain production.

Key Words: Maize; Rice; Wheat; Bran; Holstein Friesian; Cows; Milk

INTRODUCTION

De-oiled rice bran, maize bran and wheat bran are the by-products available in considerable quantity in most of the countries, which can be used as animal feed. The nutritive value of rice bran has been observed to be quite low compared to wheat bran and maize bran. However, the acceptability and dry matter (DM) intake of animals were not affected due to inclusion of de-oiled rice bran in concentrate mixture (Singh *et al.*, 2000). The present study was conducted for the comparative evaluation of different cereal brans for the lactating Holstein Friesian cows.

MATERIALS AND METHODS

Twelve Holstein Friesian cows during mid of their second and third lactation were selected from a group of 48 cows and were randomly distributed into three equal groups. The animals of group A, B and C were fed on concentrate mixture containing 30% maize bran, 30% rice bran and 30% wheat bran based rations, respectively. Maize fodder was given ad-lib to all animals. The concentrate was supplemented to above roughage-based ration to meet the requirement for maintenance and milk production as (NRC, 1989). The amount of concentrate for milk production was given at 0.5 kg (as feed basis) per kg milk produced over and above the maintenance requirement of individual animals. The daily requirement of concentrate mixture was divided into two parts and was offered at 05:00 h and 17:00 h individually. Maize fodder was given twice a day, in the morning and then in evening. Milking was done twice a day at 05:00 h and 17:00 h. The experiment lasted for a period of 60 days. The records of feed offered, residue left, milk

yield, butterfat, total solids and solids-not-fat were maintained for individual cow during the entire period of experiment. The DM of green fodder was determined to observe DM intake of cows during the experimental feeding period. The weekly DM determination of concentrate and different brans were also done to ensure the total DM intake. **Chemical analysis.** The chemical analyses were carried out following the methods given by AOAC (1980). **Statistical analysis.** The data on milk yield and its composition were analyzed following the methods of Steel and Torrie (1982).

RESULTS AND DISCUSSION

Nutrient composition. Concentrate mixtures fed to animals of group A, B and C were isonitrogenous (Table I). However, the level of ADF and NDF were variable in different experimental concentrate mixtures (Table II). It was due to variable fiber contents of de-oiled rice bran (DORB), maize bran and wheat bran used in concentrate mixture (Ranjhan, 1990) and the increased ash content was contributed by DORB, maize bran and wheat bran (Singh *et al.*, 2000) and molasses (Ranjhan, 1990).

Animal performance. The Holstein Friesian cows fed diets containing maize bran, rice bran and wheat bran produced 18.05±3.60, 12.87±1.10 and 14.65±1.11 kg milk, respectively (Fig. 1). The cows fed ration containing maize bran produced significantly higher milk than those fed rice bran and wheat bran (Table III). The analysis of variance of butterfat and total solids revealed non-significant difference among the groups. Similar findings were also reported by Sundaram *et al.* (1987) and Reddy *et al.* (1988). The fat percentage in different treatments is shown in Fig. 2.

Table I. Compositions of concentrate mixtures

Ingredient (kg/100 kg)	Conc. A	Conc. B	Conc. C
Maize bran	30	-	-
Rice bran	-	30	-
Wheat bran	-	-	30
Maize	28	26	23
Cotton seed cake	10	10	6
Rape seed cake	1.0	3	10
Maize gluten 30%	12	12	12
Molasses	17	17	17
Mineral mixture	2	2	2
Chemical Composition (% DM)			
Organic matter	87.6	89.3	88.4
Crude protein	14.95	15.00	15.00
Ether extract	2.4	3.0	1.8
DE (Mcal/kg)	3.45	3.09	3.09
ME (Mcal/kg)	2.73	2.67	2.69
TDN	71.50	70.00	70.30
NDF	73.20	78.00	81.20
ADF	16.70	27.20	19.50
Ash	11.10	13.70	11.60

Table II. Chemical composition of grain by products

Ingredients	DM	TDN	ME (Mcal/kg)	DE	CP	EE	CF	NDF	ADF
Maize bran	89	80	2.59	2.5	14	2.5	12	17	10
Wheat bran	89	70	2.67	2.7	13.1	4.4	11.3	51	15
Rice bran	91	70	2.67	3.09	12.1	15.1	12.8	33	18

Fig. 1. Average milk production of different groups fed on maize bran (A), rice bran (B) and wheat bran (C) based diets

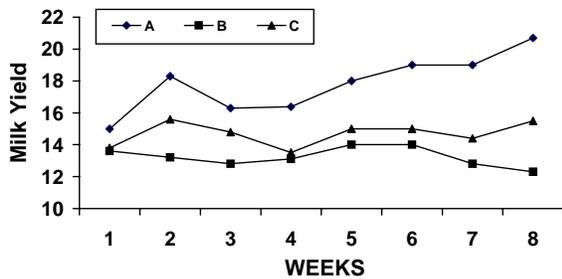
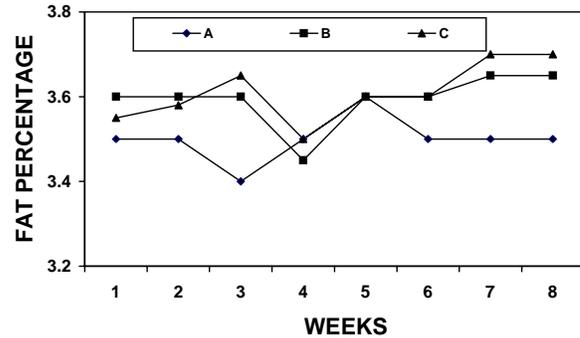


Table III. Lactation performance of experimental cows

Parameters	Group A	Group B	Group C	Sig.
Duration of experiment (days)	60	60	60	
Total Milk yield	1083	772.2	879	S1
Average daily milk yield	18.05	12.87	14.65	S
Body weight after calving	443.4	451.4	428.9	NS2
Body weight at end of experiment	453.9	461.0	432.5	NS
Change in weight	10.5	9.60	4.4	NS
CP (g/day)	1214	1221	1198	NS
Energy (kcal/kg)	2500	2500	2500	NS
Chemical composition of milk (%)				
Fat	3.5	3.59	3.6	NS
Total Solids	12.26	12.38	12.37	NS
Solids-not-Fat	8.72	8.71	8.77	S
Economics				
Total daily feed cost/cow (Pak Rs3.)	112.47	103.73	114.88	S

Fig. 2. Fat Percentage of different groups fed on maize bran(A), rice bran (B) and wheat bran (C) based diets



The analysis of variance of solids-not-fat percentage of milk yield revealed a highly significant difference among the groups. Group C fed on wheat bran based ration yielded higher solids-not-fat percentage of milk i.e. $8.774 \pm 0.009\%$ than group A fed on maize bran group B fed rice bran 8.720 ± 0.025 and 8.706 ± 0.031 , respectively. The results are in accordance with Chaudhary *et al.* (2001).

Milk production economics per cow values were higher (Rs. 68.03) in group A cows fed on maize bran followed by group C fed on wheat bran (Rs. 31.62) and group B fed on rice bran based rations. It may be concluded that maize bran was efficient and economical than other rice and wheat bran.

From the results of the present experiment, it is evident that agro-industrial by products can be utilized as a cheap source of energy and protein for lactating cows.

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