Asian J. Dairy Res., 3 (2): 108-110, 1984.

CHEMICAL COMPOSITION AND NUTRITIVE VALUE OF APPLE POMACE

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ABSTRACT

Apple pomace a by-product of Apple juice industry was tested for its composition and nutrients utilization on growing buffalo male calves. The product was found to be low in crude protein (5.03%), crude fibre (17.05%) and high in NFE (72.48%) content. The dry matter intake was 2.47 kg per day or 66.2g per kg $^{0.75}$. The digestibility coefficients of various nutrients were 57.78, 32.46, 64.71, 54.76 and 66.17% for DM, CP, CF, EE and NFE respectively. All the animals showed negative nitrogen balance. The product contained DCP 1.62% and TDN 64.84%.

On efficient processing of apples nearly 80% juice is extracted and 20% fruit waste known as apple pomace cantaining hardly 15 to 20% DM is thrown out. Obviously, it was essential to explore the possibility to use this product as animal feed. The present investigations were therefore, concerned to investigate its chemical composition and nutrients availability for ruminants.

Apple pomace was obtained fresh from Fruit Processing Plant.* The product was quite wet containing 20% DM at the time of collection. Four Murrah male buffalo calves of 10 to 12 months of age but within narrow range of body weight were fed exclusively on partially wilted product (45% DM) for a period of 40 days. During the last 7 days the animals were subjected to a metabolic trial. The chemical analysis of apple pomace, feaces and urine samples was conducted using the standard methods (A.O.A.C., 1970).

Table 1 reveals that apple pomace is low protein and high carbohydrate feed. The analysis report of this product was compared with some of the feed ingredients listed by Sen *et al.* (1978). The CF (17%) of the product was almost nearer to oats grain (15.5%), brewery grains (13.5%) and rice bran (22.6%). The NFE (72%) of the product was comparable with grains (oats, 64.3%, barley, 79.4%, sorghum, 77.5%, paddy crushed, 72.5%) and grain by-products (wheat bran, 64.5%, maize bran, 75.1%; rice polish, 55.6%; brewery grains, 59.3%). The small differences in NFE of apple pomace under this study (72%) as against 69.2% reported by Morrison (1956) and 66.3% by Bhargava and Talpatra (1968) and the low CF content may be due to either origin of apples or its processing. The buffalo calves consumed apple pomace ranging from 1.70 kg to 2.08 kg dry matter with an average of 1.98 kg/100 kg body weight. The palatability and feed intake is governed by the nutrients composition of the feed. Depression in food intake on reduced protein content of mixed diets of roughage and concentrate is already

*Himachal Pradesh Horticultural Produce, Marketing & Processing Corporation Ltd. Parwanu-173220 (H P.).

known (Elliot, 1967). The intake of other nutrients (Table 1) followed the trend of DM intake in each animal.

Table 1. Chemical composition of Apple Pomace, its nutrients intake and digestibility coefficient

Nutrients	Chemical composition (%)	Intake/day (g)	Intake/kg $^{0.75}$ (g)	Dig. Coefficient (%)
Dry matter	35	2474	66.18	57.78±1.82
Organic matter	97.99	2424	86.85	62.66±1.80
Crude protein	5.03	124	3.32	32.46±1.35
Crude fibre	17.05	420	11.24	64.71±2.49
Ether extract	3.45	94	2.51	54.76±1.83
Nitrogen free-extract	72.48	1794	47.99	66.17±2.05
ADF	31.52	780	20.86	60.31±1.89
NDF	34.02	842	22.52	59.02±1.60

Table 2. Data on nitrogen metabolism and nutritive value on Apple Pomace

Items	Value
Live body weight (kg)	125
Metabolic body size (kg $^{0.75}$)	37.38
Nitrogen metabolism (g/day/kg $^{0.75}$) :	
N-intake	0.53
Factal-N	0.36
Urine-N	0.21
Retained-N	—0.04
Faecal-N/N-intake (%)	64
Urine-N/N-intake (%)	39
Nutritive value (%) :	
DCP	1.62
TDN	64.84±1.96

The digestibility coefficients for CF and NFE were high (Table 1) but it was extremely low for CP. The nitrogen loss through faeces was 67% and that through urine 40% of the total-N intake, which resulted in negative nitrogen balances in each animal (Table 2). The digestibility of nutrients on low protein diet has been reported to be generally poor due to the fact that desired protein level was essential for maximum fermentative activity (Veira *et al.*, 1980). The nitrogen digestibility, balance and retention per 100 kg body weight recorded a linear response to nitrogen intake (Mathur, 1981). The decrease in apparent digestibility can partly be accounted for the increase in metabolic faecal nitrogen on high carbohydrate ration. The digestible crude protein of apple pomace was low (Table 2), however, the major contribution towards total digestible nutrients was from digestible NFE (47.98%) followed by digestible crude fibre (10.99%) and digestible ether extract (4.25%).

The total digestible nutrients have been assessed more on rations having higher level of nitrogen in the feed (Rishi, 1981) which has further suggested that improvement in nitrogen status of the feed may enhance the TDN value of the product under test.

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