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Nutrient Profile of Unconventional Feeds of Malwa Regionof Madhya Pradesh

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ABSTRACT

This study was carried out to assess the nutritional composition of some unconventional feed resources available in Indore district of Madhya Pradesh, so as to use them in the diet of livestock to enhance their productivity. Seven (07) unconventional ingredients including soybean husk(Glycine max), mordhan husk(Stariapumila), watermelon seed coat(Citrulluslanatus), babul chuni(Acacia arabica), saufby-product(Foeniculum vulgare), rajgiri husk(Amaranthus spp.)and soybean chuni(Glycine max) were collected, sun-dried,processed into meal and analyzed for their chemical and macro-mineral composition. The results showed that the moistureranged from 0.68% (watermelon seed coat) to 7.47% (saufby-product). The crude protein (CP) content ranged from 6.41% (rajgiri husk) to 17.0% (soybean chuni). Saufby-product recorded the highest (3.36%) Ether Extract (EE) value, followed by byrajgiri husk (3.06%) and soybean chuni (2.85%), while the others were below 2.0%. The crude fiber (CF) content was ranging from 64.6% (watermelon coat) to 14.2% (soybean chuni). Total ash and acid insoluble ash was highest in saufby-product (20.5 and 7.44%) and lowest in watermelon coat (1.99 and 0.18%). Saufby-product contained the highest level of calcium (4.33%), followed by babul chuni (3.23%), whilerajgiri huskand soybean chunnirecorded highest level of 0.54% phosphorus. The cell wall content was highest in mordhan husk (85.12%) followed by watermelon coat (84.80%). Mordhan husk contained the highest level of hemicellulose (38.9%), while soybean husk recorded high level of cellulose (15.3%). The lignin content was highest in watermelon coat (44.9%) followed by mordhan husk (42.0%), rajgiri husk (38.2%), soybean husk (20.9%), saufby-product (18.9%), babul chuni (8.52%) and soybean chuni (6.66%). These results showed that unconventional samples contained appreciable quantities of dietary nutrients and can be partially or completely substitute for the conventional feed sources in the animal feeding.

Key words: Malwa region, Nutrient content, Unconventional feed

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INTRODUCTION

India has one of the largest livestock populations in the world, and one of its notable characteristics is that almost its entire feed requirement is met from crop residues and byproducts, grasses, weeds and tree leaves collected from cultivated and uncultivated lands, grazing on common lands and harvested fields. The ultimate aim of any livestock industry is the attainment of sustainable livestock production in the shortest time possible in order to give access any people to animal protein source with minimum cost. Birthal and Jha (2005) have found feed scarcity as the main limiting factor to improving livestock productivity. The demand of feed is always high and that has further stimulated by tremendous increases of the price of conventional or basic feed ingredients (Singh et.al., 1992) and ultimately made livestock production very expensive. Thus, in order to allow indigenous livestock to contribute effectively to the poverty alleviation and food security improvement, it is necessary and essential to increase their productivity by improving their strategies of feeding through unconventional and local feed resources utilization. However, very limited studies carried out

Table. 1. Nutritional profile of Unconventional feeds ofMalwa region of Madhya Pradesh (% DM basis)

Sample Name	Moisture	CP	EE	CF	NFE	TA	AIA	Ca	P	NDF	ADF	Hemi-cellulose	Cellu-lose	Lignin
Soybean husk	1.39 ±0.05	7.85 ±0.19	1.35 ±0.06	39.3 ±0.86	41.1 ±0.93	8.96 ±0.37	1.37 ±0.16	1.46 ±0.06	0.24 ±0.00	68.0 ±0.87	36.2 ±0.49	31.5 ±0.39	15.3 ±0.10	20.9 ±0.28
Mordhan husk	5.20 ±0.27	13.2 ±0.16	1.63 ±0.08	30.3 ±0.88	41.6 ±0.62	7.93 ±0.53	5.34 ±0.28	0.52 ±0.04	0.38 ±0.01	85.1 ±0.11	46.1 ±0.66	38.9 ±0.32	4.17 ±0.36	42.0 ±0.52
Water melon coat	0.68 ±0.03	7.11 ±0.46	1.08 ±0.03	64.6 ±0.88	24.4 ±0.87	1.99 ±0.10	0.78 ±0.06	0.68 ±0.01	0.09 ±0.01	84.8 ±0.49	57.7 ±0.51	27.0 ±0.63	12.7 ±0.57	44.9 ±0.18
Babul chuni	4.00 ±0.16	13.5 ±0.20	1.46 ±0.12	16.8 ±0.88	53.8 ±0.40	10.3 ±0.11	3.28 ±0.14	3.23 ±0.01	0.33 ±0.01	34.0 ±0.18	18.2 ±0.73	15.7 ±1.13	9.77 ±1.10	8.52 ±0.71
Saufby product	7.47 ±0.18	11.6 ±0.25	3.36 ±0.24	15.1 ±0.58	41.7 ±0.29	20.5 ±0.26	7.44 ±0.04	4.33 ±0.24	0.28 ±0.01	33.6 ±0.31	27.1 ±0.48	6.56 ±0.17	8.22 ±0.53	18.9 ±0.61
Rajgiri husk	6.54 ±0.20	6.41 ±0.10	3.06 ±0.27	40.0 ±0.57	35.3 ±1.38	8.60 ±0.75	6.52 ±0.20	0.74 ±0.01	0.54 ±0.01	67.6 ±0.33	46.1 ±0.78	21.4 ±1.04	7.89 ±0.63	38.2 ±0.36
Soybean chuni	1.68 ±0.08	17.0 ±0.32	2.85 ±0.08	14.2 ±0.66	52.4 ±1.49	11.7 ±0.57	3.60 ±0.11	2.68 ±0.06	0.54 ±0.01	31.5 ±0.91	16.7 ±0.70	13.1 ±1.33	10.11 ±0.60	6.66 ±0.75

Babul chuni contained 13.5% crude protein, 1.46% ether extract, 16.8% crude fibre, 53.8% nitrogen free extract, 10.3% total ash, 3.28% acid insoluble ash, 3.23% calcium and 0.33% phosphorus. The cellwall constituents were 34.0% NDF, 18.29% ADF, 15.7% hemicellulose, 9.77% cellulose and 8.52% lignin. Babul pods contain 12.0% CP and 55.0% TDN. Babul seeds are moderate source of energy (TDN 59%). Babul seed chuni contains 16.0% CP, 39.5% NFE and 55% TDN (Animal Nutrition Group, NDDB).Sauf by-product contained 11.6% crude protein, 3.36% ether extract, 15.1% crude fibre, 41.7% nitrogen free extract, 20.5% total ash, 7.44% acid insoluble ash, 4.33% calcium and 0.28% phosphorus. The cellwall constituents were 84.8% NDF, 70.1% ADF, 27.0% hemicellulose, 12.7% cellulose and 57.3% lignin.Rajgiri husk contained 6.41% crude protein, 3.06% ether extract, 40.0% crude fibre, 35.3% nitrogen free extract, 8.60% total ash, 6.52% acid insoluble ash, 0.74% calcium and 0.54% phosphorus. The cellwall constituents were 67.6% NDF, 46.1% ADF, 21.4% hemicellulose, 7.89% cellulose and 38.2% lignin. The reported nutritive value (per 100 gram) of rajgiri grains are carbohydrate 65g, sugars 1.7g, dietary fibre 7g, fat 7g, protein 14 g, calcium 159mg and phosphorus 557 mg. Soybean chuni contained 17.0% crude protein, 2.85% ether extract, 14.2% crude fibre, 52.4% nitrogen free extract, 11.7% total ash, 3.60% acid insoluble ash, 2.68% calcium and 0.54% phosphorus. The cellwall constituents were 31.5% NDF, 16.7% ADF, 13.1% hemicellulose, 10.1% cellulose and 6.66% lignin. Sruamsiri and Silman (2008) reported the chemical composition of soybean hull, which contained 92.3% DM, 12.6% CP, 2.82% EE, 43.7% NDF, 48.6% ADF, 0.55% Ca and 0.18% P on dry matter basis. The nutritional value of soybean hulls on an as-fed basis moisture 8.18%, crude protein 12.2%, crude fibre 33.3%, ADF 42.4%, NDF 57.2%, NFE 39.1%, ash 4.87%, ether extract 1.54%, calcium 0.52% and phosphorus 0.15% was reported by Barbosa et al., 2008. According to animal feed resources information system of year 2012, the chemical composition and nutritional value of soybean hulls on DM basis was crude protein 13.2%, crude fibre 38.8%, ADF 45.8%, NDF 64.1%, NFE 39.1%, ash 5.30%, ether extract 2.20%, lignin 2.40%, calcium 0.55% and phosphorus 0.16%.

on the nutritive value of soybean husk (Glycine max), mordhan husk (Stariapumila), watermelon coat (Citrulluslanatus), babul chuni (Acacia arabica), saufby-product (Foeniculum vulgare), rajgiri husk (Amaranthus spp.) and soybean chuni (Glycine max) and their use in livestock/poultry feeding. Although the presence of antinutritional factors has often been mentioned as the handicap of the intensive utilization of some of them (D'Mello, 1992;Semenye, 1990), they have been used both in ruminants and monogastrics with various performance results depending on their nutritional value and inclusion level.Thus, it is essential to incorporate the available unconventional feed to formulate least cost balance feed to make farming profitable. In this context the present study was undertaken to evaluate the nutrient composition of unconventional feeds available in Malwa region of Madhya Pradesh as source of feeding to livestock.

MATERIALS AND METHODS

Samples of various unconventional feeds were collected in plastic bags and brought to the laboratory as such from Indore district of Madhya Pradesh (M.P), near College of Veterinary Science and Animal Husbandry, Mhow. The unconventional feed samples were soybean husk (Glycine max), mordhan husk (Stariapumila), watermelon seed coat (Citrulluslanatus), babul chuni (*Acacia arabica*), saufby-product (*Foeniculum vulgare*), rajgiri husk (Amaranthus spp.) and soybean chuni (Glycine max). These samples were dried in a hot air oven at 100±5°C overnight, then grinded in a willymill and stored in airtight polythene bags for laboratory analysis. Samples of unconventional feeds analysed for proximate principles viz.,moisture, crude protein (CP), ether extract (EE), crude fiber (CF), nitrogen-free extract (NFE), total ash and acid insoluble ash (AIA) by the standard methods (AOAC, 2000), cell wall contents (Vonsoest et.al., 1991), calcium (Talpatra et al., 1940), phosphorus (AOAC, 2000). The data obtained were subjected to descriptive analysis (Snedecor and Cochran, 1994) using the Statistical Package for Social Science (SPSS). The results expressed in percentage of dry matter (% DM) were presented as mean±standard error.

RESULTS AND DISCUSSION

The nutritional compositions of all examined unconventional feeds are presented in Table 1. The moisture percent ranged from 0.68 (watermelon seed coat) to 7.47% (sauf by-product). The finding suggest that soybean husk contained 7.85% crude protein, 1.35% ether extract, 39.3% crude fibre, 41.1% nitrogen free extract, 8.96% total ash, 1.36% acid insoluble ash, 1.46% calcium and 0.24% phosphorus. The cellwall constituents were 68.0% NDF, 36.2% ADF, 31.5% hemicellulose, 15.3% cellulose and 20.9% lignin. As for nutrient composition of soybean husk in this experiment, it was comparable to that reported by Sruamsiri and Silman (2008) who reported 91.1% DM, 5.04% CP, 1.65% EE, 60.1% NDF, 42.0% ADF, 1.21% Ca and 0.06% P on dry matter basis. Mordhan husk contained 13.2% crude protein, 1.63% ether extract, 30.33% crude fibre, 41.6% nitrogen free extract, 7.93% total ash, 5.34% acid insoluble ash, 0.52% calcium and 0.38% phosphorus. The cellwall constituents were 85.1% NDF, 46.1% ADF, 38.9% hemicellulose, 4.17% cellulose and 42.0% lignin. The chemical composition of Mordhan husk is similar to that of many common organic fibres like rice husk which contain cellulose 40-50 percent, lignin 25-30 percent, ash 15-20 percent and moisture 8-15 percent (Hwang and Chandra, 1997).Water melon seed coat contained 7.11% crude protein, 1.08% ether extract, 64.6% crude fibre, 24.4% nitrogen free extract, 1.99% total ash, 0.78% acid insoluble ash, 0.68% calcium and 0.09% phosphorus. The cell wall constituents were 84.8% NDF, 57.7% ADF, 27.0% hemicellulose, 12.7 % cellulose and 44.9% lignin. Similar to the present findings, Mustafa and Alamin (2012) reported 8.36% CP, 73.5% CF, 3.33% EE, 5.46% Ash and 97.4% DM in watermelon hull on DM basis.

CONCLUSION

It can be concluded that unconventional feeds contained appreciable quantities of important dietary nutrients that could partly or completely replace some of the conventional feed sources. However, during feeding attention needs to be paid towards the inclusion level of the unconventional feed resources in the animal feeding.

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