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Analysıs of Feed Used in Horse Breedıng Enterprıses in Şanlıurfa Regıon in Terms of Nutrıent Content

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Abstract

In this study, alfalfa hay, oats, barleypaste, cornflex, dry meadow grass and wheat straws, which are the most popular roughages in the feed from different horse farms in the Suruç district of Şanlıurfa, were collected and examined in nutrients. HY, NDF and ADF levels (%), rows; 90.61-91.82; 2.64-2.90; 9.11-10.65; 2.05-2.79; 20.64-22.17; KM, HK, HP, HY, NDF and ADF levels of oats (%), respectively, 90.78-91.36; 2.51-3.36; 8.64-10.86; 5.43-6.77; 38.55-43.16; It was determined between 17.37-18.60 balls. KM, HK, HP, HY, NDF and ADF levels of alfalfa hay collected from three separate farms (%) were lower 87.45-91.88; 7.17-9.22; 16.40-18.28; 3.20-3.51; 40.79-47.19; 39.30-41.49 KM, HK, HP, HY, NDF and ADF levels of dry meadow grass collected from different farms (%) were 89.45-92.17, respectively; 6.01-7.89; 8.06-9.86; 2.27-2.46-52.40-56.65; As 32.18-34.93. The KM, HK, HP, HY, NDF and ADF levels of wheat straw collected from three different farms (%) were first 89.65-91.35; 7.30-8.77; 3.28-3.83; 0.30-0.39; 73.96-79.04; Between 50.45-55.34. The chemical composition of cornflex collected from different growers, is in Table4.6. KM, HK, HP, HY, NDF and ADF levels of cornflexure (%), first 82.95-.82; 1.45-1.92; 7.11-8.44; 3.97-4.32; 11.07-13.44; According to the statistic alanalysis performed, differences were found in barley, oats, alfalfa hay, dry meadow grass, wheat straw and corn flexes given to horses. is thought to be due to the soil structure and freshness of the place where it was harvested.

Key Words: *Horse Feeding, Nutrients, Forage*

Introduction

Horses have played a significant role in human life throughout history. They transformed how wars were fought, provided us with fast and efficient transportation, enabled long-distance travel, and were also used as pack animals. Horses have been used for a variety of tasks since ancient times. Their strength and efficiency were far more effective than human labor, and they were used to plow fields. Horses have also been used on trade routes throughout history, helping to develop trade and create and spread the commercial value of many products. In the modern era, horses have lost their importance in many ways due to technological advancements, and instead, they have become a source of income in economically developed societies, primarily through sports, hobbies, and racing (Aslan, 2017).

Horses are used for a wide variety of athletic pursuits with the primary goal of winning. While nutrition is unlikely to compensate for a lack of natural talent or inadequate physical training, there is a general belief that proper nutritional management is essential for any horse to reach its athletic potential.

However, it should be noted that the factors that constitute an ideal diet vary by region, horse breed, age, and use, so the rations provided to horses may also vary accordingly. Feeding practices tend to be based on tradition rather than evidence from well-designed scientific studies.

According to the latest data collected by FAOSTAT (Fao, 2014), there are reported to be almost 60 million horses in the world (58,832,221), which is almost the same as today's numbers.

Today, the most fundamental challenge for horse owners, breeders, trainers, and business managers is what and how to feed their horses. While horse feeding is generally practiced ad libitum, the wide variety of opinions on forage and vitamin use makes choosing the right one difficult. How we feed our horses depends on the horse's age, sex, breed, weight, and, of course, its activity level.

Pasture offers horses a wide variety of forages, including edible wild grasses, shrubs, and flowers. While these may not seem like enough, they can meet the protein and carbohydrate needs of non-trained horses.

Because horses struggle to find food in the wild, their stomachs are designed for this, and their digestive systems are not designed to handle large amounts of feed at once. Horses, with relatively small stomachs compared to their bodies, need to be fed three to four times a day. This feeding system can both eliminate digestive problems and increase feed efficiency. Furthermore, if weaning a horse off a day's worth of food can lead to loss of appetite. Weaned horses can first experience digestive problems, followed by physical problems.

According to TÜİK (Turkish Statistical Institute) Livestock statistics (TÜİK, 2020), there are 108,076 horses in Turkey. Şanlıurfa has the largest horse population in Turkey in terms of horse breeding and the number of horses it owns. With 8,775 horses, it has 504 more horses than its closest runner, Kars (8,279). Şanlıurfa, which holds a significant place in Turkish horse breeding, is one of only six cities in Turkey where official horse breeding takes place. Its 750-acre Hippodrome makes it well-positioned for all developments. Considered the capital of Arabian horse breeding, Şanlıurfa boasts approximately 1,000 of Turkey's 3,000 Arabian horses.

Horses have filled a variety of roles in different cultures throughout history. Evolving from pasture-dwelling creatures, horses' diets are unique and depend on the horse's role and use (Müller, 2012). Each horse has a unique genetic body structure, determined by factors such as height and conformation. Each horse has an individual metabolism that determines how well it digests its food and how efficiently it utilizes nutrients. Furthermore, each horse has its own collection of bacteria in its digestive system to digest forage. Therefore, the same amount of food will have different effects on different horses, so it's best to feed horses according to their needs, not a formula. Each horse's nutrient requirements will vary depending on whether they are kept in a stable, their breed, their sex, and the weather. If a horse is nutrient deficient, the clearest indicator is weight loss (Vogel, 1995).

With the increasing popularity of horses after their domestication and use in sports, changes have also emerged in equine nutrition programs (Manso, 2019). Horse nutrition practices vary across disciplines and geographic regions, and understanding the appropriate forage and nutrition for horses is crucial as individuals with unique needs (Mastellar, 2017). As grass-eating steppe dwellers, horses have evolved over millions of years to thrive on a high-fiber diet through their eating behaviors and digestive systems (Janis, 1976; Mcgreevy et al., 1995).

Nutrition is a vital component of equine care, and without proper management, various health problems can arise in horses (Mastellar, 2017). The daily dry matter requirement for mature and young horses is 3-3.2% of their body weight (NRC, 2007). Ponies have a higher dry matter requirement than adult horses (Pearson et al., 2001).

Roughage, hay, and hay-related products, including grazing and consumption, are an important part of a horse's diet and nutrition. Roughage is undoubtedly the most important part of a horse's diet, as it requires access to forage for most of the day (Müller, 2012). According to Müller, horses that lack sufficient forage in their diets inevitably develop intestinal, digestive, and dental problems. Digestibility is also a key factor influencing the value of horse nutrition (Lawrence, 2017).

Kollathova et al. (2020) investigated the effects of dried grape pulp on biochemical blood serum parameters (total protein, glucose, triglyceride, cholesterol, urea, AST, ALT, ALP, calcium, phosphorus, magnesium, sodium, potassium, and chloride) and nutrient digestibility in horses. They reported that dried grape pulp could be used in horse diets up to 200 g without adverse effects on horse health and for potential improved digestibility of some nutrients.

There are several types of forage available for horses, depending on the species, harvesting method, and geographic location. Types of hay include alfalfa, bird's foot clover, red clover, orchardgrass, wheat straw, and ryegrass. Alfalfa is a popular choice for hay because it is a good source of minerals and, due to its broad leaves, is more nutritious (Hill, 2007).

Recent research has shown that high performance horses and developing racehorses, which require more nutrition than normal horses, can be fed whole feed conventional feed and concentrate feed, but less feed can cause health problems such as colic and stomach ulcers (Rıngmark, 2014; Rıngmark et al, 2013).

Williams (2004) states that protein is important as the building blocks of muscle. Soybean meal and alfalfa are good sources of protein and can be used in lactating mares and foals, which require more protein than adult horses. Adult horses typically require between 8 and 10% protein in their diet.

Horses, which can be considered monogastric or non-ruminant herbivores, have evolved to benefit from a nearly constant intake of high-fiber diets. NRC (1989) reports that work and training increase horses' water needs by 50-300% due to these fiber sources. The main factors influencing this increase are DM consumption and environmental temperature. Küçük (2006) states that the most inappropriate times to water horses are immediately before exercise and after exercise, when the heart rate is quite rapid. Providing horses with frequent, small amounts of water during these times is a beneficial practice that not only prevents dehydration but also reduces digestive problems.

As water is restricted, voluntary food intake decreases (Sneddon et al., 1991). When food is also withdrawn, horses can survive for at least a week without water; studies have shown that horses can survive 72 hours of water deprivation and rehydrate rapidly (Tasker, 1967); (Sneddon et al., 1993).

In this study, feed samples collected from farms in Şanlıurfa province were analyzed and as a result of this analysis, the nutrient content of the feeds was revealed and suggestions were presented to complete the nutrients missing in the diets given to horses.

2. Materials and Methods

Forage samples (corn flex, wheat straw, oats, barley mash, alfalfa hay, and meadow hay) used as roughage sources were collected from horse breeding farms in the Şanlıurfa region. In the study, samples were taken according to the sampling method, depending on whether the randomly selected forages were in bales or in bulk in the storage areas. The dry matter (DM), crude protein (CP), crude fat (CF), crude fiber (CS) and crude ash (CA) analyses of the samples were performed as reported by A.O.A.C. (1990). The acid solvent-insoluble fibrous matter (ADF) and neutral solvent-insoluble fibrous matter (NDF) analyses were performed as reported by Van Soest (1991). The organic matter (OM), non-nitrogenous extracts (NEM), cellulose and hemicellulose values were determined by calculation. The data obtained from the research results will be analyzed according to the one-way analysis of variance method, and the Duncan multiple comparison test was used to compare the differences between the groups.

3. Results and Discussion

Corn flex, wheat straw, oats, barley mash, alfalfa hay, and meadow hay samples were collected from three different horse breeding farms in the Suruç district of Şanlıurfa and analyzed for their nutrient content. The dry matter (DM), crude ash (CASH), crude protein (HP), crude fat (CF), neutral detergent-insoluble fiber (NDF), and acid detergent-insoluble fiber (ADF) values for barley mash, oats, corn flex, wheat straw, alfalfa hay, and meadow hay are shown in the tables below, respectively.

3.1. Barley Mash

Differences in the HP and HY levels of barley grits collected from different farms were found to be statistically significant ($P<0.05$), and these differences are shown in Table 3.1. Herrera (1990), in his

nutrient analysis of barley grits, found the HP ratio to be 11, the NDF ratio to be 19.5, and the ADF ratio to be 7.8.

Table 3.1. Chemical composition of barley mash from different growers (%)

Nutrients	Growers			*p*
	1	2	3	
DM	91.45±0.73	90.61±0.86	91.82±0.70	ns
CA	2.77±0.05	2.90±0.13	2.64±0.10	ns
CP	9.11±0.11^{b}	9.94±0.10^{ab}	10.65±0.14^{a}	*
CF	2.05±0.07^{c}	2.79±0.08^{a}	2.39±0.04^{b}	*
NDF	21.15±0.23	22.17±0.27	20.64±0.30	ns
ADF	6.71±0.11	7.12±0.13	6.88±0.11	ns

^{abc}: *The difference between the groups in the same column is statistically significant. *P<0.05*

3.2. Oats

When the chemical composition of oats collected from three different farms is examined in Table 3.2, statistically significant differences were found in the HK, HP, HY, and NDF ratios. Herrera (1990), in his nutritional analysis of oats, found the HP value to be 12.8, the NDF value to be 24, and the ADF value to be 16.5.

Table 3.2. Chemical composition of oats from different growers (%)

Nutrients	Growers			*p*
	1	2	3	
DM	90.84±0.51	90.78±0.92	91.36±0.89	ns
CA	3.36±0.09^{a}	2.78±0.10^{b}	2.51±0.09^{b}	*
CP	10.24±0.30^{a}	10.86±0.34^{a}	8.64±0.26^{b}	*
CF	5.43±0.22^{b}	5.98±0.12^{ab}	6.77±0.19^{a}	*
NDF	38.55±0.94^{b}	41.81±0.56^{ab}	43.16±0.74^{a}	*
ADF	17.37±0.33	17.83±0.48	18.60±0.37	ns

^{abc}: *The difference between the groups in the same column is statistically significant. *P<0.05*

3.3. Corn Flex

The chemical composition of corn flex collected from different growers is shown in Table 3.3. No statistically significant differences were found in the DM and ADF contents of corn flex, but significant differences were found in the HK, HP, HY and NDF ratios (P<0.05). In a study conducted by Herrera (1990) on corn flex, the HP value was found to be 9.7, the NDF value was 9.3 and the ADF value was 3.3.

Table 3.3. Chemical composition of corn flex from different growers (%)

Nutrients	Growers			*p*
	1	2	3	
DM	84.82±0.88	82.95±0.82	84.05±0.91	ns
CA	1.92±0.03^{a}	1.51±0.05^{b}	1.45±0.05^{b}	*
CP	7.11±0.19^{b}	8.44±0.23^{a}	7.97±0.32^{a}	*
CF	4.32±0.10^{a}	4.03±0.09^{b}	3.97±0.07^{b}	*
NDF	12.91±0.31^{a}	13.44±0.25^{a}	11.07±0.21^{b}	*
ADF	4.45±0.09	4.70±0.06	4.64±0.09	ns

^{abc}: *The difference between the groups in the same column is statistically significant. *P<0.05*

3.4. Wheat Straw

When the chemical composition of wheat straw is examined in Table 3.4, no statistically significant difference was observed in DM content. However, statistically significant differences were observed in HK, HP, HY, NDF, and ADF values (P<0.05).

Birkelo (1986), in his study to examine the nutritional value of wheat straw, found the DM content to be 92.9, the HK ratio to be 5.58, the NDF ratio to be 81.1, and the ADF ratio to be 54.4.

The nutritional quality of straw is primarily influenced by the growth stage at harvest and the mixture of different grasses and other forages in the permanent pasture. Nutritional quality, particularly the content of water-soluble carbohydrates, is strongly influenced by weather conditions at harvest, while protein content is more strongly influenced by physiological age and soil nutrient status (Longland, 2011).

Table 3.4. Chemical composition of wheat straw from different growers (%)

Nutrients	Growers			*p*
	1	2	3	
DM	90.43±0.93	91.35±0.96	89.65±0.89	ns
CA	8.77±0.13^{a}	7.73±0.22^{b}	7.30±0.19^{b}	*
CP	3.83±0.07^{a}	3.28±0.10^{b}	3.67±0.10^{a}	*
CF	0.31±0.02	0.30±0.02	0.39±0.01	*
NDF	79.04±0.80^{a}	73.96±0.75^{b}	75.22±0.98^{b}	*
ADF	50.45±0.78^{b}	55.34±0.68^{a}	52.78±0.81^{ab}	*

^{abc}*: The difference between the groups in the same column is statistically significant. *P<0.05*

3.5. Meadow Hay

When the chemical composition of meadow hay collected from different farms was examined as shown in Tables 3.5, statistically significant differences were found in HK, HP, HY, NDF and ADF values (P<0.05).

Table 3.5. Chemical composition of meadow hay from different growers (%)

Nutrients	Growers			*p*
	1	2	3	
DM	91.80±0.77	89.45±0.92	92.17±0.95	ns
CA	7.89±0.30^{a}	6.94±0.22^{b}	6.01±0.28^{c}	*
CP	8.06±0.23^{b}	8.98±0.26^{ab}	9.86±0.35^{a}	*
CF	2.46±0.09	2.27±0.07	2.37±0.09	*
NDF	52.40±0.82^{b}	53.31±0.59^{b}	56.65±0.7^{a}	*
ADF	34.93±0.93^{a}	33.67±0.81^{ab}	32.18±0.75^{b}	*

^{abc}*: The difference between the groups in the same column is statistically significant. *P<0.05*

3.6. Alfalfa Hay

When the chemical composition of alfalfa hay collected from three different farms was examined (Table 3.6), statistically significant differences were found in the DM, HK, HP, NDF, and ADF values (P<0.05).

Kume et al. (2001) investigated the nutritional value of alfalfa hay and found the DM ratio to be 63.8, the HP ratio to be 13.7, the NDF ratio to be 45.2, and the ADF ratio to be 29.

Table 3.6. Chemical composition of alfalfa hay from different growers (%)

Nutrients	Growers			*p*
	1	2	3	
DM	87.45±0.84^{b}	91.88±0.63^{a}	91.32±0.97^{a}	*
CA	7.17±0.16	9.22±0.013^{a}	7.81±0.15^{b}	*
CP	16.55±0.30^{a}	16.40±0.27^{a}	18.28±0.22^{b}	*
CF	3.20±0.04	3.33±0.05	3.51±0.05	ns
NDF	47.19±0.83^{a}	45.83±0.70^{a}	40.79±0.63^{b}	*
ADF	41.49±0.70^{a}	35.07±0.52^{b}	39.30±0.45^{a}	*

^{abc}*: The difference between the groups in the same column is statistically significant. *P<0.05*

Research has shown that the nutritional value of forages varies seasonally (Williams, 2004). This also depends on their maturity at harvest, environmental conditions, and fertilization method. These significant differences are thought to be due to the forages used in the analysis being sourced from different locations, harvested at different times, and the soil structure and freshness of the harvested area.
Forage should be green, leafy, and free of dust, dirt, and fungi to maximize nutritional value. Health problems associated with overfeeding of nutrients are increasing in horses, but horses also require extended eating periods to prevent the development of certain stereotypical behaviors (Hill, 2007).

4. Conclusion

The feeding habits of horses raised in Şanlıurfa and its districts were investigated. The results are the first study conducted on animal husbandry, particularly horse nutrition, in the region. It is believed that they will shed light on future studies and, consequently, guide horse breeders to gain more knowledge and experience.

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