The role of Alfalfa Hay in animal health and nutrition

First, it is important to clarify what is “high-quality” hay? This is a term that can mean different things to different people. For some segments of the industry, the esthetic value (color, texture, softness, smell, etc.) is the driving force behind the price. The definition of “high quality”, in a nutritional sense, is hay that is highly digestible and capable of being consumed in sufficient quantities by the livestock.

Dairy cattle nutritionists value alfalfa hay for its high energy value which supports milk production. Its rapidly rumen digested structural fiber which stimulates feed intake. Its coarse structural fiber that stimulates ruminative chewing and salivation which results in rumen buffering. Its structural fiber which has a high buffering capacity. Its protein level which supports animal protein needs.

Below, find the nutritional characteristics of alfalfa hays with different quality categories (1. Table).

1. **Table: The nutritional characteristics of alfalfa hays of various quality categories**

Category	CP* (%DM)	NDF* (%DM)	ADF* (%DM)	TDN* (%AF)
X-Premium	24,0	33	26,0	56,6
Premium	22,0	36	28,0	55,2
Good	20,5	39	30,5	53,5
Fair	18,0	43	33,5	51,5

Source: P.H. Robinson, University of California

**CP is Crude Protein. NDF is Neutral detergent fiber, estimates total structural fibre. ADF is Acid Detergent Fiber, estimates the portion of NDF that is not hemicellulose. TDN is Total digestible nutrients.*

Alfalfa hay has been a significant feedstuff in rations of dairy cattle for a long time. Indeed, it has a number of beneficial nutritional attributes that make it a high quality feedstuff for dairy cows.

Alfalfa hay generally contains between 25% and 30% of its dry matter as rapidly digested non-structural carbohydrates (NSC), such as pectins, sugars and starches. That quantitatively

contributes to the level of total digestible nutrients (TDN) in the hay. In addition, the total structural fiber in alfalfa hay, ranging between 35% and 40% of total hay dry matter (DM) as neutral detergent fiber (NDF), is rapidly digested by microorganisms in the rumen leading to a high proportional contribution to the hay's TDN value. The high protein level, generally ranging between 18% and 24% of DM, is also highly digestible (80% to 90%), which further contributes to the high TDN value of the hay.

Alfalfa hay fiber, measured as NDF, is ideal for stimulating ruminative chewing in dairy cows. This is not an insignificant nutritional attribute, as ruminative chewing, stimulates the flow of saliva to the rumen. Saliva has a high buffering capacity and so its flow to the rumen will help prevent rumen pH from declining and potentially inducing the metabolic problems associated with rumen acidosis. In addition, alfalfa hay NDF has a high buffering capacity, which increases the overall amount of buffering that results from intake of alfalfa hay.

Alfalfa hay proteins has a relatively low proportion that is soluble in rumen fluid.

It is relatively high in several minerals that are required by lactating dairy cows. These include calcium, phosphorus, potassium and magnesium. Although alfalfa hay also contains significant levels of most other macro and trace minerals.

Hay quality will depend on how the hay was harvested, handled, and stored. Ideally, to preserve nutrients, hay should cure in dry, sunny weather as quickly as possible. Once it's at the proper moisture content (15% - 18%), it should be taken from the field and stored in a dry, well-ventilated area. Hay not harvested and stored under these conditions may lose nutrients or get moldy, both of which dramatically lower quality. High quality hay comes from healthy forage stands with few or no weeds.

When evaluating hay quality, you can get a general sense of its quality with a visual evaluation. What is the different between the high quality hay and the low quality hay?
Look for the following characteristics.

The high quality hay is:

- leafy,
- fine-stemmed,
- few seed heads or blossoms,
- green,
- good smell,
- few weeds,
- no foreign materials.

The low quality hay is:

- few leaves,
- shattered leaves,
- coarse,
- stemmy,
- full of seed heads or blossoms,
- musty smell,
- bleached or brown,
- soil or foreign materials,
- noxious weeds.

To conclude, with the increase of supplementary feed price, home grown forage are becoming more and more an important feed intake source for cattle.

Alfalfa hay is key for dairy production but it might not be for the reasons you are expecting. Indeed, contrary to other forage, its main benefit is not based on protein or sugar content by themselves. If hay is so crutial from a nutritional point of view, it is because of its fiber content which balances pH for an improved digestibility and better feed value conversion. With its minerals input, it also completes nutritional needs to optimize dairy cows potential.

To be able to use its power, hay intake needs to be high enough. Before all visual criterias such as colors or hay smell, what makes a qood quality hay is its availabilty of being well digested by cows. Quality drives Dry Matter Intake which then, allows an healthly and balanced rumen for your cows.

Finally, to maximize hay quality and avoid spoilage, harverst conditions and good storage management are crutial.

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