Available Evidence in Application of Paper Mulberry in Animals Breeding

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Abstract. As a new protein feedstuff, paper mulberry has the characteristics abundant nutrition, high protein content and good palatability, and has great development potential. In this paper, the feeding value of mulberry, the feeding method and the application in animal feeding are reviewed, which provides reference for the wide application of mulberry in animals breeding.

1. Introduction

Paper Mulberry is a kind of highly adaptable tree, which is widely distributed in north and south provinces of China. In north China, three crops can be harvested in one year. Crude protein content is rich, up to 21.30% ~ 22.97%; Suitable content of amino acid, calcium and phosphorus; At the same time, it has a certain bacteriostatic effect [1, 2]. In 2007, the seminar on hybrid broussonetia held by the state forestry administration, experts agreed that broussonetia could be used as a good feed material for livestock and poultry, with great potential for development [3]. In 2015, broussonetia was listed as one of the ten targeted poverty alleviation projects in China, focusing on the implementation of "forest-material-livestock" integrated poverty alleviation of hybrid broussonetia in the impoverished areas of China. At present, the application of hybrid broussonetia mainly focuses on direct feeding or feeding after being made into broussonetia silage. Therefore, scientific and reasonable development of broussonetia resources, effective application of broussonetia in livestock and poultry production, is a major challenge we face.

2. Forage value

Broussonetia, as a new protein feed, contains as much as 20% crude protein in its young leaves, which is three times as much as corn and twice as much as wheat, only second to soybean.

After previous determination we found that the broussonetia papyri era dry matter, crude protein, crude fat, crude fiber, calcium, phosphorus content were 85.82%, 20.29%, 3.42%, 9.86%, 2.23%, 0.3%, 8% higher than that of the crude protein content than alfalfa meal, at the same time, crude fat, calcium,
phosphorus and other nutrients content is appropriate, has the very high feeding value, can be used as a raw material, compound feed feeding all kinds of livestock and poultry [4, 5]. In terms of amino acid composition, the total amino acid content in the leaves of blouson is about 20%, and the proportion of 8 essential amino acids in the total amino acid is about 40% [6]. The amino acid content of most leaves is higher than that of alfalfa powder. In terms of amino acid digestion and absorption, lysine content of leaves was 1.36%, 6.8 times and 1.7 times of that of maize and alfalfa respectively. It can be seen from this that when preparing a diet, the feed cost can be saved under the condition of ensuring a reasonable diet by combining the structure leaves with corn, soybean meal and alfalfa in a reasonable and effective way [7]. It shows that broussonetia can be used as a good feed resource in animal production.

3. Feeding method of braided tree

3.1. Broussonetia papyri era silage
Broussonetia is a deciduous tree with high fiber content. A large amount of fiber not only affects the palatability of feed but also affects its digestion and absorption in animals. The content of crude fiber can be reduced effectively and the feeding and palatability of broussonetia can be improved by making broussonetia into silage. Zhang Yimin etc. [8] the study found that will compose the leaves without straw fermentation 0 d and 9 d after two groups of data, contrast found that compose the leaves after fermentation of crude protein and crude fiber content increased by 6.47% and 1.39% respectively, crude fiber and nitrogen content is reduced by 2.28% and 7.7% respectively, the validity of the whole structure leaves forage has been greatly improved, palatability improving. Xiong luo ying [9] studied the effect of fermented leaves on slaughtering performance and meat quality of AA broiler chickens, and found that adding fermented leaves to diet could improve the pH value of muscles, and significantly reduce the dripping loss and cooking loss of muscles.

3.2. Fresh leaves and leaf powder
Broussone, as a plant feed resource, has rich yield. It can be harvested three crops a year in northern China. In order to make full use of it, part of it can be stored in blouson harvest season and crushed into powder after natural air drying for use as feed. In the season of resource shortage, it can be used as a good feed material. In mid-summer [10], the leaves powder was fed to growing and finishing pigs, and the results showed that it was feasible to use the leaves powder as the feed for growing and finishing pigs instead of a certain proportion of the basic diet. Wang yongshu [11] fed bama xiang pigs with structured leaves and found that using structured leaves in the diets of bama xiang pigs could improve the meat quality and reduce the feed cost.

4. Application of broussonetia in animal breeding
Broussonetia papyri era as a new type of feed raw materials, its nutritional value is rich, good palatability, at present has been used in livestock and poultry breeding, but it also has the fiber content is higher, bad digestion, protein nutrients the faeces loss serious shortcomings and so on, therefore, we should actively develop feed resources rationally, to maximize use of broussonetia papyri era. Many domestic scholars have made in-depth research on the application of tree leaves in animal feeding.

4.1. Application of hybrid blouson in poultry
When xiong luoying et al. [12] studied the effects of fermented leaves on growth and metabolic performance of broilers, they found that the crude fiber content of fermented leaves decreased to different degrees, and the crude protein content increased significantly. Feeding leaves had no adverse effect on the growth of broilers. Yan-zhi li [13] in terms of research, such as leaf production performance of laying hens, egg quality and blood biochemical indexes and the immune function of the impact of the show that compose the leaves can improve the production performance of laying hens lay eggs peak,
egg quality and blood biochemical indexes, also can improve the production performance of late egg laying hens and eggs quality, effectively promote the body's immune function.

4.2. Application of hybrid blouson in pigs
In the study of pig feeding, the leaves are mainly applied to the diet of growing and fattening pigs. Broussous enjoys the reputation of "high yield forage tree". In the early stage, individual farmers in China had the habit of feeding pigs with blouson. Broussone grows faster, and the fresh leaves are fed directly, and the dried leaves can also be used as feed after being crushed. Li haixin [15] found that the average daily weight gain of growing pigs could be significantly increased after the leaves were fermented. Adding 10% of the original leaves or fermented leaves in the diets of growing pigs can significantly reduce the backfat thickness, significantly increase the content of free amino acids and monosodium glutamate in muscles, and improve the flesh color to some extent. TaoXing without [16] hybrid broussonetia papyri era feeding growing swine trials found that test Ⅰ group (fed chow 80% + 20% fermented structure leaves) pig daily gain of up to 0.74 kg/d. This indicated that the nutritive value of fermented leaves was improved and the growing pigs had a good effect.

4.3. Application of hybrid blouson in cattle and sheep
The content of crude fiber in broussonetia was higher, and the rumen structure of ruminants could digest the crude fiber better than that of monogastric animals. Tu yan et al. [17] used nylon bag method to study the degradation rate of each part of the hybrid braided tree and found that, except for the stem, other parts of the braided tree could be fully digested in 2d. The degradation rate of crude protein in 2d was above 85%, and that of NDF and ADF in leaves and shoots was above 80%. The results showed that the leaves and branches of hybrid brassica could be used as feed resources to provide nitrogen and carbon sources for ruminants. Sue should jade [18] research broussonetia papyri era fermented feed effect on the properties of Holstein cow's milk found in the feed to add 0%, 4%, 8% and 12% respectively of broussonetia papyri era fermentation feed for feeding, the results show that adding of broussonetia papyri era feed the cows of its milk production has different butterfat rate of cows, milk protein and lactose rate and dry matter content had no significant difference. Lin Mengen [19] in the silage hybrid broussonetia papyri era alternative protein feed effect on the properties of mutton sheep production, added in the diet of silage replace corn silage hybrid broussonetia papyri era, replace quantity are 10%, 30% and 50% respectively, the results show that compared with the control group, 3 group of mutton sheep intake, daily gain, feed conversion ratio had no significant effect, with the improvement of silage additives broussonetia papyri era, feed intake, daily gain, only all day profit decrease trend, show that silage hybrid broussonetia papyri era can be used as a protein feed in the mutton sheep diet.

5. Conclusion
Brassica is a new feed material, rich in crude protein, crude fat, calcium, and phosphorus and other nutrients, reasonable amino acid content, tannin, lignin and other anti-nutrient factors content is relatively low. It can replace some basic diets of single stomach animals such as chickens and pigs, and can also be used as roughage resources of ruminants such as cattle and sheep. Animals can gain weight, improve meat quality and increase egg production after eating broussous. However, it is still difficult to reduce the content of lignin, tannin and other anti-nutrient factors. Therefore, it is a key issue for our future research to rationally develop and utilize broussonetia resources and increase the proportion of broussonetia in the diet. With the continuous progress of science and technology and the continuous development of animal nutrition, broussonetia will be well used in animal diets, and broussonetia feed will also become one of the important feed resources to alleviate the shortage of feed resources in China.
Acknowledgments
This work was financially supported by Tangshan Food and Drug Comprehensive Testing Center Academician workstation and Hebei second-phase modern agricultural industry technology system innovation team construction project (HBCT2018160403) fund.

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