

How Functional Premix Feed Be Used for Improvement of the Reproductive Capacity of Cattle

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Abstract: Premix feed is a feed mixture containing one or more feed additives and diluent or carrier after mixed evenly, which plays an important role in cattle feeding. In this paper, the characteristics and functions of premix feeds were analyzed, and the effects of adding fat, vitamins, microelements and other mixtures in daily feed on the reproductive performance of cattle were analyzed, and the effects of adding different premix feeds in feed on the postpartum diseases of cattle were expounded.

1. Introduction

Premix feed is a feed mixture containing one or more feed additives and diluent or carrier mixed evenly [1-2], also known as additive premix, whose main function is to evenly disperse a small amount of raw materials into a large amount of mixed feed. It should be noted that premix feed cannot be directly fed to cultured livestock and poultry[3]. Thus, premix feed can be regarded as the core of compound feed, because it contains a large number of active microelements, so it determines the mixing effect of feed. Premix feed has two kinds of single premix and composite premix.

2. Characteristics and Functions of Premix Feed

2.1. Characteristics of Premix Feed

(1) Complex composition. Premix feed generally contain seven or eight kinds of microelements, more than 12 kinds of vitamins[4], 1-2 kinds of drugs and other additives and more than 2 kinds of amino acids, and the roles with different functions of various feed additives.

(2) Less dosage for great efficacy. Generally, the proportion of premixed feed in mixed feed is between 0.6% and 5% [5]. Although the amount of premixed feed is at a relatively small proportion, it plays a huge role in improving the production performance of livestock and poultry and improving the feed conversion rate.

(3) It cannot be fed directly. The concentration of active ingredients of feed additives in premix feed is at a relatively high level, which is usually dozens or even hundreds of times that required by animals. If fed directly to livestock and poultry, it will cause poisoning.

2.2. Function of Premix Feed

With the rapid development of animal husbandry, there are more and more premix feed manufacturers. The use of premix feed can not only increase the benefit of farmers, but also reduce the cost of feed. Using premix feed, its benefits and advantages are mainly reflected in the following aspects.

(1) Increase the nutritional composition of feed. The use of premix feed can make the nutritional status of feed to reach a balanced and perfect status[6]. For example, the addition of lysine and methionine in premix feed can supplement the essential amino acids that are lacking in animal feeding, which can greatly improve the utilization rate of protein, and reduce the waste of feed.

(2) Promote metabolism. The premix feed is supplemented with vitamins and various microelements, which are essential active substances in the growth and metabolism of animals and active components of enzymes in the body [7], which are involved in the whole metabolic process of livestock and poultry growth, and thus the complete various life activities can be completed.

(3) Some hormones, microelements and vitamins in premix feeds are essential active substances for substance synthesis in animals, which can significantly promote the growth and increase the body weight of livestock and poultry [8].

(4) It can promote the digestion and absorption of nutrient elements in feed. For example, vitamin D contained in premix feed can promote the absorption and utilization of phosphorus and calcium in feed, thus facilitating the synthesis of microorganisms[9].

(5) Ensure and improve the quality of feed. For example, antioxidants and vitamin E in premix feed can prevent the oxidation of fat and the lack of vitamin in feed[10], so as to improve the quality of feed.

(6) It can play the effect of anti-bacterial deworming, so as to maintain the normal growth of animals. In addition, it can improve the quality effect of livestock and poultry products, maintain the quality, color and fragrance of meat, eggs and other products, so as to improve the income of agricultural products.

(7) Improve reproductive efficiency. The microelements and vitamins contained in prefix feeds are closely related to the reproduction and microelements of poultry, which can improve the fertilization rate of breeding eggs, sexual function, embryo development, survival and growth of poultry.

3. Effect of Mixing in Daily Feed on Reproductive Performance of Cattle

3.1. Fat

In general, peak milk production occurs between 4 and 8 weeks after calving at a time when the need for nutrients increases and therefore the cow's food intake increases, with the maximum intake occurring between 10 and 14 weeks postpartum. Therefore, in the early lactation, cows will have a negative energy balance because of nutrient failure. Due to insufficient external intake of nutrients, cows need to consume their own body fat to replenish energy, which leads to the wasting of cows in early lactation and the rise of milk yield, which inhibits the further increase of milk yield of cows. The addition of medium fat in the feed of dairy cows can increase the energy concentration of the feed of dairy cows, which is the best way to overcome the energy supply shortage in the early lactation.

3.2. Microelements

Microelements are indispensable in the process of growth of animal nutrition elements, it is

important for the growth of animal nutrition physiological function. In the process of animal growth, it mainly plays a role in the structure of tissues in the body, and participates in various metabolic activities in the body as a component of enzymes and hormones in the form of ions involved in the body acid-base balance and electrolyte balance. If the content of microelements are at excessive high or low level in livestock and poultry feeding, it will directly or indirectly affect the breeding performance of cattle. Vitamins are mainly involved in various metabolic activities and chemical reactions in the body in the form of catalysts or coenzymes, so as to maintain the normal physiological function of tissues and organs in the body of livestock and poultry and ensure the health of cattle. If there is a lack of microorganisms in the feeding process, the metabolic disorder of the animal body will occur, and the reproduction and health of cattle will be affected.

In addition, the lack of various micronutrients and vitamins in the feed of cattle will delay the time of postpartum estrus and make it difficult for cattle to estrus. Even when estrus occurs, the performance will be very weak and not conducive to the normal breeding of cattle. Studies have found that β -carotene has a significant regulating effect on reproductive hormones in animals, so that it can improve the conception rate of cattle by promoting the development of bovine follicles. In addition, the peak in dairy cows need a balanced nutrients, and this is one of the most important supply balance of trace elements and vitamins, it can improve the health of dairy cows, enhance its resistance and immunity, thus speeding up the cows postpartum recovery of the body, reduce the invasion of exotic diseases and internal diseases can the delivery, so as to further improve the cow milk production.

3.3. Compound Feed

The diets of fattening cattle were supplemented with 2% compound premix (concentrate ratio: wheat 60% + rapeseed meal 20% + corn 19% + salt 1%; Nutrient level of concentrate per kg:DE 13.76 MJ, CP 176 g, Ca 3.4 g, P 5.3 g.) The average daily investment of composite premix head is 0.28 yuan, the average daily income of composite premix head is 1.01 yuan, the input-output ratio is 1 : 3.61, and the economic benefit is significant. In the lactation period of cows, the addition of refined feed (soybean meal 19.9% + corn 50% + wheat bran 8.0% + rapeseed cake 9.5% + rice bran 6% + calcium hydrogen phosphate 0.48% + stone powder 0.5% + baking soda 1% + salt 1%) significantly shortened the time of first estrus after calving and the postpartum empty pregnancy days. In addition, the pregnancy rate of the first and second time was also significantly increased, and the number of spermatozoa needed for pregnancy was also significantly shortened; It can reduce the incidence of underbirth, endometritis, postpartum paralysis, limb and foot disease, and significantly improve the fecundity of cattle and the incidence of postpartum diseases.

4. Premix Production Technology for Cattle to Improve Fecundity

4.1. Nutrient Treatment

(1) Vitamin processing. Vitamins E and A are commonly used in cattle production. In addition, additional vitamins such as vitamin B12, niacin and thioneine are needed to improve the fecundity of cattle. Because the amount of vitamin added in cattle production is relatively small, generally a small amount of carrier is used to pre-dilute the vitamin in advance, and then it is thoroughly mixed with a large number of raw materials fed to cattle, so that it can mix evenly.

(2) Preprocessing of microelements. Microelements in bovine premix are added in the form of inorganic salts with copper sulfate, manganese sulfate, zinc sulfate and so on. Some inorganic salts are easy to absorb water and agglomerate, so they must be crushed before use. Some inorganic salts can be mixed twice first because they are used in small quantities. Selenium also plays a great role

in improving the fecundity of cattle, but there are small demand especially the inorganic salt sodium selenite used is a highly toxic substance, so it needs to be reprocessed first, which can be dissolved into 84°C hot water for 5 minutes for an aqueous solution, and finally it can be added to the bovine premix.

(3) Selection of diluent and carrier. Carriers are tiny particles capable of carrying or adsorbing active ingredients. After some trace components added to the bovine premix are absorbed by the carrier, their physical properties will change to some extent. On most occasions, the carrier is required to do the following: First, the carrier itself does not have activity, it fails to react with trace components or premix, and the activity of micro components in the premix is not easily damaged. Second, it is mixed with the raw material of compound feed and premix. Third, high chemical stability, there are no health effects on cattle after feeding.

Finally, it is endowed with low price, it will not improve the composition of premix. The required characteristics of the diluent are, first, that the diluent is also not an inactive substance and will not change the active ingredient of the additive and bovine premix. Second, the physical characteristics of the diluent including particle size and relative density are as close as possible to the microcomponents, especially the particle size is at a relatively uniform level. Third, the diluent itself will not be fixed or absorbed by active trace elements. Fourth, the diluent is harmless and will not negatively affect the health of cattle. Five is the moisture content is not high, and in storage not agglomerate, not easy to absorb moisture. Sixth, the chemical properties are stable, not easy to produce obvious changes with air composition and other premix composition.

4.2. Technical Requirements for Bovine Premix Production

(1) Prevent the loss of active ingredients. In the process for premix production, the availability and stability of the premix production should be ensured, stable processing of raw materials is required for the selection of vitamins and sulfate microelements are required, or with alternative of oxide. The stability of the microcomponents should be at a high level. Under normal use and storage conditions, the chemical and physical composition of the premix should be highly stable and the moisture content should not exceed 5%.

(2) Addition of Amino acid. Addition of elements such as lysine and rumen methionine to premix can improve economic benefits and milk yield of cattle, which needs to be added by breeding plants according to actual needs.

(3) Packaging and storage. At present, the premixed packaging bag is mostly three-in-one paper bag, which is characterized by avoiding light, waterproof and not easy to damage, and the packaging is relatively strong. The bagging of premix is generally 20-25 kg per bag. As the premix contains more trace active ingredients, chemical reactions may occur in the case of moisture, so be sure to pay attention to moisture during storage.

5. Effects of Different Premixes on Postpartum Diseases of Cattle

In the daily breeding process of cattle, diseases often cause difficulty in pregnancy, lack of estrus, and abortion after pregnancy. The occurrence of disease can also stretch the interval between calving and re-calving to more than 400 days, a frequency that can lead to a decrease in overall cattle production levels and, invisibly, a serious negative impact on cattle based economic performance. After calving, the body is often weak. There will also be a lack of various nutrients and vitamins. Microelements in the animal body will participate in a variety of physiological and biochemical activities, which has more pertinence with the synthesis of vitamins, enzymes, hormones and other active substances.

The activity of many enzymes in the animal body is also closely pertinent to metal ions, and the

change of metal ions will also cause the change of enzyme activity, which will affect the postpartum health status of cattle. If cows are fed diets lacking vitamin E or selenium, they will not be in estrus regularly or even not at all. This will also lead to a decrease in the rate of conception and even the loss of the fetus. Limb and foot disease is one of the common diseases in cattle rearing industry, which will lead to the decline of production performance and even make the cattle eliminated. Adding trace elements to feed can prevent the incidence of hoof disease.

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