

SCIENTIFICALLY SPREAD SALT FOR LIVESTOCK

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Abstract: This paper reviews and summarizes the process and experiences of the scientific development of salt for livestock in the Inner Mongolia Autonomous Region of China, raises the issue on further strengthening and improving administrative measures and making efforts to create a new process of scientific research, production and sale of salt for livestock in the process of implementing the "one body with two wings" development strategy of salt industry.

Keywords: Salt for Livestock Scientific Preparation Vigorous Popularization Strengthen Management

The Inner Mongolia Autonomous Region of China is the major province of animal husbandry in China with beautiful and affluent prairie such as Hulun Buir, Xilin Gol, Khorchin, Ulanqab and Erdos, etc. in the region which are well-known throughout the country. The area of natural grassland is 18,804,500 hectares and the area of artificial pasture is over two million hectares. Based on incomplete statistics, the amount of large and small livestock on hand in the whole region is over 70 million. As the structural adjustment of animal husbandry and change of mode of operation in recent years, large and small farms sprang up like mushrooms supported by leading enterprises in animal husbandry such as "Xingfa sheep", "Yili" and

"Mengniu", etc.

From the perspective of scientific stock keeping and according to theoretical calculation, the consumption of salt by livestock in the whole region is very large and 80% market of salt for livestock is to be developed at the moment. It can be predicted that its economic benefits and social benefits are considerably large.

1 · The salt for livestock must be developed, produced and sold as prescribed by relevant regulations and policies of the state.

Salt is a necessity of life and salt industry plays an irreplaceable role in national economy as the dominant measure for salt

iodization; it assumes the sacred mission to eliminate iodine deficiency and disorders. Since livestock live in an iodine deficiency environment like human, the Regulations on Edible Salt Iodization as a Means to Eliminate Iodine Deficiency and Disorders, the Edible Salt Monopoly Regulations and the Regulations for the Administration of Salt Industry in the Inner Mongolia Autonomous Region issued by the Chinese State Council all explicitly stipulate that the salt for livestock, as a particular variety, shall be listed in the salt category and be monopolized by salt industry departments in all localities. Therefore, the salt for livestock shall be exploited and developed as prescribed by regulations and policies of the state on edible salt monopoly.

2 · The salt for livestock of Inner Mongolia Autonomous Region, China stepped into the track of scientific development.

Since the founding of the People's Republic of China, the party and the state have attached great importance to the development of animal husbandry and vigorously advocated scientific stock keeping. To actively promote the development of animal husbandry and relevant industrial economies of the whole region, the salt industry department of the autonomous region listed the salt for livestock in the scope of research, development and operation as a special salt variety as early as the 1950s. The people's committee of the autonomous region at that time exclusively formulated relevant policies on the supply of salt for livestock in July, 1956 and offered preferential policies on the reduction of 60% salt tax imposed on livestock production units.

For the purposes of further developing scientific stock keeping, changing the breed structure of salt for livestock and improving economic benefits, the salt industry department of the autonomous region began to develop a special salt for livestock with certain technological contents, i.e. salt brick and dust salt of mineral feeds in the middle 70s. Salt industry departments led the cooperation with Inner Mongolia Agriculture and Animal Husbandry College, the Station for Spreading Science and Technology in Farms and Pastures of Inner Mongolia, Inner Mongolia Industrial College and other units, researched and developed salt brick and dust salt of mineral feeds for the use of animal husbandry once again and achieved success in 1983. Besides, the first production base with an annual production of 2,000 tons of salt bricks and dust salt of mineral feeds was built in Hohhot and put into batch production in 1985. The scientific achievement on salt bricks of mineral feeds was awarded the third prize for scientific and technological progress in the autonomous region in 1987.

To transfer scientific and technological achievements into productive forces, the administrative department of salt industry in the autonomous region, on the basis of market conditions of the salt for livestock, approved the construction of three production bases in the Hulun Buir Salt Industry Branch, the Ejnor Salt Field in Xilin-Gol-Bund and the Erdos Xingsheng Salinization Co., Ltd., with an accumulative investment of nearly RMB10 million under the principle of "overall planning, proper distribution, market adaptation and gradual development". The total production capacity of salt bricks and

dust salt of mineral feeds in the whole region reached 50,000 tons/year at present.

For the purposes of intensifying the administration of salt for livestock in the whole region and continually satisfying requirements for the production and development of animal husbandry in the countryside and pastures, the salt administrative department of the autonomous region, in accordance with relevant regulations of the state, issued a series of regulations and documents such as enterprise standards, i.e. the Methods for the Administration of Salt for Livestock in the Whole Region, the Implementation Opinions on the Development of Salt for Livestock in the Whole Region and Ordinary Salt for Livestock (Q/NY003-2002), etc. in succession, which further standardize the production, sale and administration of salt for livestock.

The salt administrative department of the autonomous region quickened the pace of structural adjustments of salt industry and products, raised and finally determined the sector development strategy of "with salt as the main body and with salt for livestock and a variety of salt as two wings" and promoted the development of salt for livestock to a new strategic height in 2001. As the development of production of salt for livestock and the market, the sales volume of salt for livestock in the whole region increased each year. The sales volume was 45,285 tons in 2008 (including 18,006 tons salt bricks of mineral feeds), increasing by 30% compared with that of the previous year and the annual growth rate of sale of salt for livestock in the whole region remained above 20%. The

development of salt for livestock in the Inner Mongolia Autonomous Region has stepped into a healthy track with sound development. As the implementation of the western development strategy of the state, the fast pace of ecological construction, the expansion of scope of feedlot or indoor breeding, it is believed that the salt for livestock in the Inner Mongolia Autonomous Region can have quick development within a short period as long as governments, salt industry and animal husbandry departments at all levels attach importance to this work and further strengthen cooperation in terms of animal husbandry development.

3 · Scientific innovation, improve functions of salt products for livestock

3.1 Main functions and deficient symptoms of essential mineral elements

Mineral elements are a main category of inorganic nutriment in animal nutrition. Twenty-seven kinds of essential elements with nutritional and physiological functions have been proved to be existed in animal bodies at present besides carbon, hydrogen, oxygen and nitrogen, of which elements with a content of above or equal to 0.01% are named as major elements, including seven kinds of calcium, phosphorus, sodium, potassium, chlorine, magnesium and sulfur. Elements with a content of less than 0.01% are named as trace elements. Twenty kinds have been found out at present, there is little demand for other elements except iron, zinc, copper, manganese, iodine and cobalt and generally there would not be a lack of those elements.

Mineral elements are one crucial type of

nutrients required by animals. They are not only involved in the composition of all kinds of organizations and organs within animal body, but are also involved in all kinds of physiological, biochemical and metabolic process of animals' life activities such as their growth, development, fertility and reproduction, etc. In particular, most trace elements are enzymatic components or activation factors, which have crucial physiological and metabolic functions though in little demand. The insufficient intake of mineral elements will lead to decreasing productive factors, biochemical changes and relevant deficient symptoms such as pica, anemia, crude fur, swelling thyroid gland and anorexia, etc. and affect cultivation benefits.

The following factors shall be taken into consideration as to how to develop and research series of products of salt for livestock:

① Produce salt products for livestock of different physical forms aiming at the different features of ways for feeding livestock with salt and feeding habits, such as blocky, granular and power ones, etc. for the convenience of feeding. According to investigation, blocky salt bricks of mineral feeds are suitable for free licking of cattle and sheep, the ordinary granular salt for livestock is suitable for centralized feeding of horse, mule, donkey and other livestock while the powder salt for livestock is suitable for mixed feeding of pig, chicken, duck and other domestic animals and poultry.

② Produce a variety of and multi-functional salt products for livestock aiming at major and trace elements of minerals contained in

drinking water and fodder grass of different localities, have target supply to different districts and solve the problem of insufficient intake of major and trace elements in self-help feeding of livestock and promote scientific stock keeping.

③ Aiming at common diseases and frequently encountered diseases of livestock in farming and pastoral areas and develop salt for livestock products in favor of prevention and cure of diseases.

Secondly, it is not enough to develop series of salt products for livestock through mere reliance on technical factors of production enterprises in the salt industry. It must be completed through firm reliance on technical factors of animal husbandry scientific and research institutes and joint efforts of people in the salt industry.

3.2 Functions of salt bricks (dust salt) of mineral feeds

Main elements: salt, calcium, copper, iron, manganese, zinc, cobalt, selenium and other mineral elements. The famous animal dietitian in Inner Mongolia Autonomous Region, China, the researcher Lu Dexun designed formulas aiming at different types of feeding animals and production objectives on the basis of a comprehensive analysis of our country's regional location, feeding manners, fodder grass structure, feeding management level, regional differences of contents of mineral elements in fodder grass and drinking water and other factors. The salt brick of mineral feeds with enzyme contains Arazyme. Basic functions: give priority to supplement, balance and control mineral nutrition, prevent allotriophagy, foot rot, while muscle disease, postpartum paralysis of high-yield milk cow,

pup rickets, nutritional anemia, etc. caused by the lack of mineral nutrition and imbalance of cattle and sheep, regulate biological metabolism and have nutrition and health care functions. For milk cow, the salt brick of mineral feeds with enzyme can significantly increase milk yield, prevent and have adjuvant therapy of recessive mastitis, reduce somatic number in the milk, improve milk quality, prolong peak milk production period, improve physique of milk cow, prolong the useful life of milk cow, reduce the rejection rate of milk cow, prevent infertility caused by the inflammation of milk cow's reproductive system, increase the survival rate of calves, reduce common diseases of milk cow such as milk fever, acidosis and left displaced abomasums, etc.

3.3 Technical indexes of salt bricks (dust salt) of mineral feeds

The formula of salt bricks of mineral feeds contain nutrients that cattle, sheep and other animals are most prone to be lack of, such as protein, mineral elements and energy, etc. and their proportion satisfy the biological needs of animals. With reference to the recommended amount for nutritional needs of milk cow (1989), beef cattle (1996) and sheep (1985) raised by NRC and the latest feeding standard issued in our nation, the types and proportion of nutrients in the formula of salt bricks of mineral feeds are scientific since the two factors of animal needs and contents of feeds itself are given full consideration.

Physical and chemical indexes: Particles of raw materials all pass through the 2.38mm sieve analysis, 1.68mm sieve analysis of oversize material <20%; ingredients' mixing uniformity coefficient of variation CV <10%;

the shape of salt bricks of mineral feeds is the two series of short cylinder or cube, the appearance is flat and there is no obvious crack on the surface; have high compressive strength, the "hardness" of salt bricks of mineral feeds is about more than 50kg/m²; damage rate <5%; humidity-proof degree <90%.

3.4 Variety and explanation

① Salt bricks of mineral nutrition supplement feed (ruminants)

This variety is designed for ruminants and it supplements and balances mineral nutrition. The daily output of fresh milk of milk cow increased by more than two kilograms than the control group, the daily gain of ruminants increased by over 10% than the control group and their incidence of disease dropped by over 80%.

② Salt bricks of mineral nutrition consolidation feeds (milk cow)

This variety is designed for middle and high-yield milk cow. It consolidates mineral nutrition based on supplements and promotes growth, development, production and reproduction. The daily output of fresh milk of milk cow increased by more than three kilograms than the control group.

③ Salt brick of mineral nutrition consolidation feeds (finished cattle)

This variety is designed for finished cattle. It consolidates mineral nutrition based on supplements and promotes growth and development. The daily gain of finished cattle increased by over 15% than the control group.

④ Salt brick of mineral nutrition consolidation feeds (sheep)

This variety is designed for the Pu Neng

sheep and small-tail Han sheep, etc. It consolidates mineral nutrition based on supplements and promotes growth and development. The daily gain of sheep increased by over 20% than the control group.

⑤ Salt brick of mineral nutrition consolidation feeds

This variety is designed for down producing goat. It consolidates mineral nutrition based on supplements and promotes growth and development. The daily gain of down producing goat increased by over 15% than the control group and the cashmere yield increased by over 10%.

This variety is designed for deer. It consolidates mineral nutrition based on supplements and promotes growth and development. Its daily gain increased by over 15% than the control group and the antler yield increased by over 10% than the control group.

⑥ Salt bricks of mineral nutrition regulation feeds (milk cow)

This variety is designed for high-yield milk cow and milk cow during the peak of milk production period. It emphasizes on the balance of mineral nutrition elements based on supplements and consolidation, especially the nutrition regulation functions of trace elements, reduces common diseases of high-yield milk cow such as milk fever, acidosis, left displaced abomasums, etc. and promotes growth, development, production and reproduction. The daily output of fresh milk of milk cow increased by more than three kilograms than the control group.

⑦ Salt brick of mineral nutrition regulation feeds with enzyme

This variety can significantly increase milk yield, improve milk quality, greatly reduce somatic number, prevent and have adjuvant therapy of recessive mastitis, prolong the useful life of milk cow, reduce the rejection rate of milk cow, improve physique of milk cow, reduce probability of retained afterbirth, prolong peak milk production period, reduce common diseases of milk cow such as milk fever, acidosis, left displaced abomasums, etc., prevent infertility caused by the inflammation of milk cow's reproductive system and increase the survival rate of calves.

⑧ Salt brick of mineral nutrition consolidation feeds with enzyme

This variety can increase milk yield, improve milk quality, control somatic number, prevent recessive mastitis, prolong the useful life of milk cow, reduce the rejection rate of milk cow, improve physique of milk cow, significantly increase the rate of weight of beef cattle and mutton sheep, The daily gain increased by 10~20% than the control group and the cashmere (antler) yield and quality increased by over 10%.

4 · Actively conducting publicity is an essential and important measure for promoting the development of salt for livestock.

It is of the utmost importance to vigorously develop salt for livestock and conduct effective publicity. In particular, due to the insufficient understanding of farmers and herdsmen on the significance of scientific stock keeping and rejuvenating animal husbandry by science and technology as well as their lack of understanding on the

functions and benefits of salt for livestock products, the spread and popularity of salt for livestock are affected to the largest extent. Apart from a gradual increase of publicity through all channels in multiple forms, transportation and marketing enterprises at all levels shall change concepts, lay emphasis on the publicity and popularization of salt for livestock from the internal salt industrial system and guarantee human resources, materials and capital based on their respective actual situation. They shall enable general farmers and herdsmen fully realize the perniciousness of use of earth salt and inferior salt and consciously repel the write-off effects of earth salt and inferior salt on the market of salt for livestock.

It is far less to develop salt for livestock merely relying on the salt industry department. They shall firmly rely on departments at all levels, especially strengthening the role of animal husbandry and veterinary departments, etc. Animal husbandry and veterinary departments, as an important active force in grassroots of countryside and pastures, have close contacts with farmers and herdsmen. Their publicity and guidance play an immeasurable role in developing scientific stock keeping and spreading the use of salt for livestock. Therefore, salt industry departments at all levels must strengthen their cooperation with animal husbandry and veterinary departments, etc. in the future, give full attention to the role of animal husbandry and veterinary departments, etc. at all levels to promote the sound development of salt for livestock in the whole region.

marketing network and gradually improve sound pricing system

At present, the salt industry marketing network of the whole region is constructed in accordance with the principle of "be convenient for management, proper distribution and make things convenient for the people". All localities generally established wholesale network, agency wholesale outlets and direct sale outlets in market centers, remote countryside and districts under severe write-off effects of private salt based on their actual situation, wholesale, consolidation of original networks and giving priority to the retail link, made great achievements and ensured the supply of salt market covering remote areas. However, due to the small scale of these operating units, their lack of economic power and low profitability of salt products, some private vendors are not willing to sell salt for livestock and there are some gaps in the supply of salt for livestock in some villages. In order to further strengthen the reform and self construction of monopoly subjects, the salt departments are actively researching and exploring the application of modern operating model such as "logistics distribution and chain operation" in the salt industry at present so as to reduce circulation expenses, improve efficiency and improve service to adapt to the requirements for development under new situation.

Since salt for livestock falls into the category of salt monopoly, its pricing system is determined with total reference to the state's standards on salt at present. The current price of salt for livestock is determined in accordance with the production cost,

operating expenses and proper profits of salt for livestock with the state's promotion of the development of animal husbandry as the fundamental goal. The price is generally low and profits are meager. Whereas, the salt for livestock needs to add more than ten mineral major and trace elements such as iodine, etc. besides salt, and its production cost is higher than the same kind of salt, then the problem of meager profits in the retail link and reluctance of operation occurs. Moreover, many farmers and herdsmen would rather purchase cheaper earth salt and inferior salt to feed livestock, which further exaggerates the flood of illegal salt products and restricts the development of salt for livestock. We shall actively report to competent pricing authorities of the state and the autonomous region, endeavor to establish a pricing system of salt for livestock with "multiple win" of various sides and make general raisers realize the value for money and expand the salt for livestock market through continual improvement of product quality, increasing the technological added value of products and reducing costs.

6 · Prospects

Firstly, our animal husbandry stands at a crucial period of the transition from raise-driven traditional means of production to scale, intensified, specialized and modernized means of production. The feedlot and semi-feedlot breeding modes gradually spread in combination with the ecological protection of prairie in pastures and farming-pastoral regions. The transition of breeding modes raises higher requirements for the output and quality of feed products. Secondly, the contraction between feed production and human grain is increasingly prominent. The salt bricks (dust salt) of mineral feeds are new-type grain-efficient feeds and livestock supplement all-around mineral trace elements through free licking every day, which cannot be satisfied by ordinary feeds. In addition, the production of salt bricks (dust salt) of mineral feeds itself do not discharge waste, waste residue and waste water. Therefore, salt bricks (dust salt) of mineral feeds have broad market prospect and are especially beneficial to the development of animal husbandry in our nation.