Situations and Countermeasures on Veterinary drug residues and Detection to Animal Material Food of Entry-Exit Trade

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Abstract With the people's lives improving, the demands of livestock products on the import and export aspects were growing. Veterinary drug residues as the important factor which might influence animal products safety has become a major concern. In this paper, the status quo and inspection of the veterinary drug residue and the corresponding control measures were put forward.

Key words Veterinary drug residue, Animal derived food, Inspection, Present situation, Control measures

1 Introduction

As the international trade integration gets intensive, the safety of animal derived food has become an issue that caught global attention, among which the problem of veterinary drug residue is promising. Because of great cultivation differences and imperfect laws and regulations, as well as many money-oriented husbandry companies in China, the overdose of additives in veterinary drug is very so common that the addition of veterinary drug residue in animal derived food for international trade is getting worse and worse, which often leads to reduction of export amount or being banned. Thus, to solve this problem becomes a challenge task for both employees in the entry-exit inspection and quarantine bureau and veterinarians.

2 Status quo of veterinary drug residue

According to the definition given by the Joint Council of Food Agricultural Organization and World Health Organization on Veterinary Drug, veterinary drug refers to the residue of primary medicine or its metabolism in the livestock which has been injected with medicine. Animal derived food is the general term of meat (including intestine such as liver, kidney), egg, dietary and milk product[1].

Right now, the main factor for causing the veterinary drug residue in the animals for export and import is medicines such as antibiotics, hormone and pesticide, *etc*. According to the Joint Expert Council of Food and Agriculture Organization, there are about 120 species of veterinary drug residues in food, among which antibiotics are the major veterinary additives and veterinary medicine residue, accounting 60% of the additives in the medicine[2], because antibiotics promote the growth of livestock and the exchange rate of fodder, and perfect the quality of product. Therefore, people apply antibiotics into the treatment of animal diseases and add it to the fodder to prevent diseases, which will bring direct and enormous economic benefit for producers and improve animals' productivity. Some producers put in much more doses than it is required. Some people even use prohibited medicine or fake medicine. All those facts lead to the drug residue in animals. Even though the Chinese Agricultural Department has constantly demanded that the production of fodder and veterinary drugs should follow the given standards, the limits of laws and regulations, as well as observation system result in the veterinary residue phenomena in China, which not only influences the health of Chinese, but also obstructs the export and import of animal derived food in China. Such situation has been increasing in recent years[3].

3 Detection of veterinary drug residue in China

Chinese Agricultural Department has been working on the detection of veterinary drug residue in animals. So far, tens of methods to detect the veterinary drug residue in animal derived products have been issued, which provided certain basis for future study. However, the species of veterinary are too few and most of them have been banned from using. Moreover, the method is limited in traditional equipment, such as high performance liquid chromatography, gas chromatograph, LC/MS and GC/MS. The above-mentioned equipments are too expensive and complicate to operate that they have become unsuitable for massive detection and monitoring. Scientists have invented several agents to detect the veterinary residue, but there isn't a single set of all-round veterinary residue risk evaluation and detection system. The study of enramycin - enzyme - immune - detection technology has hardly been reported in other countries[9]. At present, only Japan has reported on such residue in animals and aquatic food[10].

In face of the technological problems, China is still in the passive position. According to the Report on the Highest Amount of Veterinary Drug Residue in Animal-derived Food, issued by Agricultural Department, and Study on the Adoption of Interna-

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tional Standards and Some Advanced Standards of Agricultural Products in China, issued by State Standard Committee, the veterinary species in the relevant medicine residue standards mainly include some registered drugs and banned drugs, instead of the ones that have been registered in other countries. In recent years, because the lack of relevant detection standard in China and infusion of livestock product from other countries, Chinese food can not be exported to other countries, which has threatened the safety of animal derived food in China and has obstructed the development of export trade.

4 International veterinary drug residue detection levels

As the limits of veterinary drug residue in livestock product are getting lower and lower, microanalysis or ultramicroanalysis is often required. However, because of many species of veterinary drugs and complicated chemical structure and components, sometimes it is necessary to detect the toxic metabolism, degradation product, conversion product, and inter-medium product, *etc*. These trends have posed new challenge and requirement to the detection skill and method in export and import trade in China. The detection method and equipment has been developed in recent years. In terms of detection equipment, the high performance gas chromatography and liquid chromatography in 1960s have been replaced by the LC/MS and GC/MS in modern days. Speaking of detection method, scientists nowadays prefer enzyme immune analysis method, ion assimilation spectrum method, light spectrum method, and nuclear magnetic resonance spectroscopy, *etc*. The application of those equipment has made the modern international trade easier and more advanced and has caused technological advantage and trade barrier in developed countries such as Europe, America and Japan[6]. It is said that the American Food and Drug Administration can detect more than 360 kinds of drug residues in food at the same time. Germany can do 325 species, Canada and 251. In Japan, there are more than 6 000 detection standards, which almost cover from original animals to animal derived products. Certainly, in today's world, new ways to detect drug residues are improving every day.

5 The trend of veterinary drag residue detection in the world

In recent years, developed countries such as European Union, American and Japan have more strict requirements on veterinary drug residue. For instance, the species of usable veterinary drugs in European Union had decreased from 967 to 350 after 2008, which meant that the animal derived products which have been injected with banned medicine can not be exported to European Union. In 2002, three laboratories have been established in Switzerland and England where the 1 μg/kg of nitrofuran residue can be detected. In the meantime, Japan expanded its drug residue in imported food from 229 kinds to all the food and required that if veterinary drug residue amount hasn't been listed in the brand of livestock product, the product would be banned. Besides, as long as Japan thinks certain country is the one with more veterinary drug residue, it would stop import food from this country. According to the *Food Hygiene Law* in Japan in May, 2003, the highest amount of many kinds of residue is only one tens of the original standard and those without limit index, the allowed residue is no larger than 0.01 mg/kg[4,5].

6 Suggestions on improving drug residue detection technology

At present, the common measure to detect residue in veterinary drug in animals is to use ELISA and RIA to detect samples and to choose the suspicious samples to verify with LC/MS and GC/MS method so as to ensure the frequent international trade in a cheap, convenient and efficient way. According to the above experiences, it is suggested that China should introduce from foreign countries the detection method and relevant technology, improve the current industrial and national standards, quicken the invention of detection agents, enhance workers professional skills and transform the existed detection technology for commercial promotion[11,12].

7 Conclusions

All in all, the veterinary drug residue in animal derived product in China is in a burning situation and the detection technology in China still lags behind developed countries. The improvement needs cooperation from all sides. Only when the integration of fodder, veterinary medicine and detection are realized can we carry out the one package service, which is what all veterinarians and professional workers have been trying to achieve[13-14].

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