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Merits and Demerits of Food Additives

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Abstract Food additive is a double-edged sword. It has merits and demerits. Food additives have such merits as improving sensory properties of foods, preventing deterioration and extending the shelf life, increasing varieties of foods, enhancing convenience of foods, facilitating food processing, and satisfying other demands. However, excessive and illegal use of food additives will exert adverse influence on food security. Therefore, it is required to take proper measures to bring merits of food additives into full play, and get rid of their demerits.

Key words Food additives, Merits and demerits, Legal application, Scientific Application

1 Introduction

With the popularization of science, people know food additives more or less. From any bottle of drink or a bag of snacks at hand, we can find "find additives". Some also indicate specific additives, such as sodium citrate, pectin, D-sodium erythorbate, soybean phospholipids, and sodium hydrogen carbonate, $etc^{[1]}$.

According to provisions of United Nations Food and Agriculture Organization (FAO) and World Health Organization (WHO), food additives are non-nutritive substances added to food to preserve flavor or enhance its taste and appearance. In Article 99 of Food Safety Law of the People's Republic of China, food additive means any synthetic or natural substance used to improve the quality, color, fragrance, flavor of food, and used to add to the food or put together with the food for corrosion proof, keeping fresh or processing technology requirements [2-3].

From the above definition, we can know that food additives can make foods more attractive, delicious, have better taste and flavor, and easier for preservation. Many merits make food additives become inevitable result of historical and sci-tech development [4-5]. However, the problem of food security is more and more prominent, some people realize that food additives not only have merits but also have demerits. In order to properly deal with merits and demerits of food additives, we will make brief introduction to merits and demerits of food additives, and study how to get rid of their demerits.

2 Merits of food additives

At present, food additives used in China have 19 categories, including antioxidant, stabilizer, food coloring, preservative, coagulator, flavor enhancer, and sweetener. Generally, all foods on the market contain food additives more or less. Some food advertisements declaring "no food additive" with the only purpose of attracting consumers, because consumers often take food additives as harmful chemical additives. For such problem, we should clearly realize that scientific and proper use of food additives does not harm our body, and they are greatly different from harmful chemical additives. Most food additives commonly used are very

safe, and they have outstanding merits in color, flavor, taste, and preservation.

2. 1 Improving sensory properties of foods Nowadays, people's living standard is gradually improving. People no longer eat for hungry only, but start to care about color, taste, and flavor of foods. The popular food junkies in recent 10 years are forerunners. They judge the food according to sensory properties, such as color, flavor, taste, and appearance. From this, it can be known that sensory properties of foods are of great importance to foods.

Application of colorant, color fixative, and bleaching agent can change appearance color of foods and make foods more attractive; use of flavoring can make foods more appealing in smell and taste; use of emulsifier and thickener can beautify appearance of foods and make foods more pleasing. With the help of these foods additives, sensory properties of foods can be improved greatly.

- 2.2 Preventing deterioration and extending the shelf life From production, sales, consumer purchase, to eating of foods, it is a long process. To prevent rotting in this entire process, use of food additives is a feasible method. Firstly, preservative agent can prevent food rotting resulted from microorganism, extending shelf life of foods, and prevent food poisoning due to pollution of microorganism. Secondly, antioxidant can defer and even prevent oxidation and deterioration, make foods more stable and preservable, and prevent formation of harmful oil and fat autoxidisable substance. Thirdly, food additives can prevent enzymatic browning and non-enzymatic browning of some foods, especially fruits and vegetables.
- 2.3 Increasing varieties of foods and enhancing convenience of foods Now, we can buy various foods in supermarket and market. Even the same food also has many types. Besides, convenient foods, such as instant foods, instant bean vermicelli, and instant rice, gradually become rich and rich. Truly, packaging and other processing methods increase varieties and convenience of foods. In addition, the application of coloring, flavoring and seasoning and other food additives in the process of food production also enhances convenience of foods. This is particularly reflected in instant foods that provide extreme convenience for us.
- **2.4 Favorable for food processing** Application of antifoaming, filter aid, stabilizer, coagulator and other food additives in food processing is favorable for food processing. For example, Sodium Carboxymethyl Cellulose (CMC, a stabilizer) can form sta-

ble emulsified dispersed liquid with vinegar, soy sauce, vegetable oil, fruit juice, gravy, and vegetable juice, which is good for emulsification property of vegetable oil, protein, and aqueous solution and can make them form stable uniform emulsified liquid.

2.5 Satisfying other demands Apart from improving sensory properties of foods, preventing deterioration and extending the shelf life, increasing varieties and convenience of foods, favorable for food processing, food additives have other merits. Diabetes patient can not eat sugar, but it can use non-nutritional sweetener to replace sugar. For example, TGS or Aspartuyl Phenylalanine Methyl Ester can be produced to sugar-free foods. In all, merits of food additives bring more color and convenience for our life. Some experts say "without food additives, there will be no modern food industry". Thus, food additives are of great importance to the food industry. And we should know and understand merits of food additives.

3 Demerits of food additives

Food accidents, such as "lean meat", "poisonous milk powder", "Sudan red", and "ripener", occur frequently in recent years. Even primary children know some key words about food security. Merits of food additives are obvious. However, some profit-oriented enterprises and retailers cast eyes at food additives. They add excessive or illegal additives in foods, which harms health of consumers or even life of consumers.

- **3.1 Excessive addition** Some of food additives that have functions of improving food quality and extending the shelf life have certain toxicity, so it is required to take strict control over their application. For example, excessive intake of D-sodium erythorbate (antioxidant) will lead to a series of intestines and skin diseases, while excessive intake of sodium nitrite (coloring agent) may benumb vasomotor center, respiratory center, and peripheral blood vessel. Unfortunately, there are many cases of excessive use of food additives. Deep-fried twisted dough sticks and deep-fried dough cakes use excessive alum (leavening agent). Nevertheless, the alum contains aluminum, while excessive residue of aluminum will lead to disorder of nervous system of children and will contribute to occurrence of degenerative brain disorder.
- **3.2 Illegal use of food additives** In National Food Safety Standard Standards for Uses of Food Additives (GB2760 2011), there are provisions of scope, maximum level and usage principle of more than 2000 existing food additives. The Food

Safety Law implemented on June 1st, 2009 makes more than 80% food additives have product standard. Illegal use of food additives is criminal act and should be struck at strictly in compliance with laws. Thus, we should use food additives in strict compliance with laws and the usage of food additives beyond the scope is not allowed.

Illegal addition of inedible substances in foods is varied: Sudan red may be added to chilli powder and foods containing hot pepper; protein concentrate and melamine may be added to dairy products; pigment green may be added to tea; Auramine may be added to soyfood; poppy shell may be added to hotpot seasoning; potassium bromate may be added to wheat powder.

4 Conclusions

From the above analysis, it can be known that food additive is a double edged sword. On the one hand, it not only brings convenience for us, but also promotes development of modern food industry. On the other hand, it may be used by lawless people and consequently harms our health and life. It is hoped that food additives could bring into full play their merits, but not bring demerits.

Besides, the state should constantly improve related laws and strengthen supervision of food production and circulation. In addition, people engaged in food production, circulation and selling should raise their legal and responsibility awareness, but do not pay attention only to benefit. Furthermore, as consumers, we should learn more knowledge about food security and select proper foods. In sum, it is hoped that we should bring into play merits of food additives and get rid of demerits of food additives to the maximal extent.

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opportunistic behavior; if the government's regulation efficiency is higher, the probability of the opportunistic behavior of food enterprises to be found will be higher, and it is more likely to encourage the enterprises practise honest operation and reduce the opportunistic behavior.

In summary, if the government can implement effective supervision, it will play a better role in ensuring the quality and safety of agricultural products, curbing the opportunistic behavior, and providing effective incentives for the food enterprises to implement food traceability system and practise honest operation.

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