ISSN: 13434292
Volume 139, Issue 01, July, 2021

The history of food additives −The specifications of food additives since 1990s−

Sato, K.[1]

Hoshi University, School of Pharmacy, Department of Analytical Chemistry, 2-4-41 Ebara, Shinagawa-ku, Tokyo 142-8501, Japan[1]

ABSTRACT— Food safety is receiving heightened attention worldwide as the important links between food and health are increasingly recognized. Improving food safety is an essential element of improving food security, which exists when populations have access to sufficient and healthy food. Food additives play a key role in maintaining the food qualities and characteristics that consumers demand, keeping food safe, wholesome and appealing from farm to fork. Although synthetic food additives are approved in many countries, the chemical additives are becoming less and less welcome by consumers; there has been an increasing interest in the use of natural additives, which necessitates the exploration of alternative sources of safe, effective and acceptable natural additives. Over the last 50 years, developments in food science and technology have led to the discovery of many new substances that can fulfil numerous functions in foods. These food additives are now readily available and include; emulsifiers in margarine, sweeteners in low-calorie products and a wider range of preservatives and antioxidants which slow product spoilage and rancidity whilst maintaining taste. The production of additive materials by plants, animals and microorganisms has recently attracted a great deal of research interest and a considerable number of patent applications, with the addition probiotic foods which reported to provide several health benefits. The industry is now able to produce some natural pigments for applications in food and therefore nowadays, natural dyes and colors have growing importance. Red pigments produced by fungus Monascus purpureus were traditionally used in oriental countries, because of its potential application as food additives. This review focus on bacteriocins, their recent classification, their mode of action and biotechnological applications in food. Though nisin is the only purified bacteriocin used commercially in food systems.

KEYWORDS: Food additives, safety, regulatory issues, toxicology

1. INTRODUCTION

The purpose of this review is to present an overview and comparison of the regulation of substances added to foods in a number of different countries/jurisdictions, as well as the efforts of internationally recognised scientific and advisory bodies, such as the Codex Alimentarius Commission (CAC) and the Joint FAO/WHO Expert Committee on Food Additives (JECFA) with respect to the safety assessment of these substances. The specific countries/jurisdictions addressed are Argentina, Australia, Brazil, Canada, China, the European Union (EU), Japan, Mexico, New Zealand, and the United States (herein referred to as the "target countries"). The choice of jurisdictions to be included was based on a number of factors, and was intended to include both of well-established and emerging regulatory systems. The substances added to human food that are included in this review are direct food additives, common food ingredients such as sugar, food contact materials, flavouring agents, food enzymes, and/or processing aids. In addition, information pertaining to the development of regulations for nanomaterials falls under the scope of this review. Pesticide residues, drug residues or contaminants (e.g. lead) are not addressed in detail. A full list of included substances and their definitions according to each target country is provided. It should be noted that regulatory information for each country may be updated frequently and this report was written as an overview of the regulatory framework for each country. To the best of our knowledge, regulatory

information is current as of June 2012. It is recognised that the definitions of terms used in this document may vary by organization.

2. Conclusions

JECFA, whose genesis occurred at the FAO/WHO Conference on Food Additives in 1955, continues to be of fundamental importance to the activities of the CAC and especially to the Codex Committee on Food Additives and the Codex Committee on Contaminants in Foods. While the outcome of JECFA's evaluations does not have any direct bearing on the regulatory approval of a food additive in any specific country, JECFA's scientific evaluations and reassessments are widely recognised and may affect an application for approval for a new food additive in a particular country. Similar to JECFA, the CAC has no regulatory authority and its standards are not enforceable unless they have been adopted into the regulatory framework for a nation; however, its standards for food additives continue to serve as guidelines to many nations.

In addition to their guiding international influence, the early work of JECFA and CAC and the principles outlined by those committees laid the foundation for how substances added to food are regulated in many individual countries today, including the countries examined: Argentina, Australia, Brazil, Canada, China, the EU, Japan, Mexico, New Zealand, and the US. The regulatory authority for each target jurisdiction/country utilises its own regulatory framework and although the definitions, regulations and approval processes may vary among all target countries, in general there are many similarities across all target countries. In all cases, the main purpose of each regulatory authority is to establish a framework and maintain/enforce regulations to ensure the safety of food consumed and sold within its respective countries. Although the path for approval of different categories of food additives varies from jurisdiction to jurisdiction, there are many commonalities in terms of the data requirements and considerations for assessment of the safety of use of substances added to food, including the use of positive lists of approved substances, pre-market approval, and a separation between science and policy decisions. There is also a move toward harmonisation of food regulations, as illustrated by Australia and New Zealand, by Mercosur and by the EU. International collaboration is occurring to address the challenge of developing regulatory guidance and safety assessment for use of nanomaterials in foods. Harmonisation of global food regulations is envisioned to promote use of all available foods through free trade, to support farmers, and to reduce hunger and poverty globally.

3. REFERENCES

[1] Institute of Food Research. The Codex Recommendation by the CODEX Alimentarius Commission Committee on Food Labelling. 2000. http://www.foodallergens.info/Legal/CO- DEX.html. Accessed on April 1, 2021.

[2] Ebisawa M, Ikematsu K, Imai T, Tachimoto H. Food allergy in Japan. J. World Allergy Org. 2003; 15: 214–217.

[3] Akiyama H, Imai T, Ebisawa M. Japan food allergen labeling regulation--history and evaluation. Adv Food Nutr Res. 2011; 62: 139–171. PMID:21504823, doi:10.1016/B978-0-12- 385989-1.00004-1

[4] Consumer Affairs Agency, Government of Japan. Appendix, Labeling of foods containing allergens. 2015. https://www. caa.go.jp/policies/policy/food_labeling/food_labeling_act/ pdf/food_labeling_cms101_200720_01. Accessed on April 1, 2021.

[5] Shoji M, Adachi R, Akiyama H. Japanese food allergen labeling regulation: an update. J AOAC Int.

2018; 101(1): 8–13. PMID:29202908, doi:10.5740/jaoacint.17-0389

[6] Matsuda R, Yoshioka Y, Akiyama H, et al. Inter-laboratory evaluation of two kinds of ELISA kits for the detection of egg, milk, wheat, buckwheat, and peanut in foods. J. AOAC Int. 2006; 89: 1600–1608. PMID:17225608, doi:10.1093/ jaoac/89.6.1600

[7] Watanabe Y, Aburatani K, Mizumura T, et al. Novel ELISA for the detection of raw and processed egg using extraction buffer containing a surfactant and a reducing agent. J Im- munol Methods. 2005; 300(1-2): 115–123. PMID:15907925, doi:10.1016/j.jim.2005.02.014

[8] Shibahara Y, Oka M, Tominaga K, et al. Determination of crustacean allergen in food products by sandwich ELISA [in Japanese]. Nippon Shokuhin Kagaku Kogaku Kaishi. 2007; 54(6): 280–286. doi:10.3136/nskkk.54.280

[9] Seiki K, Oda H, Yoshioka H, et al. A reliable and sensitive immunoassay for the determination of crustacean protein in processed foods. J Agric Food Chem. 2007; 55(23): 9345– 9350. PMID:17929889, doi:10.1021/jf0715471

[10] Sakai S, Matsuda R, Adachi R, et al. Interlaboratory evaluation of two enzyme-linked immunosorbent assay kits for the determination of crustacean protein in processed foods. J AOAC Int. 2008; 91(1): 123–129. PMID:18376594, doi:10.1093/jaoac/91.1.123

[11] Abbott M, Hayward S, Ross W, et al. Validation procedures for quantitative food allergen ELISA methods: community guidance and best practices. J AOAC Int. 2010; 93(2): 442– 450. PMID:20480889, doi:10.1093/jaoac/93.2.442

[12] Sakai S, Adachi R, Akiyama H, Teshima R. Validation of quantitative and qualitative methods for detecting allergenic ingredients in processed foods in Japan. J Agric Food Chem. 2013; 61(24): 5675–5680. PMID:23039046, doi:10.1021/ jf3033396

[13] Yamakawa H, Akiyama H, Endo Y, et al. Specific detection of wheat residues in processed foods by polymerase chain reaction. Biosci Biotechnol Biochem. 2007; 71(10): 2561–2564. PMID:17928695, doi:10.1271/bbb.70251

[14] Yamakawa H, Akiyama H, Endo Y, et al. Specific detection of buckwheat residues in processed foods by polymerase chain reaction. Biosci Biotechnol Biochem. 2008; 72(8): 2228–2231. PMID:18685187, doi:10.1271/bbb.80237

[15] Watanabe T, Akiyama H, Maleki S, et al. A specific qualitative detection method for peanut (Arachis hypogaea) in foods using polymerase chain reaction. Journal of Food Biochemistry. 2006; 30(2): 215–233. doi:10.1111/j.1745-4514.2006.00056.x

[16] Taguchi H, Watanabe S, Temmei Y, et al. Differential detection of shrimp and crab for food labeling using polymerase chain reaction. J Agric Food Chem. 2011; 59(8): 3510–3519. PMID:21395255, doi:10.1021/jf103878h

[17] Yamakawa H, Akiyama H, Endo Y, et al. Specific detection of soybean residues in processed foods

by the polymerase chain reaction. Biosci Biotechnol Biochem. 2007; 71(1): 269–272. PMID:17213648, doi:10.1271/bbb.60485

[18] Yano T, Sakai Y, Uchida K, et al. Detection of walnut residues in processed foods by polymerase chain reaction. Biosci Bio- technol Biochem. 2007; 71(7): 1793–1796. PMID:17617706, doi:10.1271/bbb.70118

[19] Taguchi H, Watanabe S, Hirao T, et al. Specific detection of potentially allergenic kiwifruit in foods using polymerase chain reaction. J Agric Food Chem. 2007; 55(5): 1649–1655. PMID:17288438, doi:10.1021/jf0624446