

# BÖLÜM 1

## GIDA GÜVENLİĞİ

*Birol KILIÇ<sup>1</sup>  
Azim ŞİMŞEK<sup>2</sup>  
Halil YALÇIN<sup>3</sup>*

### 1. Giriş

İnsanlar, gıda endüstrisi ve ekonomi açısından önemli sorunlara neden olan gıda kaynaklı hastalık salgınları, gıda güvenliği açısından kritik bir konu olmaya devam etmektedir. İnsanların sağlıklı olmaları, fiziksel gelişim ve aktivitelerini sürdürebilmeleri için yeterli miktarda ve çeşitte gıdaya ulaşabilmeleri gerekir. Bu gereksinim sağlanırken, sağlıklı ve güvenli gıda üretimi ve tüketimi bir zorunluluktur (1). Gıda güvenliği, gıda kaynaklı hastalıklardan kaçınmak için gıdaların üretimi, taşınması, depolanması, dağıtımı ve tüketimi aşamalarında uyulması gerekli kurallar ve önlemleri açıklayan bilimsel bir yöntem/disiplin olarak tanımlanabilir (2). Güvenli gıda ise, besleyici değerini kaybetmemiş, fiziksel, kimyasal ve biyolojik kontaminantlar açısından temiz ve raf ömrü süresince bozulmamış gıdalar olarak tanımlanır (3). Üretilen bir gıdanın tüketim açısından güvenli olması, herhangi bir gıda prosesinin temel şartıdır. Dünyada gıda kaynaklı hastalıklara ilişkin problemler gün geçtikçe artmaktadır. Gıda güvenliği ile ilgili tehlikeler, yetersiz çevre koşulları, kötü kişisel hijyen, hijyenik kalitesi düşük su kaynakları ve hammadde kullanımı, gıdaların hijyenik olmayan şekilde hazırlanması, saklanması ve tüketimi, kontrol dışı gıda üretimi ve denetim

<sup>1</sup> Prof. Dr., Süleyman Demirel Üniversitesi, Mühendislik Fakültesi, Gıda Mühendisliği Bölümü, birolkilig@sdu.edu.tr, ORCID iD: 0000-0001-6575-4418

<sup>2</sup> Doç. Dr., Isparta Uygulamalı Bilimler Üniversitesi, Eğirdir Meslek Yüksekokulu, Gıda İşleme Bölümü, azimsimsek@isparta.edu.tr, ORCID iD: 0000-0002-7570-0832

<sup>3</sup> Doç. Dr., Mehmet Akif Ersoy Üniversitesi, Veteriner Fakültesi, Gıda Hijyeni ve Teknolojisi Bölümü, hyalcin@mehmetakif.edu.tr, ORCID iD: 0000-0003-2162-2418

sorumluluk sahibi olmalıdır. Ayrıca, tüketicilerin gıda güvenliği konularında dikkatli ve bilgili olmaları gerekmektedir. Gıda işletmeleri, üretim, dağıtım ve sunum noktaları gıda güvenliği sistemlerini uygulamalıdır. Özetle gıda güvenliği, tüm insanların her zaman, aktif ve sağlıklı bir yaşam için beslenme ihtiyaçlarını ve gıda tercihlerini karşılayacak yeterli, güvenli ve besleyici gıdaya fiziksel ve ekonomik olarak erişebilmesiyle sağlanır.

## KAYNAKLAR

1. Egan MB, Raats MM, Grubb SM, et al. A review of food safety and food hygiene training studies in the commercial sector. *Food control*. 2007; 18(10), 1180-1190.
2. Harrison D. Introduction to Food Safety. *Journal of Food: Microbiology, Safety & Hygiene*. 2021; 6:167.
3. Uçar A, Yılmaz MV, Çakiroğlu FP. Food safety—problems and solutions. *Significance, prevention and control of food related diseases*. 2016; 3.
4. Kamboj S, Gupta N, Bandral JD, et al. Food safety and hygiene: A review. *International Journal of Chemical Studies*. 2020; 8(2), 358-368.
5. Fung F, Wang HS, Menon S. Food safety in the 21st century. *Biomedical journal*. 2018; 41(2), 88-95.
6. Borchers A, Teuber SS, Keen CL, et al. Food safety. *Clinical reviews in allergy & immunology*. 2010; 39, 95-141.
7. Njoagwuani EI, Onyeaka H, Mazi IM, et al. Food safety in vulnerable populations: A perspective on the challenges and solutions. *The FASEB Journal*. 2023; 37(5), e22872.
8. Bhaskar SV. Foodborne diseases-disease burden. In: Gupta RK, Dudeja, Minhas S (Ed.) *Food safety in the 21st century*. Academic Press; 2017. p. 1-10.
9. WHO. *Fact sheet on food safety*. [Online] <https://www.who.int/news-room/fact-sheets/detail/food-safety>. [Accessed: 4th October 2023].
10. Qi X, Alifu X, Chen J, et al. Descriptive study of foodborne disease using disease monitoring data in Zhejiang Province, China, 2016–2020. *BMC Public Health*. 2022; 22(1), 1831.
11. Singh PK, Singh RP, Singh P, et al. Food hazards: Physical, chemical, and biological. In: Singh RL, Mondal S (Ed.) *Food safety and human health*. Academic Press; 2019. p. 15-65.
12. Bleotu C, Chifiriuc MC, Socolov R, et al. Introduction in Food Safety, Biosecurity and Hazard Control. In: Holban AM, Grumezescu AM (Ed.) *Food Control and Biosecurity*. Academic Press; 2018. p. 1-24.
13. Keener L. Chemical and Physical Hazards: The “Other” Food Safety Risk. *Food Testing and Analysis Magazine*; 2001.
14. Van Asselt ED, Arrizabalaga-Larrañaga A, Focker M, et al. Chemical food safety hazards in circular food systems: A review. *Critical Reviews in Food Science and Nutrition*. 2022; 1-13.
15. Rather IA, Koh WY, Paek WK, et al. The sources of chemical contaminants in food and their health implications. *Frontiers in pharmacology*. 2017; 8, 830.
16. Nasreddine L, Parent-Massin D. Food contamination by metals and pesticides in the European Union. Should we worry?. *Toxicology letters*. 2002; 127(1-3), 29-41.

17. EU. *Chemical hazards in our food: EU food safety policy protect us but faces challenge*. [Online] [https://www.eca.europa.eu/Lists/ECADocuments/SR19\\_02/SR\\_FOOD\\_SAFETY\\_EN.pdf](https://www.eca.europa.eu/Lists/ECADocuments/SR19_02/SR_FOOD_SAFETY_EN.pdf). 2019; [Accessed: 4th October 2023].
18. Sambu S, Hemaram U, Murugan R, et al. Toxicological and teratogenic effect of various food additives: an updated review. *BioMed Research International*. 2022; 6829409. <https://doi.org/10.1155/2022/6829409>.
19. Partridge D, Lloyd KA, Rhodes JM, et al. Food additives: Assessing the impact of exposure to permitted emulsifiers on bowel and metabolic health—introducing the FA-Diets study. *Nutrition bulletin*. 2019; 44(4), 329-349.
20. Urugo MM, Tringo TT. Naturally Occurring Plant Food Toxicants and the Role of Food Processing Methods in Their Detoxification. *International Journal of Food Science*. 2023; 9947841. <https://doi.org/10.1155/2023/9947841>.
21. Havelaar AH, Brul S, De Jong A, et al. Future challenges to microbial food safety. *International Journal of Food Microbiology*. 2010; 139, S79-S94.
22. Sudershan RV, Naveen Kumar R, Bhaskar V, et al. Foodborne Infections and Intoxications in Hyderabad India. *Epidemiology Research International*. 2014; 5.
23. Sağlam D, Şeker E. Gıda kaynaklı bakteriyel patojenler. *Kocatepe Veterinary Journal*. 2016; 9(2): 105-113.
24. Esheli M, Thissera B, El-Seedi HR, et al. Fungal Metabolites in Human Health and Diseases-An Overview. *Encyclopedia*. 2022; 2(3), 1590-1601.
25. Moretti A, Susca A, Mulé G, et al. Molecular biodiversity of mycotoxigenic fungi that threaten food safety. *International journal of food microbiology*. 2013; 167(1), 57-66.
26. Alshannaq A, Yu JH. Occurrence, toxicity, and analysis of major mycotoxins in food. *International journal of environmental research and public health*. 2017; 14(6), 632.
27. Bosch A, Gkogka E, Le Guyader FS, et al. Foodborne viruses: Detection, risk assessment, and control options in food processing. *International Journal of Food Microbiology*. 2018; 285, 110-128.
28. Lorenzo JM, Munekata PE, Dominguez R, et al. Main groups of microorganisms of relevance for food safety and stability: General aspects and overall description. In: Barba FJ, Sant'Ana AS, Orlien V, et al. (Ed.) *Innovative technologies for food preservation*. Academic Press; 2018. p. 53-107.
29. Greening GE, Cannon JL. Human and animal viruses in food (including taxonomy of enteric viruses). In: Goyal SM, Cannon JL (Ed.) *Viruses in foods*. 2nd ed. Springer; 2016. p. 5-57.
30. Elbehiry A, Abalkhail A, Marzouk E, et al. An Overview of the Public Health Challenges in Diagnosing and Controlling Human Foodborne Pathogens. *Vaccines*. 2023; 11(4), 725.
31. Bányai K, Estes MK, Martella V, et al. Viral gastroenteritis. *The Lancet*. 2018; 392(10142), 175-186.
32. Petrović T, D'Agostino M. Viral contamination of food. In: Barros-Velázquez J (Ed.) *Antimicrobial food packaging*. Academic Press; 2016. p. 65-79.
33. Crawford SE, Ramani S, Tate JE, et al. Rotavirus infection. *Nature Reviews Disease Primers*. 2017; 3(1), 1-16.
34. Koutsoumanis K, Allende A, Alvarez-Ordóñez A, et al. Public health risks associated with food-borne parasites. *EFSA journal*. 2018; 16(12), e05495.

35. Chávez-Ruvalcaba F, Chávez-Ruvalcaba MI, Santibañez KM, et al. Foodborne Parasitic Diseases in the Neotropics—a review. *Helminthologia*. 2021; 58(2), 119-133.
36. Gabriël S, Dorny P, Saelens G, et al. Foodborne parasites and their complex life cycles challenging food safety in different food chains. *Foods*. 2022; 12(1), 142.
37. Dorny P, Praet N, Deckers N, et al. Emerging food-borne parasites. *Veterinary parasitology*. 2009; 163(3), 196-206.
38. Erkmén O, Bozoglu TF. *Food Microbiology: Principles into Practice*. John Wiley & Sons; 2016. <https://doi.org/10.1002/9781119237860>.
39. Schirone M, Visciano P. Trends of major foodborne outbreaks in the European Union during the years 2015–2019. *Hygiene*. 2021;1(3), 106-119.
40. WHO. *WHO Estimates of the Global Burden of Foodborne Diseases*. [Online] <https://www.who.int/publications-detail/redirect/9789241565165> 2015; [Accessed: 5th October 2023].
41. Menini A, Mascarello G, Giaretta M, et al. The Critical Role of Consumers in the Prevention of Foodborne Diseases: An Ethnographic Study of Italian Families. *Foods*. 2022; 11(7),1006.
42. CDC. *Factors That Increase Your Risk for Food Poisoning*. Centers for Disease Control and Prevention. [Online] <https://www.cdc.gov/foodsafety/people-at-risk-food-poisoning.html>. 2023; [Accessed: 5th October 2023].
43. FDA. *People at Risk of Foodborne Illness*. U.S. Food and Drug Administration. [Online] <https://www.fda.gov/food/consumers/people-risk-foodborne-illness>. 2023; [Accessed: 6th October 2023].
44. Evans EW, Gwynne CR. Identifying vulnerable populations at risk of foodborne infection: people with diabetes mellitus. *Food Protection Trends*. 2020; 40, 374-379.
45. Buzby JC. Children and microbial foodborne illness. *Food Review/National Food Review*. 2001; 24(2), 32-37.
46. Sockett PN, Rodgers FG. Enteric and foodborne disease in children: A review of the influence of food-and environment-related risk factors. *Paediatrics & child health*. 2001; 6(4), 203-209.
47. Mor G, Cardenas I. The immune system in pregnancy: a unique complexity. *American journal of reproductive immunology*. 2010; 63(6), 425-433.
48. Gourama H. Foodborne pathogens. *Food safety engineering*. 2020; 25-49.
49. Bintsis T. Foodborne pathogens. *AIMS microbiology*. 2017; 3(3), 529.
50. Tooby M, Morton V, Nesbitt A, et al. Consumption of High-Risk Foods in the Canadian Population, Foodbook Study, 2014 to 2015. *Journal of Food Protection*. 2021; 84(11), 1925-1936.
51. FAO. *Establishment Design of Facilities and Equipment*. Food and Agriculture Organization of the United Nations. [Online] <https://www.fao.org/3/cc6252en/cc6252en.pdf>. 2023; [Accessed: 6th October 2023].
52. Holah JT. Hygienic factory design for food processing. In: Levievel HLM, Holah JT, Napper D (Ed.) *Hygiene in Food Processing*. 2nd Ed. Woodhead Publishing; 2014. p. 53-90.
53. Holah J. Hygiene in food processing and manufacturing. In: Motarjemi Y, Levievel H (Ed.) *Food Safety Management*. Academic Press; 2014. p. 623-659.
54. Levievel HLM, Mostert MA, Curiel GJ. Hygienic design of food processing equipment. In: Levievel HLM, Holah JT, Napper D (Ed.) *Hygiene in food processing*. Woodhead Publishing; 2014. p. 91-141.

55. Trematerra P, Fleurat-Lessard F. Food industry practices affecting pest management. *Stewart postharvest review*. 2015; 11(1), 1-7.
56. Otles S, Despoudi S, Bucatariu C, et al. Food waste management, valorization, and sustainability in the food industry. In: Galanakis CM (Ed.) *Food waste recovery*. Academic Press; 2015. p. 3-23.
57. Stanga M. *Sanitation: cleaning and disinfection in the food industry*. John Wiley & Sons; 2010. <https://doi.org/10.1002/9783527629459>.
58. Margas E, Holah JT. Personal hygiene in the food industry. In: Levievel HLM, Holah JT, Napper D (Ed.) *Hygiene in Food Processing*. Woodhead Publishing; 2014. p. 408-440.
59. Todd ECD. Personal Hygiene and Food Worker Health. In: Anderson V, Levievel H, Motarjemi Y (Ed.) *Food Safety Management*. 2nd Ed. Academic Press; 2023. p. 699-734.
60. Kumar R. *Food Safety in Storage and Transportation*. [Online] [https://www.researchgate.net/publication/353073161\\_Food\\_Safety\\_in\\_Storage\\_and\\_Transportation](https://www.researchgate.net/publication/353073161_Food_Safety_in_Storage_and_Transportation). 2021; [Accessed: 6th October 2023].
61. McCurdy S, Peutz J, Wittman G. *Storing Food for Safety and Quality*. [Online] <https://extension.oregonstate.edu/sites/default/files/documents/pnw612.pdf>. 2009; [Accessed: 6th October 2023].