

The application of omics in food quality and safety

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Abstract:

Food Safety and Quality affect economic by increasing the shelf life of the food product, increase importation and exportation of the food product, increase the productivity of the workers, increase the national productivity and give good news about the food product. Food safety means the food is free from hazards, either biological, physical and chemical hazards. Food safety and quality affect human health by lowering the occurrence of foodborne diseases, improve of the health status of the consumers and lowering the numbers of sick peoples in the hospitals. A new approach in the food quality and food safety, the progress in the analytical methods in the food processing and production brought about a novel and modern approach related to the food quality and the food safety.

The omics approach in the food is a recently coined expression and is an integration of relevant, omics disciplines. The application of omics in the biology and the medical domains. The food and the nutrition researchers have been interested in these omics approach research. The omics is a tool used for detection of the food constituents and the nutrients at the molecular level. Researches in the food area use the analytical techniques through different omics disciplines as prote omics, metabol omics, lipid omics, nutrigen omics, metagen omics and transcript omics. The using the different omics techniques separately or in combination not only in the analytical methods of the food constituents used also in the food authentication and for detection of the food safety and the food quality. The using of advanced analytical techniques in omics branch has empowered the researchers who studying the food and the nutrition. The analytical techniques used in each “omics” discipline and how omics approach elucidates the arguments related to the food quality, the food safety, the origin of the food, man and women nutrition.

Key Words: Consumer, omics, food safety, food quality.

Introduction

The consumer concerns related to the food safety parameters and globalization of the food production trade have resulted in a global and interconnected system for the production and distribution of the food. In the last decade many public and private standards on the food safety and quality have been improved due to these developments (31,32,33,34,35 and 36). Food processing companies from developing countries and emerging economies have problems to comply with these standards, the increasing of the marginal costs of certification and accreditation puts more economic pressures on the food processing companies profits in developing countries in the world (37,38,39,40 and 41). The combined impacts of these effects ask for strategies to reevaluate the cost and the effectiveness of the certification and the accreditation methods (42,43,44,45,46 and 47). The public concerns about the food safety analytical techniques to meet the inspection requirements of high sensitivity, specificity, and reproducibility (48,49,50,51,52,53 and 54). Enzyme-mimetic nanomaterials or nanozymes, which combine enzyme-like properties with nanoscale features as an excellent tool for the food safety and

quality, the fundamental principles nanozymes for the food quality and safety detection technique in the food production. The peroxidase, oxidase, and catalase-like nanozymes, are able to detect the major food analyses (1,2,3,4,5 and 6). The discrimination of the roles of nanozymes in diverse detection platforms. The applications of nanozymes in detecting various endogenous ingredients and exogenous contaminants in the foods (7,8,9,10,11 and 12). The nanozyme-based detection techniques to practical-oriented food analytical techniques, while some challenges in optimization of nanozymes, diversification of recognition-to-signal manners, and sustainability of the techniques needed (13,14,15,16,17 and 18).

Standards related to food quality and safety :

The food quality and safety standards that are critically important not only for developed countries, but also for developing economies, where the consumers’ safety is among the primary issues to be considered in the food supply chain management (55,56,57,58,59 and 60). After the rapid development of many economies, quality standards have focused on consumers’ demand for safe food. The

documents, certifying the food quality and safety are getting much more attention, together with the production supervision and control from the starting phase, the producer, up to the market chain's end (61,62,63,64,65 and 66). The ecological factors and their effects, as the chemicals, the pesticides, the food hygiene and control, the ethical trade and the production, are among the components of the food quality standard groups. Clients' higher expectations leads to the higher requirements on producers and exporters, which need to ensure the higher food safety to enter internal and external markets (72,73,74,75 and 76). Quality concept in the food production puts an emphasis on conformity with the product's intended purpose; the safety; the satisfaction of the consumer's expectations and perceptions (77,78,79,80,81 and 82). The consumers pay attention to the first two, but their expectations involve a number of different factors, as the price, the taste, the appearance, the production system, the nutritious content and the fair trade, among others (83,84,85,86,87 and 88). The food product quality must be sound and reliable, low prices, so the companies must develop standardized procedures for production and selling processes (89,90,91,92,93,94 and 95). The needed quality standards are designed to meet the requirements of the consumers and the regulations. The food content, product description, chemical safety, sanitary conditions, among others. Farmers and production companies have the greatest responsibility for the food safety assurance (96,97,98,99,100 and 101). In addition, farmers and production companies need to prove that they have applied diligence and traceability practices (102,103,104,105 and 106).

The smart food packaging :

The development of chemical sensors and biosensors over several decades has been investigated producing novel and very interesting sensor devices with great promise for the application including the food production (107,108,109,110 and 111). The including of such sensors into the food packaging production produces a smart packaging. The smart packaging use the chemical sensor or biosensor to monitor the food quality the food safety of the food from the farm to the consumers. The smart packaging can use a variety of sensor suitable for monitoring of the food quality and the food safety, as freshness, pathogens, leakage, carbon dioxide, oxygen, pH, time or temperature (112,113,114,115 and 116). The smart packaging is needed as on-line quality control and the food safety in term of consumers, authorities and the food producers, and has great potential in the development of new sensing systems integrated in the food packaging, the control of the weight, the volume, the colour and the appearance (117,118,119 and 120).

Biogenic amines :

The food safety and the food quality are the main concerns of the consumer and human health sector in different countries around the world. The market globalization have led to increase in the number of humans affected by food poisoning which have different origins as bacteria, virus, parasites, mold, contaminants and others. Some cases of food poisoning can be traced back to the chemical and the natural toxins (25,26,27,28,29 and 30). One of the toxins is the biogenic amine histamine in the food constitute a potential public health importance due to their physiological and toxicological effects. The consumption of the foods containing high content of biogenic amines has been associated with health hazards (31,32,33,34,35 and 36). Food poisoning cases associated with the biogenic amines in food throughout the world, mainly in relation to histamines in fish. The biogenic amines are found in varying levels in different types of foods as fish, cheese, meat, vegetables, etc., and the biogenic amines formation is affected by different factors associated with the raw

material making up food products, microorganisms, production and preservation methods. The biogenic amines are heat stable. The biogenic amines plays an important role as indicators of the food quality and the food acceptability. The biogenic amines must be controlled to ensure the food quality and the food safety (19,20,211,22,23 and 24).

Risks and benefits in food safety and quality

The food composition analysis is concerned with both the beneficial and the harmful food components in the human food as the nutrients, the bioactive non-nutrients, the anti-nutrients, the toxicants, the contaminants and the other potentially useful and dangerous elements (88,89,90,91,92,93 and 94). The food safety include the elements of the nutrition such as the known risk factors for certain chronic diseases, the nutrients in the form of fortificants and the supplements, the genetically modified foods, the functional foods, the high levels of nutrient additives and nutritional supplements are included (101,102,103,104,105 and 106).

The food quality parameters

Any food attributes used to evaluate quality can be deemed quality parameters. The quality defined as different things to different peoples in the food supply chain, so the specific parameters used can vary. The food quality implies the total characteristics that define its value and satisfy its stated needs (71,72,73,74,75 and 76). The food quality is related to food characteristics, such as nutrition, organoleptic properties, as the taste or the smell, and the sanitation. Using qualities of convenience and conservational impact, and the psychosocial qualities of satisfaction throughout Parameters commonly used food quality testing as the color of the skin and the inner flesh, The texture, which is detected as the firmness, the sweetness is measured as soluble sugars in BRIX, the sourness is measured as the titrable acidity. The acids evaluated will depend on the food .Phytochemicals to detect the nutritional and the health benefits of the food. Toxins, like aflatoxins that indicate the safety and hygienic condition of the food product (51,52,53,54,55,56 and 57).

Fresh Product Quality Parameters:

Numerous factors affect the food quality, depending on stage of the food supply chain. The factors have long-lasting effects on the food product quality as the good manufacturing practices, the environmental conditions, the soil, and the genotypes (21,22,23,24,25 and 26).

The consumer obtain the food safety by:

Efficient cleaning of the food serving establishments as clean the kitchen surfaces after preparing the foods. After handling the raw meat, poultry, fish and other raw foods always wash hands. Thorough cooking of the food, follow recipes and label instructions on cooking times and temperatures. Pre-heat the oven properly. Check the food is piping hot before serving. Double check that sausages, burgers, pork and poultry are cooked right through; they should not be 'rare' or pink in the core and when pierced with a knife any juices that run out of the meat should be clear, not bloody (61,62,63,64,65 and 66). Avoid cross food contamination, human food poisoning is often caused when harmful bacteria are present on one food are spread via hands or kitchen utensils to cross-contaminate other foods. Good sanitation helps prevent this. Keep raw foods separate from cooked and ready-to-eat food at all times. Chilling, do not put hot food directly into the fridge or freezer, let it cool sufficiently first; but remember that cooling should be completed within one or two hours after cooking

(67,68,69,70 and 71).

Conclusion:

The food quality parameters are categorized as the product and the process attributes. The product attributes can be appearance, texture, taste, smell, safety, the postproduction life, and the convenience. The process attributes can be the origin of the product, the methods of production, and the environmental conditions.

Though product attributes are more often associated with end consumers, increasingly both product and process attributes are being considered by those throughout the supply chain.

Conflicts of Interest

The author declare no conflicts of interest

References:

1. Shaltout, F. , Riad,E.M ., and AbouElhassan, Asmaa , A(2017): prevalence Of Mycobacterium Tuberculosis In Imported cattle Offals And Its lymph Nodes. Veterinary Medical Journal -Giza (VMJG), 63(2): 115 – 122.
2. Shaltout, F., Riad,E.M ., and Asmaa Abou-Elhassan (2017): Prevalence Of Mycobacterium Spp . In Cattle Meat And Offal's Slaughtered In And Out Abattoir. Egyptian Veterinary medical Association, 77(2): 407 – 420.
3. Abd Elaziz, O., Fatin S. Hassanin, Fahim A. Shaltout and Othman A. Mohamed (2021): Prevalence of Some Foodborne Parasitic Affection in Slaughtered Animals in Local Egyptian Abattoir. Journal of Nutrition Food Science and Technology 2(3): 1-5.
4. Abd Elaziz, O., Fatin, S Hassanin , Fahim, A Shaltout, Othman, A Mohamed (2021): Prevalence of some zoonotic parasitic affections in sheep carcasses in a local abattoir in Cairo, Egypt. Advances in Nutrition & Food Science 6(2): 6(2): 25-31.
5. Al Shorman,A.A.M. ;Shaltout, F. and hilat,N (1999):Detection of certain hormone residues in meat marketed in Jordan.Jordan University of Science and Technology, 1st International Conference on Sheep and goat Diseases and Productivity, 23-25 October, 1999.
6. Ebeed Saleh , Fahim Shaltout , Essam Abd Elaal (2021): Effect of some organic acids on microbial quality of dressed cattle carcasses in Damietta abattoirs, Egypt. Damanhour Journal of Veterinary Sciences 5(2): 17-20.
7. Edris A, Hassanin, F. S; *Shaltout, F. , Azza H Elbaba and Nairoz M Adel*(2017): Microbiological Evaluation of Some Heat Treated Fish Products in Egyptian Markets.*EC Nutrition* 12.3 (2017): 124-132.
8. Edris ,A., Hassan,M.A., Shaltout, F. and Elhosseiny , S. (2013): Chemical evaluation of cattle and camel meat.BENHA VETERINARY MEDICAL JOURNAL, 24(2): 191-197 .
9. Edris ,A.M., Hassan,M.A., Shaltout, F. and Elhosseiny , S(2012): Detection of E.coli and Salmonella organisms in cattle and camel meat. BENHA VETERINARY MEDICAL JOURNAL, 24(2): 198-204.
10. Edris A.M.; Hemmat M. I., Shaltout, F. ; Elshater M.A., Eman F.M.I. (2012): STUDY ON INCIPIENT SPOILAGE OF CHILLED CHICKEN CUTS-UP. BENHA VETERINARY MEDICAL JOURNAL, VOL. 23, NO. 1, JUNE 2012: 81-86 .
11. Edris A.M.; Hemmat M.I.; Shaltout, F. ; Elshater M.A., Eman, F.M.I.(2012):CHEMICAL ANALYSIS OF CHICKEN MEAT WITH RELATION TO ITS QUALITY. BENHA VETERINARY MEDICAL JOURNAL, 23(1): 87-92 .
12. Edris, A.M.; Shaltout, F. and Abd Allah, A.M. (2005): Incidence of Bacillus cereus in some meat products and the effect of cooking on its survival. Zag. Vet. J.33 (2):118-124.
13. Edris, A.M.; Shaltout, F. and Arab, W.S. (2005): Bacterial Evaluation of Quail Meat. Benha Vet. Med.J.16 (1):1-14.
14. Edris, A.M.; Shaltout, F. ;Salem, G.H. and El-Toukhy,E.I. (2011): Incidence and isolation of Salmonellae from some meat products.Benha University ,Faculty of Veterinary Medicine , Fourth Scientific Conference 25-27th May 2011Veterinary Medicine and Food Safety) 172-179 benha , Egypt.
15. Edris AA, Hassanin, F. S; *Shaltout, F., Azza H Elbaba and Nairoz M Adel*(2017): Microbiological Evaluation of Some Heat Treated Fish Products in Egyptian Markets. *EC Nutrition* 12.3 (2017): 134-142.
16. Edris, A.M.; Shaltout, F. ;Salem, G.H. and El-Toukhy,E.I. (2011): Plasmid profile analysis of Salmonellae isolated from some meat products. Benha University ,Faculty of Veterinary Medicine , Fourth Scientific Conference 25-27th May 2011Veterinary Medicine and Food Safety)194-201 benha , Egypt.
17. Ragab A , Abobakr M. Edris, Fahim A.E. Shaltout, Amani M. Salem(2022): Effect of titanium dioxide nanoparticles and thyme essential oil on the quality of the chicken fillet. BENHA VETERINARY MEDICAL JOURNAL41(2): 38-40.
18. Hassan, M.A, Shaltout, F. , Arfa M.M , Mansour A.H and Saudi, K. R(2013): BIOCHEMICAL STUDIES ON RABBIT MEAT RELATED TO SOME DISEASES. BENHA VETERINARY MEDICAL JOURNAL 25(1):88-93.
19. Hassan, M.A and Shaltout, F. (1997): Occurrence of Some Food Poisoning Microorganisms In Rabbit Carcasses Alex.J.Vet.Science, 13(1):55-61.
20. Hassan M, Shaltout FA* and Saqur N (2020): Histamine in Some Fish Products. Archives of Animal Husbandry & Dairy Science 2(1): 1-3.
21. Hassan, M.A and Shaltout, F. (2004): Comparative Study on Storage Stability of Beef, Chicken meat, and Fish at Chilling Temperature. Alex.J.Vet.Science, 20(21):21-30.
22. Hassan, M.A ; Shaltout, F. ; Arafa ,M.M. ; Mansour , A.H. and Saudi , K.R.(2013): Biochemical studies on rabbit meat related to some diseases . Benha Vet. Med.J.25 (1):88-93.
23. Hassan, M.A ; Shaltout, F. ; Maarouf , A.A. and El-Shafey, W.S.(2014): Psychrotrophic bacteria in frozen fish with special reference to pseudomonas species .Benha Vet. Med.J.27 (1):78-83.
24. Hassan, M.A ; Shaltout, F. ; Arafa ,M.M. ; Mansour , A.H. and Saudi , K.R.(2013): Bacteriological studies on rabbit meat related to some diseases Benha Vet. Med.J.25 (1):94-99.
25. Hassanin, F. S; Hassan,M.A., Shaltout, F. , Nahla A. Shawqy and 2Ghada A. Abd-Elhameed (2017): Chemical criteria of chicken meat.BENHA VETERINARY MEDICAL JOURNAL, 33(2):457-464.

26. Hassanin, F. S; Hassan, M.A.; Shaltout, F. and Elrais-Amina, M(2014): CLOSTRIDIUM PERFRINGENS IN VACUUM PACKAGED MEAT PRODUCTS. BENHA VETERINARY MEDICAL JOURNAL, 26(1):49-53.
27. Hassanien, F.S. ; Shaltout, F. ; Fahmey, M.Z. and Elsukkary, H.F.(2020): Bacteriological quality guides in local and imported beef and their relation to public health. Benha Veterinary Medical Journal 39: 125-129.
28. Hassanin, F. S; Shaltout, F. and , Mostafa E.M(2013): Parasitic affections in edible offal. Benha Vet. Med.J.25 (2):34-39.
29. Hassanin, F. S; Shaltout, F. , Lamada, H.M., Abd Allah, E.M.(2011): THE EFFECT OF PRESERVATIVE (NISIN) ON THE SURVIVAL OF LISTERIA MONOCYTOGENES. BENHA VETERINARY MEDICAL JOURNAL (2011)-SPECIAL ISSUE [J]: 141-145.
30. Khattab, E., Fahim Shaltout and Islam Sabik (2021): Hepatitis A virus related to foods. BENHA VETERINARY MEDICAL JOURNAL 40(1): 174-179..
31. Saad M. Saad , Fahim A. Shaltout , Amal A. A. Farag & Hashim F. Mohammed (2022): Organophosphorus Residues in Fish in Rural Areas. Journal of Progress in Engineering and Physical Science 1(1): 27-31..
32. Saif, M. , Saad S.M. , Hassanin, F. S; Shaltout, F. , Marionette Zaghoul (2019): Molecular detection of enterotoxigenic Staphylococcus aureus in ready-to-eat beef products. Benha Veterinary Medical Journal 37 (2019) 7-11.
33. Saif, M. , Saad S.M. , Hassanin, F. S; Shaltout, F. , Marionette Zaghoul (2019); Prevalence of methicillin-resistant Staphylococcus aureus in some ready-to-eat meat products. Benha Veterinary Medical Journal 37 (2019) 12-15.
34. Farag, A. A., Saad M. Saad¹, Fahim A. Shaltout¹, Hashim F. Mohammed(2023 a): Studies on Pesticides Residues in Fish in Menofia Governorate. Benha Journal of Applied Sciences , 8(5): 323-330.
35. Farag, A. A., Saad M. Saad¹, Fahim A. Shaltout¹, Hashim F. Mohammed(2023 b): Organochlorine Residues in Fish in Rural Areas. Benha Journal of Applied Sciences , 8 (5): 331-336.
36. Shaltout, F. , Mona N. Hussein, Nada Kh. Elsayed (2023): Histological Detection of Unauthorized Herbal and Animal Contents in Some Meat Products. Journal of Advanced Veterinary Research 13(2): 157-160.
37. Shaltout, F. , Heikal, G. I. , Ghanem, A. M.(2022): Mycological quality of some chicken meat cuts in Gharbiya governorate with special reference to Aspergillus flavus virulent factors. benha veteriv medical journal veterinary 42(1): 12-16.
38. Shaltout, F. , Ramadan M. Salem, Eman M. Eldiasty, Fatma A. Diab (2022): Seasonal Impact on the Prevalence of Yeast Contamination of Chicken Meat Products and Edible Giblets. Journal of Advanced Veterinary Research 12(5): 641-644.
39. Shaltout, F. , Abdelazez Ahmed Helmy Barr and Mohamed Elsayed Abdelaziz (2022): Pathogenic Microorganisms in Meat Products. Biomedical Journal of Scientific & Technical Research 41(4): 32836-32843.
40. Shaltout, F. , Thabet, M.G. and Koura, H.A. (2017). Impact of Some Essential Oils on the Quality Aspect and Shelf Life of Meat. J Nutr Food Sci., 7: 647.
41. Shaltout, F. , Islam Z. Mohammed², El -Sayed A. Afify(2020): Bacteriological profile of some raw chicken meat cuts in Ismailia city, Egypt. Benha Veterinary Medical Journal 39 (2020) 11-15.
42. Shaltout, F. , Islam, Z. Mohammed², El -Sayed A. Afify(2020): Detection of E. coli O157 and Salmonella species in some raw chicken meat cuts in Ismailia province, Egypt. Benha Veterinary Medical Journal 39 (2020) 101-104.
43. Shaltout, F. , E.M. El-diasty and M. A. Asmaa- Hassan (2020): HYGIENIC QUALITY OF READY TO EAT COOKED MEAT IN RESTAURANTS AT Cairo. Journal of Global Biosciences 8(12): 6627-6641..
44. Shaltout, F. , Marrionet Z. Nasief , L. M. Lotfy , Bossi T. Gamil(2019): Microbiological status of chicken cuts and its products. Benha Veterinary Medical Journal 37 (2019) 57-63.
45. Shaltout, F. (2019): Poultry Meat. Scholarly Journal of Food and Nutrition 22 1-2..
46. Shaltout, F. (2019): Food Hygiene and Control. Food Science and Nutrition Technology 4(5): 1-2.
47. Hassanin, F. S; Shaltout, F. , Seham N. Homouda and Safaa M. Arakeeb(2019): Natural preservatives in raw chicken meat. Benha Veterinary Medical Journal 37 (2019) 41-45.
48. Hazaa, W. , Shaltout, F. , Mohamed El-Shate(2019): Prevalence of some chemical hazards in some meat products. Benha Veterinary Medical Journal 37 (2) 32-36.
49. Hazaa, W. , Shaltout, F. , Mohamed El-Shater(2019): Identification of Some Biological Hazards in Some Meat Products. Benha Veterinary Medical Journal 37 (2) 27-31.
50. Gaafar, R. , Hassanin, F. S; Shaltout, F. Marionette Zaghoul (2019): Molecular detection of enterotoxigenic Staphylococcus aureus in some ready to eat meat-based sandwiches. Benha Veterinary Medical Journal 37 (2) 22-26.
51. Gaafar, R. , Hassanin, F. S; Shaltout, F. , Marionette Zaghoul (2019): Hygienic profile of some ready to eat meat product sandwiches sold in Benha city, Qalubiya Governorate, Egypt. Benha Veterinary Medical Journal 37 (2) 16-21.
52. Saad S.M. , Shaltout, F. , Nahla A Abou Elroos, Saber B El-nahas(2019) : Antimicrobial Effect of Some Essential Oils on Some Pathogenic Bacteria in Minced Meat. J Food Sci Nutr Res. 2019; 2 (1): 012-020.
53. Saad S.M. , Shaltout, F. , Nahla A Abou Elroos² and Saber B El-nahas(2019): Incidence of Staphylococci and E. coli in Meat and Some Meat Products. EC Nutrition 14.6 (2019).
54. Saad S.M. , Hassanin, F. S. ; Shaltout, F. , Marionette Z Nassif, Marwa Z Seif.(2019: Prevalence of Methicillin-Resistant Staphylococcus Aureus in Some Ready-to-Eat Meat Products. American Journal of Biomedical Science & Research 4(6):460-464.
55. Shaltout, F. (2019): Pollution of Chicken Meat and Its Products by Heavy Metals. Research and Reviews on Healthcare: Open Access Journal, 4, 3(381-3382).
56. Shaltout, F. A.; E.M EL-diasty; M. S. M Mohamed (2018): Effects of chitosan on quality attributes fresh meat slices stored at 4 C.

BENHA VETERINARY MEDICAL JOURNAL, VOL. 35, NO. 2: 157-168.

57. Shaltout, F. and Adel-Aziz, 2004: *Salmonella enterica* serovar Enteritidis in poultry meat and their epidemiology. *Vet. Med. J. Giza*, 52 (2004), pp. 429-436.

58. Shaltout, F. , Hala F El-Shorah, Dina I El Zahaby, Lamiaa M Lotfy(2018):Bacteriological Profile of Chicken Meat Products. *SciFed Food & Dairy Technology Journal*, 2:3.

59. Shaltout, F. , Mohamed, A.H. El-Shater ., Wafaa Mohamed Abd El-Aziz(2015): Bacteriological assessment of Street Vended Meat Products sandwiches in kalyobia Governorate. *BENHA VETERINARY MEDICAL JOURNAL*, 28(2):58-66,

60. Shaltout, F. , Mohamed A El shatter and Heba M Fahim (2019): Studies on Antibiotic Residues in Beef and Effect of Cooking and Freezing on Antibiotic Residues Beef Samples. *Scholarly Journal of Food and Nutrition* 2(1) 1-4

61. Shaltout, F., Zakaria IM and Nabil ME.(2018): Incidence of Some Anaerobic Bacteria Isolated from Chicken Meat Products with Special Reference to *Clostridium perfringens*. *Nutrition and Food Toxicology* 2.5 (2018): 429-438.

62. Shaltout, F. , Ahmed A A Maarouf and Mahmoud ES Elkhoully. (2017): Bacteriological Evaluation of Frozen Sausage. *Nutrition and Food Toxicology* 1.5 ; 174-185.

63. Shaltout, F. , El-Toukhy EI and Abd El-Hai MM.(2019): Molecular Diagnosis of *Salmonellae* in Frozen Meat and Some Meat Products. *Nutrition and Food Technology Open Access* 5(1): 1-6.

64. Shaltout, F. , A.M.Ali and S.M.Rashad (2016): Bacterial Contamination of Fast Foods. *Benha Journal of Applied Sciences (BJAS)* 1 (2)45-51.

65. Shaltout, F. , Zakaria. I. M. , Jehan Eltanani , Asmaa . Elmelegy(2015): Microbiological status of meat and chicken received to University student hostel. *BENHA VETERINARY MEDICAL JOURNAL*, 29(2):187-192, DECEMBER, 2015.

66. Saad,S.M.:Edris, A.M.; Shaltout, F. and Edris, Shimaa(2012): Isolation and identification of salmonellae and E.coli from meat and poultry cuts by using A.multiplex PCR. *Benha Vet. Med.J.special issue* 16-26.

67. Saad, S.M. and Shaltout, F. (1998): Mycological Evaluation of camel carcasses at Kalyobia Abattoirs. *Vet.Med.J. Giza*,46(3):223-229.

68. Saad S.M. , Shaltout, F. , Nahla A Abou Elroos, Saber B El-nahas. 2019: Antimicrobial Effect of Some Essential Oils on Some Pathogenic Bacteria in Minced Meat. *J Food Sci Nutr Res.* 2019; 2 (1): 012-020.

69. Saad S.M. , Hassanin, F. S; Shaltout, F. , Marionette Z Nassif, Marwa Z Seif.(2019): Prevalence of Methicillin-Resistant *Staphylococcus Aureus* in Some Ready-to-Eat Meat Products. *American Journal of Biomedical Science & Research* 4(6):460-464.

70. Saad S.M. , Shaltout, F. , Nahla A Abou Elroos and Saber B El-nahas. (2019): Incidence of *Staphylococci* and *E. coli* in Meat and Some Meat Products. *EC Nutrition* 14.6 (2019).

71. Shaltout, F. , Riad EM, TES Ahmed and AbouElhassan A.(2017): Studying the Effect of Gamma Irradiation on Bovine Offal's Infected

with *Mycobacterium tuberculosis* Bovine Type. *Journal of Food Biotechnology Research* 1 (6): 1-5.

72. Shaltout, F., Ahmed A A Maarouf and Mahmoud ES Elkhoully.(2017): Bacteriological Evaluation of Frozen Sausage. *Nutrition and Food Toxicology* 1.5 (2017): 174-185.

73. Shaltout, F. , Zakaria IM and Nabil ME.(2018): Incidence of Some Anaerobic Bacteria Isolated from Chicken Meat Products with Special Reference to *Clostridium perfringens*. *Nutrition and Food Toxicology* 2.5 (2018): 429-438.

74. Shaltout, F., Mohamed, A.Hassan and Hassanin, F. S(2004): THERMAL INACTIVATION OF ENTEROHAEMORRHAGIC ESCHERICHIA COLI O157:H7 AND ITS SENSITIVITY TO NISIN AND LACTIC ACID CULTURES. *1rst Ann. Conf. , FVM., Moshtohor, Sept, 2004.*

75. Shaltout, F., El-diasty, E.M. ;Elmesalamy, M. and Elshaer, M.(2014): Study on fungal contamination of some chicken meat products with special reference to the use of PCR for its identification . *Conference, Veterinary Medical Journal – Giza vol. December 2014/12/17 vol.60: 1-10.*

76. Shaltout, F. (2002): Microbiological Aspects of Semi-cooked chicken Meat Products. *Benha Veterinary Medical Journal*13,2,: 15-26.

77. Shaltout, F., Thabet, M.G2 and Hanan, A. Koura3. (2017): Impact of some essential oils on the quality aspect and shelf life of meat. *BENHA VETERINARY MEDICAL JOURNAL*, 33, (2): 351-364.

78. Shaltout F. , Mohammed Farouk; Hosam A.A. Ibrahim and Mostafa E.M. Afifi4.2017: Incidence of Coliform and *Staphylococcus aureus* in ready to eat fast foods. *BENHA VETERINARY MEDICAL JOURNAL*, 32(1): 13 - 17, MARCH, 2017.

79. Shaltout, F. , Zakaria, I.M., Nabil, M.E.(2017): Detection and typing of *Clostridium perfringens* in some retail chicken meat products. *BENHA VETERINARY MEDICAL JOURNAL*,. 33(2):283-291.

80. Shaltout, F. (1992): Studies on Mycotoxins in Meat and Meat by Products. *M.V.Sc Thesis Faculty of Veterinary Medicine, Moshtohor, Zagazig University Benha branch.*

81. Shaltout, F. (1996): Mycological And Mycotoxicological profile Of Some Meat products. *Ph.D.Thesis, Faculty of Veterinary Medicine, Moshtohor, Zagazig University Benha branch.*

82. Shaltout, F. (1998): Proteolytic Psychrotrophes in Some Meat products. *Alex. Vet. Med. J.*14 (2):97-107.

83. Shaltout, F. (1999): Anaerobic Bacteria in Vacuum Packed Meat Products. *Benha Vet. Med.J.*10 (1):1-10.

84. Shaltout, F. (2000):Protozoal Foodborne Pathogens in some Meat Products. *Assiut Vet. Med. J.* 42 (84):54-59.

85. Shaltout, F. (2001): Quality evaluation of sheep carcasses slaughtered at Kalyobia abattoirs. *Assiut Veterinary Medical Journal*, 46(91):150-159.

86. Shaltout, F. (2002): Microbiological Aspects of Semi-cooked Chicken Meat Products. *Benha Vet.Med.J.* 13(2):15-26.

87. Shaltout, F. (2003): *Yersinia Enterocolitica* in some meat products and fish marketed at Benha city. *The Third international conference*

Mansoura 29-30 April.

88. Shaltout, F. (2009): Microbiological quality of chicken carcasses at modern Poultry plant. The 3rd Scientific Conference, Faculty of Vet. Med., Benha University, 1-3 January.

89. Shaltout, F. and Abdel Aziz, A.M. (2004): Salmonella enterica Serovar Enteritidis in Poultry Meat and their Epidemiology. *Vet. Med. J., Giza*, 52(3):429-436.

90. Shaltout, F. and Abdel Aziz, A.M. (2004): ESCHERICHIA COLI STRAINS IN SLAUGHTERED ANIMALS AND THEIR PUBLIC HEALTH IMPORTANCE. *J. Egypt. Vet. Med. Association* 64(2):7-21.

91. Shaltout, F., Amin, R., Marionet, Z., Nassif and Shimaa, Abdel-wahab (2014): Detection of aflatoxins in some meat products. *Benha veterinary medical journal*, 27(2):368-374.

92. Shaltout, F. and Afify, Jehan Riad, EM and Abo Elhasan, Asmaa, A. (2012): Improvement of microbiological status of oriental sausage. *Journal of Egyptian Veterinary Medical Association* 72(2):157-167.

93. Shaltout, F. and Daoud, J. R. (1996): Chemical analytical studies on rabbit meat and liver. *Benha Vet. Med. J.* 8(2):17-27.

94. Shaltout, F. and Edris, A.M. (1999): Contamination of shawerma with pathogenic yeasts. *Assiut Veterinary Medical Journal*, 40(64):34-39.

95. Shaltout, F.; Eldiasty, E. and Mohamed, M.S. (2014): Incidence of lipolytic and proteolytic fungi in some chicken meat products and their public health significance. *Animal Health Research Institute: First International Conference on Food Safety and Technology* 19-23 June 2014 Cairo Egypt pages 79-89.

96. Shaltout, F.; Eldiasty, E.; Salem, R. and Hassan, Asmaa (2016): Mycological quality of chicken carcasses and extending shelf-life by using preservatives at refrigerated storage. *Veterinary Medical Journal -Giza (VMJG)* 62(3):1-7.

97. Shaltout, F.; Salem, R. Eldiasty, E.; and Diab, Fatema. (2016): Mycological evaluation of some ready to eat meat products with special reference to molecular characterization. *Veterinary Medical Journal -Giza* 62(3):9-14.

98. Shaltout, F.; Elshater, M. and Wafaa, Abdelaziz (2015): Bacteriological assessment of street vended meat products sandwiches in Kalyobia Governorate. *Benha Vet. Med. J.* 28(2):58-66.

99. Shaltout, F.; Gerges, M.T. and Shewail, A.A. (2018): Impact of Organic Acids and Their Salts on Microbial Quality and Shelf Life of Beef. *Assiut veterinary medical journal* 64(159):164-177

100. Shaltout, F.; Ghoneim, A.M.; Essmail, M.E. and Yousseif, A. (2001): Studies on aflatoxin B1 residues in rabbits and their pathological effects. *J. Egypt. Vet. Med. Association* 61(2):85-103.

101. Shaltout, F. and Hanan, M.T. El-Lawendy (2003): Heavy Metal Residues In Shawerma. *Beni-Suef Vet. Med. J.* 13(1):213-224.

102. Shaltout, F. and Hashim, M.F. (2002): Histamine in salted, Smoked and Canned Fish products. *Benha Vet. Med. J.* 13(1):1-11.

103. Shaltout, F.; Hashim, M.F. and Elnahas, S. (2015): Levels of some heavy metals in fish (*Tilapia nilotica* and *Claris lazera*) at Menufia Governorate. *Benha Vet. Med. J.* 29(1):56-64.

104. Shaltout, F. and Ibrahim, H.M. (1997): Quality evaluation of luncheon and Alexandrian sausage. *Benha Vet. Med. J.* 10(1):1-10.

105. Shaltout, F.; Nassif, M. and Shakran, A. (2014): Quality of battered and breaded chicken meat products. *Global Journal of Agriculture and Food Safety Science* – 1(2) ISSN 2356-7775.

106. Shaltout, F., Amani M. Salem, A. H. Mahmoud, K. A. (2013): Bacterial aspect of cooked meat and offal at street vendors level. *Benha veterinary medical journal*, 24(1):320-328.

107. Shaltout, F., and Salem, R.M. (2000): Moulds, aflatoxin B1 and Ochratoxin A in Frozen Livers and meat products. *Vet. Med. J. Giza* 48(3):341-346.

108. Yasser H. Al-Tarazi, A. Al-Zamil, Shaltout, F. and H. Abdel-Samei (2002). Microbiological status of raw cow milk marketed in northern Jordan. *AVMJ Volume 49 Issue 96 Pages* 180-194

109. Shaltout, F., Zakaria IM and Nabil ME. (2018): Incidence of Some Anaerobic Bacteria Isolated from Chicken Meat Products with Special Reference to *Clostridium perfringens*. *Nutrition and Food Toxicology* 2(5):429-438.

110. Shaltout, F.; El-diasty, E.M. and Mohamed, M. S. (2014): Incidence of lipolytic and proteolytic fungi in some chicken meat products and their public health significance. *1st Scientific conference of food safety and Technology*. 2014, pp. 79-89.

111. Shaltout, F.; El-diasty, E.M.; Salem, R. M. and Asmaa, M. A. Hassan. 2016: Mycological quality of chicken carcasses and extending shelf-life by using preservatives at refrigerated storage. *Veterinary Medical Journal – Giza*, 62(3):1-10.

112. Shaltout, F., R.M. Salem, E.M. El-Diasty and W.I.M. Hassan. 2019: *Effect of Lemon Fruits and Turmeric Extracts on Fungal Pathogens in Refrigerated Chicken Fillet Meat*. *Global Veterinaria* 21(3):156-160,

113. Shaltout, F., El-diasty, E.M.; Elmesalamy, M. and Elshaer, M. (2014): Study on fungal contamination of some chicken meat products with special reference to the use of PCR for its identification. *Conference, Veterinary Medical Journal – Giza vol. December 2014/12/17 vol.60* 1-10.

114. Shaltout, F.; Salem, R. M.; El-diasty, Eman and Fatema, A.H. Diab. (2016): Mycological evaluation of some ready to eat meat products with special reference to molecular characterization. *Veterinary Medical Journal – Giza*. 62(3):9-14.

115. Shaltout, F., Ahmed, A.A. Maarouf, Eman, M.K. Ahmed (2018): Heavy Metal Residues in chicken cuts up and processed chicken meat products. *BENHA VETERINARY MEDICAL JOURNAL*, 34(1):473-483.

116. Shaltout, F.; Hanan M. Lamada, Ehsan A.M. Edris. (2020): Bacteriological examination of some ready to eat meat and chicken meals. *Biomed J Sci & Tech Res.*, 27(1):20461-20465.

117. Sobhy, Asmaa and Shaltout, Fahim (2020): Prevalence of some food poisoning bacteria in semi-cooked chicken meat products at Qaliubiya governorate by recent Vitek 2 compact and PCR techniques. *Benha Veterinary Medical Journal* 38 (2020) 88-92.

118. Sobhy, Asmaa and Shaltout, Fahim (2020): Detection of food poisoning bacteria in some semi-cooked chicken meat products marketed at Qaliubiya governorate. *Benha Veterinary Medical Journal* 38 (2020) 93-96.

119. Shaltout, F.A.(2024): Abattoir And Bovine Tuberculosis as A Reemerging Foodborne Diseas. Clinical Medical Reviews and Report 6(1):1-7

120. Shaltout, F.A.(2023): Viruses in Beef, Mutton, Chevron, Venison, Fish and Poultry Meat Products. Food Science & Nutrition Technology 8(4):1-10