

AKADEMIC YEAR	GRADUATES	TITLE	SUPERVISOR	ABSTRACT
2023 - 2024				
29/11/2023	GKANIA AFRODITH	Reporting and analysis of cases of biological hazards in meat and meat products declared in EU countries in the recent years	GIAVASIS IOANNIS	Biological hazards in meat and meat products often lead to foodborne outbreaks after the consumption of the above and have adverse effects both on the consumers' health and the public health. Most cases of foodborne diseases appearing after the consumption of dangerous meat and meat products are manifested through symptoms of the gastrointestinal system such as abdominal pain, diarrhea and vomiting. However, in some cases symptoms may also derive from the nervous system and include encephalitis, meningitis and paralysis. Bearing the above in mind, health authorities should ensure the quality and safety of products intended for human consumption. Furthermore, the study and analysis of recorded foodborne diseases is important so that microbiological and epidemiological data exist, which will assist in the prevention of a subsequent epidemic outbreak. At a European level, there is a recording system for meat borne epidemic outbreaks. The information being gathered concerns the type of the biological hazard that caused the outbreak, the reporting country, the place of exposure, the type of meat or meat product it concerned, the number of human cases, the number of hospitalisations and finally the number of deaths. The purpose of this study is to highlight the biological risks in meat and meat products declared in the European Union (E.U) member states in the period 2016-2021 and to analyze these cases. This will provide a general picture regarding the biological hazards most often encountered in different meat and meat products, as well as their consequences on consumers' health across the E.U. Keywords: foodborne disease, meat products, causative agent, place of exposure
29/11/2023	KYRITSOPOULOS GEORGIOS	Reporting and analysis of cases of biological hazards in dairy products declared in EU countries in the recent years	GIAVASIS IOANNIS	Dairy products play a critical role in the food industry of Greece and the European Union (EU), providing nutrients vital to human health and a staple of many global diets. However, dairy products can host pathogenic microorganisms, known as biological hazards, if not properly processed or if they come from infected animals. Human consumption of contaminated dairy products can lead to serious illness or even death. Dairy products therefore require strict monitoring to ensure consumer safety. The European Union, in an effort to detect and warn consumers early, has established strong monitoring and notification systems, such as the European Rapid Alert System for Food and Feed (RASFF) and the European Food Safety Authority (EFSA) for monitoring and reporting on food safety issues. However, in addition to the above organizations, EU member states may have national/local food safety surveillance systems in place. This work aimed to carry out a comprehensive review of data from RASFF, EFSA, as well as published scientific studies and national systems on food safety with a particular focus on biological hazards in dairy products. Biohazards recorded in the RASFF portal, a critical tool for the rapid exchange of information on threats to the food chain, were searched. The portal serves as a reservoir of real-time alerts from member states (MS) on potential risks, enabling quick actions such as recalls, withdrawals or rejection of imports. Alongside the RASFF, published scientific studies/reports by EFSA and research groups dealing with biological risks of dairy products were searched. The review of the RASFF portal during the period 01-01-2013 to 31-05-2023 yielded 193 reports concerning biological hazards of milk and other dairy products. The most important biological hazards found were <i>Listeria monocytogenes</i> , <i>Salmonella</i> spp, and <i>Escherichia coli</i> (<i>E. Coli</i>). Cheese appeared to be the most reported dairy product to carry these risks, while there were reports of butter, milk and yogurt. EFSA reports mention contamination of dairy products (milk, cheeses) with <i>Listeria monocytogenes</i> , <i>E. Coli</i> VTEC O157. Finally, the results of published scientific studies, on the risks of dairy products in the EU, are similar to the results of this work. They also reflect the image that existed in the previous decades (2000-2020) regarding the biological risks of dairy products. Based on the literature search carried out until 30-06-2023 this work is the first report on the biological risks of dairy products for the period 2020-2023. The concurrence of findings from both RASFF, EFSA and the literature highlights the challenges that safety of dairy production faces. While RASFF provides a real-time snapshot of cases, enabling immediate action, EFSA and scientific studies offer a broader view, analyzing risks and offering solutions. The repeated occurrence of specific pathogens indicates possible systemic problems at certain stages of dairy production or processing and highlights the public health and economic impacts that outbreaks of dairy contamination may cause. Several alerts to the RASFF originate from dairy products imported from one MS to another, highlighting the importance of rapid information sharing and a harmonized approach to dairy safety standards across the EU. Thus, the study underlines the importance of continuous cooperation between MS. Finally, the need for enhanced monitoring at all stages of dairy production is indicated. In conclusion, this comprehensive analysis of biohazard cases in dairy products provides a clear picture of the current state of dairy product safety in the EU. KEYWORDS: Biohazards, dairy products, warning systems
29/11/2023	BOURLI IOANNA	An empirical investigation of consumers' attitudes toward organic feta cheese	POLYMEROS KONSTANTINOS	The multitude of food scandals of the decades of the recent past, but also the increasingly intense desire of modern consumers to choose healthy, safe and at the same time quality foods, the production process of which respects the environment and ensures the well-being of production animals, has led a significant portion of people to prefer organic over conventional foods. In the 21st century, the nutritional needs of modern man are changing rapidly as a component of the lifestyle and stimuli he receives. Therefore, the evolution of food is a key subject of study by the scientific community. Undoubtedly, dairy products, as a main pillar of the food industry, and by extension cheese products are an integral part of the human diet. In Greece, it is undeniable that feta cheese, to which many often attribute the characterization of white gold and which is legally and institutionally protected as a Protected Designation of Origin (PDO) product, has secured a dominant and irreplaceable place on the consumer's table. However, the modern Greek dairy industry, listening to the demands and wishes of consumers for organic farming and livestock products, proceeded to produce and sell organic feta cheese. In the context of this reality, this master's thesis aims to investigate consumer attitudes towards organic feta, trying to determine the parameters that determine them. In particular, it is chosen to examine the level of knowledge of the respondents about organic products in general, the criteria they take into account for the purchase of organic feta, as well as the proposed points for its procurement. Additionally, an attempt is made to interpret both the chosen medium for extracting information regarding it, and also its consumed form. All of these correlate with a number of demographic as well as social and economic variables. In order to collect all of the above, as well as other data, a questionnaire was created, which was completed electronically by 450 consumers. The software used for the purpose of the research was IBM SPSS Statistics (version 29). In addition, the χ^2 -test (chi-square test) method was chosen to conduct correlations between independent and dependent variables, so as to determine the consumption behaviors toward organic feta cheese. The results of the research show the existence of a statistically significant relationship between the gender of the respondents, their education, their family status, their profession and their income and the level of knowledge they have about organic products in general. Also, it was found that the price of the organic feta cheese affects the decision to buy it depending on the marital status of the interviewee. Also, the gender, education and professional status of the consumers determine the point of choice for the supply of organic feta cheese, while their family and economic situation determine to a significant extent the form (bulk or packaged) they will choose to buy. Finally, the correlations of education, marital status, occupation, income and the sources from which the information possessed by consumers regarding organic feta cheese comes from were also proven to be statistically significant. Keywords: consumers' attitudes, organic feta cheese, consumers' perceptions, price of product, degree of information
29/11/2023	PAZARAKIOTI AIKATERINI	A qualitative and quantitative systematic analysis of prevalence and concentration data of pathogens in the raw milk	KAKAGIANNI MYRSINI	Raw milk can contain a multitude of microorganisms and its consumption without the use of heat treatment at least equivalent to pasteurization poses risks to the health of consumers. The purpose of this master's thesis was to systematically investigate the prevalence and concentration of pathogenic microorganisms in raw cow's milk. To achieve this goal, the method of systematic review was used (Prisma, 2020) and based on this, three databases (Scopus, PubMed, Google Scholar) were searched for the relevant literature. Using the inclusion and exclusion criteria we defined, we ended up with 49 articles, which we included in our study. From the data we interpreted from these studies, we reached conclusions regarding the pathogenic microorganisms that are found most often and with a greater concentration and prevalence in raw milk, but also the regions around the planet that face a more serious problem with foodborne infections. The present systematic investigation highlighted <i>Escherichia coli</i> , <i>Staphylococcus aureus</i> and <i>Salmonella</i> spp. as the microorganisms that are most frequently involved in the occurrence of foodborne infections. Also, from a geographical point of view, the countries of Africa and some countries of Asia seem to face a major problem with the occurrence of food poisoning due to the consumption of raw cow's milk. Finally, some suggestions are made for future research based on the conclusions of this systematic investigation. Key words: Systematic investigation; Pathogens; Raw milk; Prevalence; Concentration; Foodborne diseases
29/11/2023	PAPAVASILEIOU KONSTANTINOS	A qualitative and quantitative systematic analysis of prevalence and concentration data of pathogens in poultry meat	KAKAGIANNI MYRSINI	affecting animal health and productivity. In addition, the major and ongoing changes occurring in the poultry industry dictate the continuous recording and monitoring of developments in scientific research. In this context, the purpose of this paper is to systematically investigate the modern literature on the prevalence and concentration of pathogenic microorganisms in poultry and their products, to identify the newest research data under the new conditions of production management. In addition, the aim was to compare, synthesize and classify the current information on the spread of pathogenic microorganisms in units operating with the modern production concept, as presented in the relevant surveys. From an analysis of the studies retrieved from the literature database search, 23 primary research papers were selected. In these works, investigated pathogenic species belonging to more than ten genera of microorganisms, which showed significant prevalence and strong resistance to antimicrobial drugs. The main species mentioned belong to: <i>Salmonella</i> spp., <i>Campylobacter</i> spp., <i>Escherichia coli</i> , <i>Staphylococcus aureus</i> , <i>Proteus</i> spp., <i>Citrobacter</i> spp., <i>Klebsiella</i> spp., <i>Shigella</i> spp., <i>Kluyvera</i> spp., <i>Listeria</i> spp., <i>Toxoplasma gondii</i> . In parallel with the spread of pathogenic microorganisms there is a strong research interest in the detection and investigation of resistance of microorganisms to antibiotics, as the prevalence of multi-resistant bacteria in poultry meat is of increasing concern. Resistant bacteria can be transferred from poultry products to other wildlife and humans through eating or handling contaminated meat. This transfer of resistance genes may jeopardize future treatments of infections caused by these organisms. Antimicrobial resistance represents a long-term and very complex biological problem. Therefore, concerted and precise actions are required in order to reduce its impact on the present and future of human civilization. Such measures must be performed according to science-based knowledge in order to maintain the economic efficiency of the industry while promoting public health. In this sense, comprehensive Environmental, Social Governance (ESG) initiatives in the poultry industry are encouraged to adopt the principles of the One Health approach. The general conclusion that can be drawn from the investigation is that the prevention of contamination by pathogenic bacteria in food products should not only focus on the market stages, but also on control strategies at the initial stages, including hatcheries, farms and slaughterhouses, to stop their spread along the production chain. Keywords: Prevalence, pathogens, poultry, multidrug resistance

29/11/2023	CHEIMONA DIMITRA	Listeria monocytogenes in Ready to Eat foods of animal origin: a Meta-analysis	PARLAPANI FOTEINI	The foodborne pathogen <i>Listeria monocytogenes</i> causes a serious bacterial infection, listeriosis. Contaminated ready-to-eat (RTE) foods are common sources of <i>L. monocytogenes</i> , yet global estimates of prevalence and levels in these foods are lacking. The aim of this work was to assess the occurrence of <i>L. monocytogenes</i> in ready-to-eat foods of animal origin. In this work included 90 research articles that were used to collect the information, and were searched from PubMed, Google Scholar and Scopus databases with a publication date restriction within the last five years (2018-2023). Studies were categorized based on their country of origin into the 5 continents (Europe, America, Africa, Asia and Oceania). Then, the types of samples were categorized into five food categories: 1) meat and meat products, 2) fishery products (fish, crustaceans, shellfish, etc.), 3) milk and dairy products, 4) cold cuts and 5) others ready-to-eat foods (such as various sandwiches, sausages, mayonnaise, etc.). Finally, according to the total number of initial samples and the number of positive samples per food category, the percentage of the occurrence of the pathogen <i>L. monocytogenes</i> was calculated for each food category. Thus, according to the results, in Europe and America the most positive samples appear to be found in the category of fishery products at a rate of 7.14% and 21.43% respectively, despite the fact that the studies for this category of products are few and the number of samples small. Regarding the Asian continent, the highest percentages are observed in the categories of meat products (4.56%), dairy products (4.21%) and other products (4.51%), while in Africa a large percentage of positive samples are found in the category of meat products (13.23%) and other products (21.64%). Also, not enough published data was found for Oceania, however, the results of one published study reported a figure of 19.4% in the meat product category. Keywords: <i>Listeria monocytogenes</i> , RTE food of animal origin
27/3/2024	GKOUTZIOMITROS MILTIADIS	Consumers perceptions and attitudes toward milk of animal origin and it's plant-based alternatives	POLYMEROS KONSTANTINOS	In recent times, the modernization of eating habits has brought about significant changes in the way people consume and interact with their diet. The purpose of this paper is to investigate the behavior of Greek consumers, their attitudes and opinions regarding milk of animal origin and its vegetable substitutes. To achieve this goal, a quantitative survey of 417 consumers was conducted. The results of the survey showed that consumers are very interested in the quality of their diet. They stated that organic animal milk is healthier than conventional milk and its plant-based substitutes are more suitable for lactose intolerant and vegans. Also, since the purchase cost is very important to them, plant substitutes are considered to be more expensive than animal milk and they do not consume it much. They believe that milk produced on small farms is of higher quality than milk produced by large producers. In terms of taste, plant-based substitutes don't taste any better than animal milk. Finally, they expressed concern about the existence of genetically modified organisms in plant-based animal milk substitutes. Key words: vegetable substitutes for animal milk, animal milk, consumer behavior, consumer behavior models
27/3/2024	KOLESKAS APOSTOLOS	Biofilm of food-borne pathogens and spoilage microorganisms on food contact surfaces	BOZIARIS IOANNIS	The present thesis was conducted within the framework of the Interdepartmental Postgraduate Programme of Studies "Quality and Safety Technology of Food of Animal Origin" of the Departments of Agriculture, Aquaculture and Aquatic Environment and Nutrition Science and Science of the University of Thessaly. The aim of the thesis was to monitor the biofilm growth of the pathogenic microorganism <i>Listeria monocytogenes</i> and <i>Pseudomonas</i> on polystyrene surfaces simulating the real conditions of a fish processing unit. In order to accomplish the purpose, sea bream were obtained from which fish broth was prepared, which served as the nutrient for the growth of <i>Listeria monocytogenes</i> biofilm on polystyrene (microplate) surfaces. This material is used in food packaging. In the first experiment, six strains of <i>Listeria monocytogenes</i> (L128, L129, L206, L207, L131, L133) and two <i>Pseudomonas</i> species (<i>Pseudomonas gessardii</i> and <i>Pseudomonas fragi</i>) were used in sterile fish broth because the aim was to develop a biofilm in single culture and mixed culture. In the second experiment, a mixed culture of the six <i>Listeria monocytogenes</i> strains in fish broth was used because the aim was to study the growth of <i>Listeria monocytogenes</i> biofilm in combination with the natural microflora of sea bream. The total duration of the experiments was ten days at a temperature of 8°C, approximating as closely as possible the conditions prevailing in fish processing in the industry. This study showed that when <i>Listeria monocytogenes</i> in co-culture with <i>Pseudomonas</i> shows slower growth and lower final populations than in monoculture. In contrast, when <i>Listeria monocytogenes</i> is grown with the natural microflora of sea bream it shows much higher growth. In conclusion, it can be concluded that cells of <i>Listeria monocytogenes</i> and various pathogenic microorganisms can be found in the industry which is important because the natural microflora of sea bream fish enhances the growth of <i>Listeria monocytogenes</i> biofilm. This demonstrates the need for holistic compliance with good hygienic practices in the food industry to avoid this phenomenon. Key words: Biofilm, <i>Listeria monocytogenes</i> , <i>Pseudomonas</i> , Food processing surface, Polystyrene
27/3/2024	TSARA EVAGELIA	Behavior of <i>Listeria monocytogenes</i> under stresses imposed by seafood processing conditions	BOZIARIS IOANNIS	The bacterial pathogen <i>Listeria monocytogenes</i> is responsible for serious foodborne diseases that threaten public health globally. In fishery products, the possible presence of this microorganism originates either from human contamination or processing equipment or from the food itself, being able to adhere and produce biofilm on many food processing surfaces. <i>L. monocytogenes</i> provokes listeriosis, a serious foodborne disease that threatens the global public. In recent years, several outbreaks of listeriosis have been recorded in various foods, including seafood, mainly attributed to the non-rational Good Hygiene Practices (GHP) by the industry during processing (gutting, filleting, etc.). This has prompted the scientific community to determine the factors that potentially favor the survival of <i>L. monocytogenes</i> during fish processing since there are several indications that these bacteria exhibit the ability to respond to the presence of various environmental stresses. Thus, this master's Thesis aimed to study the fate of <i>L. monocytogenes</i> under acidic stresses during fish processing. Initially, the potential response of 6 strains (mixture) of <i>L. monocytogenes</i> previously stressed in TSB broth supplemented with citric acid to create an acidic environment (pH 3.7) in an acidic environment that mimics the conditions taking place in marinated fish fillets. The population of stressed cells was compared with that of non-stressed cells (controls) of the same strains. Results indicated that acid-adapted pathogen cells exhibited defense mechanisms to acid stress conditions in the TSB medium since their populations were significantly higher than those of the control. More specifically, after a slight decrease at the first 4 h, the populations reached a plateau at 7.3 log cfu/g at 24 h, and then with a slight decrease to 6.81 log cfu/ml at 48 h. Then, <i>L. monocytogenes</i> biofilm growth was monitored in AISI-304 metal plates, 3*1*0.1cm in TSB broth and at T=15oC, from a mixture of cells previously exposed to low pH (3.7). Acid-adapted cells could produce biofilm in TSB slightly faster than controls. Finally, to better simulate the conditions on an industrial scale, the first experiment was carried out inoculating acid-stressed (pH = 3.7 for 24 hours) and non-stressed <i>L. monocytogenes</i> cells (mixture of 6 strains) in a real fillet of marinated sea bream fillet with citric acid having a final pH of 4.1 packed under vacuum conditions. Our results showed that there is a significant difference between the in vitro study (liquid culture) and the real fish sample as there was not the same development of resistance as in the first experiment. The pathogen <i>L. monocytogenes</i> is likely influenced by its interaction and coexistence with other microorganisms that make up the natural microflora of fish. Overall, the present work shed light on <i>Listeria</i> survival in acidic environments in its planktonic form and during biofilm formation. At the same time, the findings trigger the need for further studies of (a) the food itself to determine the interactions between the other microorganisms and (b) at the molecular level to elucidate the expressed genes responsible for the development of these mechanisms and the expressed genes associated with the formation of the biofilm. Keywords: <i>Listeria monocytogenes</i> , biofilm, acid stress, acid tolerance response, foodborne pathogen.
27/3/2024	TSIAFITSAS GEORGIOS	Functional properties of milk proteins and their effect on quality characteristics in foods	GEORGIOPOULOS THEOFANIS	This research work aims to investigate the various functional characteristics of milk proteins and their critical role in shaping the quality characteristics of various food products. By delving into the underlying mechanisms governing the functionality of proteins and their complex interactions with other components in food, this study seeks to provide valuable information for optimizing food compositions and improving overall product quality. In addition, this research explores the complex interactions that milk proteins have within food systems, involving not only other proteins but also carbohydrates, lipids and bioactive compounds. This knowledge can help to adjust food compositions, improve stability and achieve desired organoleptic properties such as taste and texture.
17/7/2024	ELEFTHERIADHS IOANNIS	The role of leguminous and cereal components in the quality characteristics of plant-based meat substitute products	GEORGIOPOULOS THEOFANIS	The development of Plant-Based Meat Substitutes (PBMS) has been primarily driven by the need to transition to a more sustainable and healthier food system, with a low environmental footprint, capable of replacing conventional meat and its products in the human diet. The production of PBMS focuses on mimicking the sensory properties of animal-derived meat, such as appearance, texture, and taste, as well as ensuring a nutritional quality comparable to that of conventional meat. In recent years, a wide range of PBMS with improved sensory characteristics has been introduced in the market (burgers, chicken nuggets, meatballs, sausages, etc.), in an attempt by the food industry to increase their popularity and acceptance among consumers. Their composition incorporates a variety of plant-based ingredients, each contributing to a greater or lesser extent to the formation of the desired properties of the final product. This particular study aims to explore, through a systematic literature review, legume and cereal ingredients used in the development of plant-based meat substitutes, investigating their roles and their impact on the qualitative characteristics of these products. The study of research references has demonstrated that proteins, whose commercial forms include flours, concentrates and isolates, play a dominant role in texture formation. Critical factors for ensuring the desired texture and organoleptic characteristics associated with it (such as chewiness, juiciness sensation, and tenderness) are the functional properties of the utilized proteins, including water and oil/fat holding capacity, emulsification and gelation. For this reason, in the production of PBMS, a combination of legume and cereal proteins is used, through which an improvement in the nutritional quality of the products is also achieved. The most common sources of their origin are soy, wheat gluten and peas, while their structuring is carried out mainly by applying extrusion technology. The utilization of fats and carbohydrates in the development of PBMS is limited, as increased quantities of these components present difficulties in texture formation. However, fats (such as soybean oil, corn oil, etc.) act as plasticizers, enhancing flavor and imparting tenderness, while carbohydrates (typically starches and flours) serve as binding agents and thickeners, improving the interaction between proteins, lipids, and water, and consequently, the texture and consistency of the resulting products. Among the challenges facing PBMS production industries are the reduction/elimination of undesirable flavors and odors, anti-nutritional factors, allergens, as well as the simulation of the color of conventional meat. Despite continuous efforts towards this direction and the improvement of the overall quality of PBMS, consumer acceptance of these specific products remains low. The excessively large number of ingredients used in combination with the complexity of the applied processing methods results in the creation of reservations and expression of concerns regarding the nutritional value, safety of PBMS, and long-term health and environmental impacts. In conclusion, PBMS fall short in terms of sensory properties compared to their animal-derived counterparts, it is considered that they cannot serve as nutritional substitutes, and their future in the food market is deemed uncertain. Keywords: plant-based meat substitutes, legume and cereal proteins, protein structuring, sensory properties, nutritional quality