Journal of Nutritional Dietetics & Probiotics
ISSN: 2640-6624

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Review Article *Volume 6 Issue 1*

What is the Nutritional Value of the Meat and how we can Reduce its Microbial Hazards?

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Received Date: November 15, 2024; **Published Date:** December 26, 2024

Abstract

The Meat ingredients are a valuable part of the human diet as the meat contains essential elements such as meat protein, meat vitamins, and meat minerals. The meat ingredients products types are vulnerable to the microbial meat ingredients pathogens and the meat ingredients spoilage, posing significant risks to the public health and the social meat ingredients quality and safety. The Ionizing radiation method is used in the irradiated meat ingredients to maintain the meat ingredients safety and meat ingredients quality of the consumed meat ingredients products types specifically the beef meat ingredients.

During recent decades, the irradiation method of the meat ingredients products reduces the microbial meat contamination and extends the storage period of the meat ingredients. The procedure entails exposing the meat ingredients products types to a regulated amount of the ionizing radiation method, mostly accomplished by applying the gamma rays method, the electron beams method, or the X rays method.. The radiation causes disrupts the DNA and other cellular components of the microbes contaminating the meat ingredients, making the microbes unable to reproduce and causing death of the microbial contamination. The procedure causes breaks down some of the molecules of the meat ingredients which can affect the meat nutritional quality and meat ingredients sensory characters.

Keywords: Beef Meat Ingredients; DNA; Gamma Rays Method; Meat Ingredients Irradiation Method; Human Health Hazard

Introduction

Despite the irradiation potential benefits, the irradiated meat ingredients products type's which remains controversially, with concerns to irradiation meat ingredients safety and quality, efficacy, and irradiation effect on the meat ingredients nutritional quality and the meat ingredients sensory characters of meat ingredients products types. The irradiated meat ingredients products types could create the harmful compounds or destroy the essential nutrients. In contrast, others questioned the need for the irradiation method, considering other meat ingredients safety measures, such as the good manufacturing practices and the meat ingredients testing methods. The Consumer acceptance of the irradiated meat ingredients products types needs to be addressed, with some people expressing concerns about the meat ingredients safety and meat ingredients acceptability [1-6]. Our review article aims to important evaluate the irradiated

meat ingredients products types and its repercussions on the meat ingredients quality and the meat ingredients safety of the beef meat ingredients products types. To proof the meat ingredients irradiation method effectiveness at lowering the microbial meat ingredients contamination and improving the keeping quality of the beef meat ingredients is explored along with its potential effect on the physical and the chemical characteristics, the meat ingredients nutrient content, and the meat ingredients sensory characters. This review article address the regulatory framework for the irradiated meat ingredients types, including the consumed meat ingredients labeling requirements and the consumed meat ingredients government oversight, as well as identify the areas for more meat ingredients researches and meat ingredients policy development [7-12].

The Sources and Principles of the irradiated meat ingredients products types

The meat ingredients Ionizing radiation method such as gamma rays method, the X rays method, or the high energy electrons method, is used to irradiate the meat ingredients types. The irradiated meat ingredients products types is determined by the absorbed dose expressed in Gray (Gy) or kilo Gray (kGy), with one Gray being equal to one J/kg of product. The technique is considered a safe and effective way to decrease or eliminate the hazardous microbes, improving the keeping quality, as well as enhance the meat ingredients quality and safety of the meat ingredients types [13-18]. The principles of the irradiated meat ingredients products types are determined by the ability to disrupt the genetic material of microorganisms, preventing them from reproducing or causing illness. The irradiation method affects the microorganisms' genetic material (the DNA or the RNA) directly and indirectly. The Direct irradiation method can break the bonds between base pairs in the genetic material, killing the cell's reproduction ability. The damage to the water molecules creates free radicals and reactive oxygen, which damage genetic material indirectly. The Irradiation method helps to break down certain enzymes and meat ingredients proteins that can contribute to spoilage, thereby improving the of the meat ingredients [19-24]. The United State, Canada, as well as several European and Asian nations, allow the irradiated meat ingredients products types using the Cobalt 60 method, cesium 137 methods and the electron beam accelerators method. The Cobalt 60 method, the most prevalent source of the ionizing radiation method for the irradiated meat ingredients products types, is a radioactive isotope that emits the gamma rays capable of penetrating deep into the meat ingredients products types to destroy the harmful microorganisms. The Cesium 137 method is another source of the ionizing radiation method; it is less commonly used than cobalt 60. The electron beam accelerators are used for the irradiated meat ingredients products types. The devices generate high energy electrons method that can penetrate the meat ingredients products types to eliminate the harmful microorganisms and improve the beef meat ingredients keeping quality [25-30]. The Irradiating meat ingredients products types have several benefits to the meat ingredients including multifunctional applications as well as guaranteed meat ingredients safety and meat security. The spectrum produced is effective against the bacterial spores across a broad range of concentrations. The processing does not involve heat, it is safe for the meat ingredients products types, does not significantly reduce the meat ingredients nutrient value, so leaves no chemical residues, and is simple to control during use to effectively lengthen the lifespan of the irradiated meat products types. The Radurization method uses low doses of 0.1–1 kGy [31-36]. This dose inhibits respiration, delays the ripening, disinfects the meat ingredients pests, and inactivates the Trichinella parasite. The Radicidation method is referred to as a moderate dose. The meat ingredients radiation uses a quantity of approximately 1–10 kGy, which has the effect of reducing the microbial meat ingredients spoilage and the microbial meat ingredients pathogens including the Salmonella species bacteria and the Listeria monocytogenes bacteria which contaminate the meat ingredients. In regarding to this dosage is typically found in the frozen meat ingredients products types and its application is identical to that of the pasteurization method, except irradiation method does not rely on the thermal energy method [37-42]. The Radapertization method uses extremely high doses which are above or equal to 10 kGy, ranging between 30 and 50 kGy. The irradiation dose is typically used in the sterilization process because its effect can kill all the contaminating microorganisms in the meat ingredients products types up to the level of the spores of the microorganisms. The irradiated meat ingredients products type's origin and the principles are based on the ability of the ionizing radiation method to disrupt the genetic material of the microorganisms, the enzymes, and the proteins in the meat ingredients products types, culminating in improved meat ingredients safety and meat ingredients quality. The use of irradiation method is regulated by the national and the international authorities to ensure its safety and effectiveness in the meat ingredients preservation [43-48].

The action of Irradiation method on the irradiated beef meat ingredients products

The Microbial Safety of the irradiated beef meat ingredients products

The Microbial meat ingredients safety is important aspect of the beef meat ingredients production and consumption, as these meat ingredients products can be a source of the various harmful microorganisms that can cause the meat borne illness. The beef meat ingredients products are

potentially contaminated with microbial pathogens, such as Salmonella species bacteria, Escherichia coli bacteria, Campylobacter bacteria, and Listeria monocytogenes bacteria, leading to severe illness or death in vulnerable populations [49-54]. The meat ingredients contamination might occur at the production, processing, or distribution stage, including on the farm, during transportation, in slaughterhouses or processing facilities, and in meat ingredients retail outlets or at home. The Improper beef meat ingredients handling and the storage of the beef meat ingredients products can increase the risk of beef meat ingredients contamination [55-60]. The meat borne illness outbreaks related to the beef meat ingredients have been reported in the world with various types of the meat ingredients products being implicated, including the ground beef meat ingredients products, the chicken meat ingredients products, the pork meat ingredients products, and the processed beef meat ingredients products. The outbreaks have led to the significant public health hazards, the social meat ingredients quality and the economic consequences, the highlighting the importance of the effective interventions to reduce the risk of the meat ingredients contamination [61-66]. The Irradiation method has been studied extensively for its efficacy in reducing the microbial contamination of the beef meat ingredients. The exposing of the meat ingredients products types to the ionizing radiation method, the latter reduces or eliminates the harmful meat microorganisms that can cause meat borne illness and affect the social meat ingredients quality. The irradiation method could effectively reduce the levels of the meat ingredients microbial pathogens such as Salmonella species bacteria and Escherichia coli bacteria as well as levels of the meat ingredients spoilage bacteria leading to improved microbial meat ingredients safety and a reduced the risk of the meat borne illness and improve the social meat ingredients quality [67-72]. The effectiveness of the different types of the ionizing radiation method on the beef meat ingredients including the gamma rays method and the e beams method, has been used; the gamma ray irradiation method is more effective than the e beam meat irradiation method is at inhibiting the microbial growth in the beef meat ingredients. The UV light method effectively eliminates the Salmonella species bacteria, the Pseudomonas species bacteria, the Micrococcus species bacteria, and the Staphylococcus species bacteria on the beef meat ingredients. The keeping quality of the beef meat ingredients products types is improved by eliminating the microbial meat ingredients contaminant [73-78].

The Gamma irradiation method at low doses can improve the microbiological meat ingredients safety and quality, ensure meat ingredients safety and quality, and extend the chicken meat's ingredients products ingredients keeping quality without affecting the meat ingredients quality .The 3 kGy gamma irradiated beef meat ingredients reduced the growth of the mesophilic bacteria, coliforms bacteria, and the Staphylococcus aureus bacteria [79-84]. The Food and Drug Administration (FDA) determined that a 3.5 kGy gamma ray irradiation method dose effectively eliminates the pathogenic microbes from the fresh beef meat ingredients and improve the social meat ingredients quality. The meat ingredients Irradiation method slows the growth of the bacterial cells and deactivating the bacterial metabolism. The Bacteria are inherently resistant to the action of the irradiation method and, in the lag phase or inactive state, will be more resistant. In contrast, the bacteria in the growth phase will be more effective [85-90].

The Chemical characters of the irradiated beef meat ingredients products types

The chemical characters of the irradiated beef meat ingredients refer to the changes that occur to the chemical constituents and the compositions of the meat ingredients products types due to exposure to the ionizing radiation method and affect the social meat ingredients quality. The Irradiation method can cause both the desirable and the undesirable action on the chemical characteristics of the beef meat ingredients, depending on the dose and the specific compounds in the meat ingredients products types [91-96]. The most significant changes often observed in the irradiated beef meat products is the formation of the free radicals. They become reactive molecules that damage cellular components and cause oxidative stress. Thus lipid oxidation, which causes off flavors and odors, as well as a decline in the nutritional meat ingredients quality due to the loss of essential fatty acids and other nutrients [97-102]. The irradiation method at lower doses aids lipid oxidation by reducing the levels of peroxides and other reactive species. This procedure affects the meat ingredients protein content of the beef meat ingredients, leading to alterations in the composition of the amino acids, meat ingredients protein structure, and meat digestibility. The changes have potentially positive and negative action, mostly on the meat ingredients nutritional value and affect the social meat ingredients quality, that are contingent upon the particular meat ingredients proteins involved and the dose of radiation used [103-108]. The positive action of the irradiation method include the fact that the irradiation method can cause the formation of reactive species, such as the free radicals, which can cause the formation of the covalent bonds between the amino acids in the meat ingredients protein molecules. The cross linking can change the structure of a meat ingredients protein molecule and make it resistant to enzymatic meat ingredients digestion, which causes a decrease in the meat ingredients protein digestibility [109-114]. The Irradiation method can cause the denaturation of the meat ingredients protein molecules. The Denaturation involves opening the meat ingredients protein structure, which can facilitate

the interactions between the amino acids and increase the accessibility of the digestive enzymes to meat ingredients protein molecules, and it can improve the meat ingredients protein digestibility [115-120]. The irradiation method can cause adverse action; namely, the excessive irradiation method can cause a breakdown of or changes in the amino acid compounds in the meat ingredients protein molecules which cause a decrease in the overall amino acid content and consequently decrease the meat ingredients protein digestibility. The electron beam irradiation method at less than 3 kGy did not affect changes in the meat ingredients quality of the smoked duck flesh (the amino acids, the fatty acids, and the volatiles) during the storage [121-126]. The chemical changes, the irradiation method affects the vitamin content of the beef meat ingredients products types, with some vitamins being more sensitive than others. For example, the irradiation method leads to a loss of the vitamin C, while other vitamins, such as the vitamin A and E, are relatively stable. The Irradiation method alter the beef meat ingredients oxidation–reduction ability, accelerating the lipid oxidation, the meat ingredients protein breakdown, and the flavor and the odor changes [127-132]. When combined with certain antioxidants, such as the flavonoids, the irradiation method can help prolong the induction period of the lipid oxidation., storing the irradiated beef meat ingredients at 5–10 C for one week almost did not change the pH, the texture, the total volatile base nitrogen (TVBN), or the microbe number. A higher dose of the UV irradiation method increased two thiobarbituric acid (TBA) content, decreased the water holding capacity (WHC), and the decreased the beef meat ingredients color intensity and the tenderness. The 2.5 and 5 kGy gamma irradiation method reduced the nitrite content in the chicken sausages and prevented the oxidation when combined with the antioxidants. The titratable acidity and the acid value in the beef meat ingredients can be reduced by the irradiation method [133-138]. The beef meat ingredients contamination may occur at the production, the processing, or the distribution stage, including on the farm, during the transport, in the slaughterhouses or the processing facilities, and in the retail outlets or at the home [139-142].

Conclusion

The Improper handling and the storage of the beef meat ingredients products can increase the risk of the beef meat ingredients contamination. The meat borne diseases outbreaks related to the beef have been reported globally and its effect on the social meat ingredients quality, with the various types of the meat ingredients products types being implicated, including the ground beef meat ingredients products types, the chicken meat ingredients products types, the pork meat ingredients products types, and the processed beef meat ingredients products types.

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