# Article information:

X-ray irradiation inactivation of Escherichia coli O157:H7, Salmonella enterica Serovar Typhimurium, and Listeria monocytogenes on sliced cheese and its bactericidal mechanisms - ClinicalKey
<https://www-clinicalkey-com.eproxy.lib.hku.hk/>

# Article summary:

1. X-ray irradiation was found to be effective in inactivating three major foodborne pathogens (Escherichia coli O157:H7, Salmonella Typhimurium, and Listeria monocytogenes) on packaged sliced cheese.

2. The color and texture of the cheese were not significantly altered after treatment with X-ray irradiation at the maximum dose of 0.8 kGy.

3. The bactericidal mechanisms of X-ray irradiation were related to depolarization of cell membranes, generation of reactive oxygen species, and intracellular enzyme inactivation.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article titled "X-ray irradiation inactivation of Escherichia coli O157:H7, Salmonella enterica Serovar Typhimurium, and Listeria monocytogenes on sliced cheese and its bactericidal mechanisms" discusses the efficacy of X-ray irradiation for the inactivation of foodborne pathogens on sliced cheese. The study aims to investigate the underlying mechanisms of the lethal effect and determine the effect of X-ray irradiation on product quality.

The article provides a comprehensive overview of the issue at hand, highlighting the importance of controlling foodborne pathogens in dairy products. The authors cite several outbreaks associated with cheese products caused by E. coli O157:H7, Salmonella Typhimurium, and Listeria monocytogenes. They also discuss various non-thermal techniques that have been evaluated to control pathogens on cheeses.

The authors then introduce ionizing radiation as an efficient non-thermal pathogen control treatment. They discuss X-rays obtained by bombarding a metal target as an attractive alternative to gamma-ray or E-beam irradiation due to their higher penetration power and absence of harmful radioactive sources. The authors cite several studies that reported X-ray treatment as effective in inactivating pathogens without affecting the quality of treated foods.

The study conducted by the authors involved inoculating sliced cheddar cheese with a mixed culture containing E. coli O157:H7, Salmonella Typhimurium, and Listeria monocytogenes. The inoculated samples were re-packaged and treated with 0, 0.2, 0.4, 0.6, and 0.8 kGy of X-ray radiation. The results showed approximately 5 log reductions in the viability of the three pathogens on samples achieved at an irradiation dose of 0.6 kGy.

Furthermore, the color values (L\*, a\*, and b\*) and texture parameters of sliced cheeses were not altered significantly after treatment at the maximum dose of 0.8 kGy. Various fluorescence staining methods were utilized to analyze bactericidal mechanisms such as depolarization of cell membranes, generation of reactive oxygen species, and intracellular enzyme inactivation.

Overall, this article presents a well-researched study that provides valuable insights into using X-ray irradiation for controlling foodborne pathogens on sliced cheese while maintaining product quality.

However, there are some potential biases that need to be considered while interpreting this study's findings. Firstly, it is important to note that this study was funded by Hankyong National University's research fund program for new faculty members' support in South Korea.

Secondly, while this study highlights several outbreaks associated with cheese products caused by E.coli O157:H7, Salmonella Typhimurium, and Listeria monocytogenes; it fails to mention other potential risks associated with ionizing radiation such as genetic mutations or changes in nutritional value.

Thirdly, while this study provides evidence supporting X-ray irradiation's effectiveness in controlling foodborne pathogens on sliced cheese; it does not explore any counterarguments against using ionizing radiation for food processing or packaging.

In conclusion, this article presents a well-conducted study that provides valuable insights into using X-ray irradiation for controlling foodborne pathogens on sliced cheese while maintaining product quality; however one should consider potential biases when interpreting its findings fully.

# Topics for further research:

* Risks associated with ionizing radiation in food processing
* Genetic mutations caused by X-ray irradiation
* Changes in nutritional value of food due to ionizing radiation
* Alternatives to X-ray irradiation for controlling foodborne pathogens
* Safety regulations for ionizing radiation in food processing
* Consumer perception of X-ray irradiation in food products

# Report location:

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