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Reduce Aflatoxins Levels and Microbial Contamination in Corn Grits through Gaseous Ozonation

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Introduction

Corn, a staple in diets worldwide, serves as a fundamental ingredient in various food products, including corn grits. However, the presence of contaminants, particularly aflatoxins and microbial pathogens, poses significant health risks. Aflatoxins, produced by certain molds, are potent carcinogens, while microbial contamination can lead to foodborne illnesses. This article explores the potential of gaseous ozonation as a method to effectively reduce aflatoxin levels and microbial contamination in corn grits.

Description

Aflatoxins are naturally occurring mycotoxins produced primarily by the molds Aspergillus flavus and Aspergillus parasiticus. These potent carcinogens can contaminate a wide range of crops, including corn, under conditions of high humidity and improper storage. Ingestion of aflatoxin-contaminated food can lead to serious health issues, including liver cancer and immunosuppression. Microbial contamination, on the other hand, encompasses a broad range of microorganisms, including bacteria, molds, yeasts, and viruses. Pathogenic strains within these groups can cause foodborne illnesses, resulting in symptoms such as nausea, vomiting, diarrhea, and abdominal pain. Corn grits, if not properly processed and stored, can serve as a breeding ground for harmful microbes [1].

Corn grits, derived from ground, dried corn, are a versatile ingredient used in various culinary applications. They are a valuable source of essential nutrients, including carbohydrates, fiber, and certain vitamins and minerals. Given their widespread use, ensuring the safety and quality of corn grits is paramount for public health. Gaseous ozonation, a process that utilizes ozone gas (O3) as an oxidizing agent, has gained recognition as an effective method for reducing contaminants in food products. Ozone possesses potent antimicrobial properties and can also break down mycotoxins like aflatoxins through oxidative processes. When applied appropriately, gaseous ozonation can serve as a non-thermal, chemical-free method to enhance the safety of food products [2].

Before subjecting corn grits to gaseous ozonation, thorough cleaning and removal of visible contaminants are essential. This initial step helps maximize the effectiveness of the ozone treatment. Ozone gas is generated using specialized equipment and introduced into a controlled environment containing the corn grits. The concentration and duration of ozone exposure are carefully regulated to ensure effective reduction of aflatoxins and microbial contamination. Ozone molecules react with the double bonds present in aflatoxins, initiating a degradation process that breaks down these harmful compounds into non-toxic byproducts. This oxidative reaction renders aflatoxins harmless. Ozone's powerful oxidative properties target the cellular structures of microorganisms, disrupting their metabolic processes and leading to microbial inactivation. This includes the inactivation of pathogenic bacteria, molds, and yeasts [3].

Following the ozonation process, any residual ozone is safely removed from the treated corn grits to prevent potential off-flavors or odors. Gaseous ozonation has demonstrated remarkable efficacy in reducing both aflatoxin levels and microbial contamination in corn grits, enhancing their safety for consumption. Unlike some traditional methods that involve heat, gaseous ozonation is a non-thermal process, preserving the nutritional quality and sensory attributes of the corn grits. Gaseous ozonation relies on the natural oxidative properties of ozone, eliminating the need for chemical additives or preservatives. Ozone readily breaks down into oxygen, leaving no harmful residues or byproducts. This makes it an environmentally sustainable method for food processing [4].

The effectiveness of gaseous ozonation depends on factors such as ozone concentration, exposure time, and environmental conditions. These parameters must be carefully optimized for each specific application. Compliance with regulatory standards and guidelines for ozone use in food processing is crucial to ensure food safety and consumer confidence. Implementing gaseous ozonation may require modification or integration into existing processing lines, necessitating careful planning and investment [5].

Conclusion

Gaseous ozonation stands as a promising method to effectively reduce aflatoxin levels and microbial contamination in corn grits. By harnessing the natural oxidative properties of ozone, this non-thermal, chemical-free approach offers a viable solution to enhance the safety and quality of this widely consumed food product. As research in this field advances, the integration of gaseous ozonation into food processing practices holds immense potential in safeguarding public health and ensuring the availability of safe, high-quality food products for global consumers.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Nuss, Emily T. and Sherry A. Tanumihardjo. "Quality protein maize for Africa: Closing the protein inadequacy gap in vulnerable populations." *Adv in Nutri* 2 (2011): 217-224.

2. Almeida-Ferreira, Giovanna Caputo, Ione Parra Barbosa-Tessmann and Rose

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Sega, et al. "Occurrence of zearalenone in wheat-and corn-based products commercialized in the State of Paraná, Brazil." *Brazil J Microbiol* 44 (2013): 371-375.

3. Jackson, Lauren S., Joseph Jablonski, Lloyd B. Bullerman and Andreia Bianchini, et al. "Reduction of fumonisin B1 in corn grits by twin-screw extrusion." *J Food Sci* 76 (2011): T150-T155.
4. Chulze, Sofia Noemi. "Strategies to reduce mycotoxin levels in maize during storage: a review." *Food Additi Contam* 27 (2010): 651-657.
5. Jr, AD Prudente and J. M. King. "Efficacy and safety evaluation of ozonation to degrade aflatoxin in corn." *J Food Sci* 67 (2002): 2866-2872.

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