Harnessing Algal Nutrients while Curtailing Toxin Risks: A Path Toward Sustainable and Safe Algal Food Products

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ABSTRACT:
The burgeoning human population coupled with the exigencies of climate change necessitates innovative, sustainable, and safe food solutions. Algae, with its robust nutritional profile and low-resource cultivation requirements, emerges as a promising candidate to augment future food security. However, the occurrence of algal toxins poses a significant safety concern that needs addressing to realize algae's full potential as a viable food source. This presentation delves into the dual challenge of maximizing the nutritional bounty of algae while mitigating the risks posed by algal toxins. We will explore various algal species, the spectrum of toxins they may harbor, and the implications for food safety. A critical review of current methodologies for toxin detection and quantification will be presented, alongside a discourse on existing regulatory frameworks governing algal food products. Furthermore, we will discuss viable mitigation strategies, including selective cultivation, genetic modifications, and novel toxin removal processes, to ensure the safety of algal food products. The presentation aims to foster a comprehensive understanding of the challenges and opportunities in integrating algae into our food systems, thereby contributing to the broader discourse on the safety of future food. Through a synergistic approach encompassing rigorous safety assessments, technological innovations, and consumer education, we can navigate the path toward harnessing algae's nutritional benefits while ensuring food safety, thus making a stride toward a sustainable food future.