

Title (1)	:	Alternative Processes for the Production of Bioactive Peptides
Journal	:	Materials Innovations and Solutions in Science and Technology (pp.83-93)
Document Type	:	Book Chapter
Publisher	:	Springer
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Link to Full Text	:	https://link.springer.com/chapter/10.1007/978-3-031-26636-2_8
Link to Scopus Preview	:	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85151306694&doi=10.1007%2f978-3-031-26636-2_8&partnerID=40&md5=48fd67240cb384892abbf85e58ffb360
Abstract	:	<p>Bioactive peptides are molecules of paramount importance with significant health benefits. These bioactive peptides extracted from various food sources demonstrated significant bioactivity and potency, including antimicrobials, angiotensin-converting enzyme (ACE) inhibitors, antioxidants, opioids, and antimicrobials. However, various challenges hindered the industrial-scale production of peptides, such as the sensory performance of peptides due to bitterness, low peptides bioavailability and yield, minimal human tests, unconfirmed molecular mechanisms, and the sustainability of the resources for mass production. The emerging alternative processes such as high hydrostatic pressure, microwave, ultrasound, sub- and supercritical fluids are selectively beneficial, albeit time-consuming and expensive. The diversity of the properties of bioactive peptides complicates the design of the appropriate purification steps, particularly for novel peptides. The integrative process by coupling the production and purification of bioactive peptides to a single integrative system can be a way forward for bioactive peptides production with high purity, potency, and cost-effectiveness. Thus, the review provides a comprehensive insight into the current status, trends, and challenges of bioactive peptide production through conventional and emerging processes. Meanwhile, the potential technological leap through integrative processes is also featured as the sustainability of the process must be assured.</p>