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Opinion

The Increasing Role of Peptides and Encapsulated Proteins in Evolutionary Process

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Introduction

The global dietary situation has changed, with some nations leaving the reality of malnutrition and now dealing with a pandemic of extra body weight. Researchers have been searching for solutions to change this circumstance. Promising compounds with an anti-obesity effect include peptides and proteins. Oral administration and transit through the gastrointestinal system, however, are hampered by a number of physiological obstacles that limit their ability to perform biologically. One way to potentially increase anti-obesity activity is through encapsulation, which seeks to preserve the active ingredient and alter the action. Researchers have found that encapsulated peptides and proteins have better transport, bioactivity, and regulated release. To better understand how proteins and peptides influence satiety and weight reduction, how they may affect the dietary state of obesity, and how encapsulation may improve the bioactive effects of these molecules, more research is required.

Description

This comprehensive study sought to explore how the protein molecules' encapsulation affects the nutritional state of fat. It was possible to deduce from the studies chosen based on pre-established criteria that protein and peptide encapsulation can help reduce weight gain more effectively, change how adipose tissue functions, and reduce hormone levels that affect appetite and body weight in obese animals. Proteins and peptides are compounds with possible applications in a wide range of fields. A number of uses, including use in cancer treatments, anti-aging and diagnostics, as well as the therapy of other illnesses like obesity and diabetes mellitus, have resulted from the rise of this use in tandem with technical advancements. Polymer conjugates, hydrogels, microneedles, liposome systems, and many other materials are used to safeguard the substances or molecules meant for obesity therapy.

Different kinds of matrices used as transport systems for peptides and proteins encourage a number of alterations in these molecules. The system retention ability and resilience to physical and chemical conditions that the proteins are prone to, like changes in conformation, which may result in a loss of biological activity, are affected by the active's electrostatic contacts with the biopolymers. The proteins' restricted uptake in the digestive system is another drawback of using these molecules. However, protein capsule methods get around this restriction by making the cell membrane more permeable.

These molecules have been used in a broad range of research in the press. However, the vast majority of them do not explain how encapsulation can affect these peptides and proteins to regulate food intake, prevent weight increase, and keep track of the hormones linked to obesity. In this overview, we discuss how encapsulation might be used as a tactic to enhance the activity of the compounds under consideration. The natural characteristics of molecules and active substances against the environment during processing, storage, handling, transportation, and better product approval can now be changed through encapsulation through micro and nano-systems, which is a novel and hopeful method. Greater absorption, stability, bioavailability, and alterations in sense properties are all provided by this (odor and taste).

Promoting a controlled release system for peptides and proteins has a number of benefits, including the ability to reach sufficient blood levels of the active ingredient and enhance

therapeutic results. It has been difficult to maintain the stability of molecules and bioactive substances because they are prone to functional changes brought on by exposure to oxygen, light, heat, pH fluctuation, and water. The storage life and bioavailability of some of these molecules' applications are constrained by these variables. Additionally, because they are ideally meant for oral administration, these molecules and bioactive components undergo intestinal metabolism, which alters their chemical structure and affects how they work biologically.

Conclusion

As a result, it is beneficial to ensure stability in the gastrointestinal system and permit a regulated release in the target tissue, as was already stated. The encapsulation of these molecules can be a viable tactic for the expansion of novel therapies to minimize the limitations of the use of proteinaceous substances *in vivo* and, thus, achieve the ideal treatment to delay weight gain, even in the encounter of the challenges associated to the use of peptides and proteins as stating candidates for the treatment of obesity.