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Unlocking the Potential of Flaxseed Oil: Innovative Coating Technologies and Blending Techniques for Enhanced Stability and Health Benefits

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INTRODUCTION & AIM

Plant-derived oils and fats are estimated to constitute at least 79% of annual global oil production. Flaxseed oil, which is rich in omega-3 fatty acids, has been linked to the prevention and reduction of several serious health conditions, including cancer, diabetes, atherosclerosis, hypertension, eczema, gastrointestinal disorders, and cardiovascular diseases. Despite its numerous health benefits, flaxseed oil is susceptible to oxidation. The process of extracting flaxseed oil from flaxseeds yields an equivalent to 32–45% of the seed mass, with the oil containing 55–57% alpha-linolenic acid (ALA) and 15–18% linolenic acid (n-6). Mixing flaxseed oil with other oils, such as olive and sesame, can create a balanced fatty acid profile while preserving oxidative stability. However, during storage, the peroxide and anisidine values of these oil blends tend to increase.

METHOD

Microencapsulation techniques have been developed to enhance the stability and use of flaxseed oil in food products.

RESULTS & DISCUSSION

Flaxseed, packed with alpha-linolenic acid, lignans, and fiber, provides multiple health benefits. A regular intake of flaxseed may enhance lipid metabolism, reduce hypertension, regulate blood sugar, and mitigate insulin resistance. Scientific studies focus on protective processing methods like coating milled flaxseed with Arabic gum, ascorbic acid, and hydrogenated fats to minimize its oxidation. Microencapsulation shields oxidation-sensitive compounds in foods, improving their stability. The key methods used in microencapsulation include physical (spray/freeze drying), chemical (interfacial polymerization/cross-linking), and physico-chemical (ionic gelation/coacervation) techniques. Incorporating flaxseed oil into zein films boosts their tensile strength and moisture resistance, while maltodextrin with sodium caseinate demonstrated the optimal encapsulation performance. These strategies enable the effective integration of flaxseed into foods while preserving their nutritional potency and absorption.

CONCLUSION

As a result, the food industry can develop functional products that harness the health-promoting properties of flaxseed oil while ensuring product stability and quality

FUTURE WORK / REFERENCES

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