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Supplementary Materials

Red Seaweed Carrageenan: A Comprehensive Review of Preparation in Cosmetics - An In Depth Analysis

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Table S1. The analysis of red seaweed carrageenan, often derived from species like *Kappaphycus alvarezii* or *Eucheuma denticulatum*, focuses on several key aspects

Analysis	**Parameters**	**Remark**
Chemical Composition	Carrageenan Content	Quantification of carrageenan, a sulfated polysaccharide, using methods such as gravimetric analysis or chemical assays.
	Minerals and Nutrients	Analysis of essential minerals (e.g., calcium, potassium) and nutrients through techniques like ICP-OES or AAS.
	Polyphenols and Antioxidants	Assessment of antioxidant properties using assays like DPPH or FRAP.
Functional Properties	Gel Strength	Determined using a gel strength test, which measures the firmness of the gel formed by carrageenan.
	Viscosity	Measured using a viscometer to assess the thickening or gelling properties in different concentrations.
	Solubility	Evaluation of solubility in various solvents, typically water, to determine the solubility profile at different temperatures.
Structural Analysis	FTIR Spectroscopy	Used to identify functional groups and confirm the presence of specific carrageenan types (e.g., kappa, iota, lambda).
	NMR Spectroscopy	Provides detailed structural information on the carrageenan polysaccharide.
Microscopic Analysis	FE-SEM	Scanning electron microscopy can be used to observe the surface morphology of carrageenan and its interaction with other substances.
Rheological Properties	Rheology	Measurement of the flow and deformation behavior of carrageenan gels, providing insight into its performance in various applications.
Purity and Quality Control	Testing for Contaminants	Checking for heavy metals, microbial contaminants, and other impurities.
	Gelation Temperature	Determination of the temperature at which carrageenan forms a gel, relevant for its use in food and pharmaceutical applications.
Applications	Food Industry	Used as a gelling, thickening, and stabilizing agent.
	Pharmaceuticals	Employed in drug delivery systems due to its gel-forming properties.
	Cosmetics	Utilized for its stabilizing and thickening characteristics in various formulations.

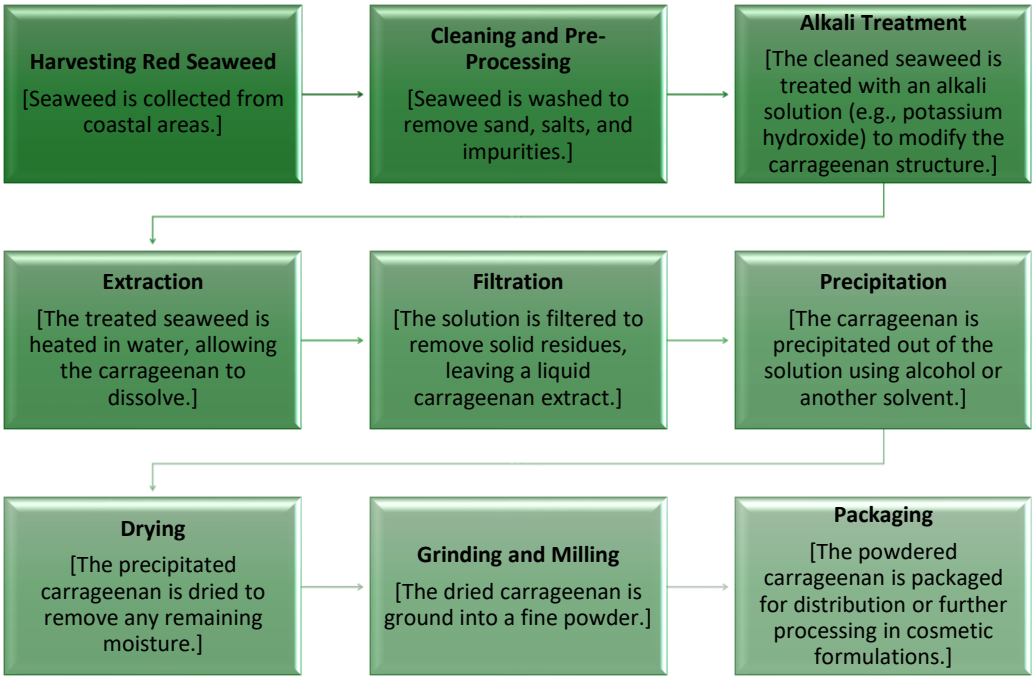

Figure S1. flow chart showing the harvesting and processing of red seaweed (Rhodophyta) for carrageenan extraction. This visually illustrates the early stages of carrageenan production

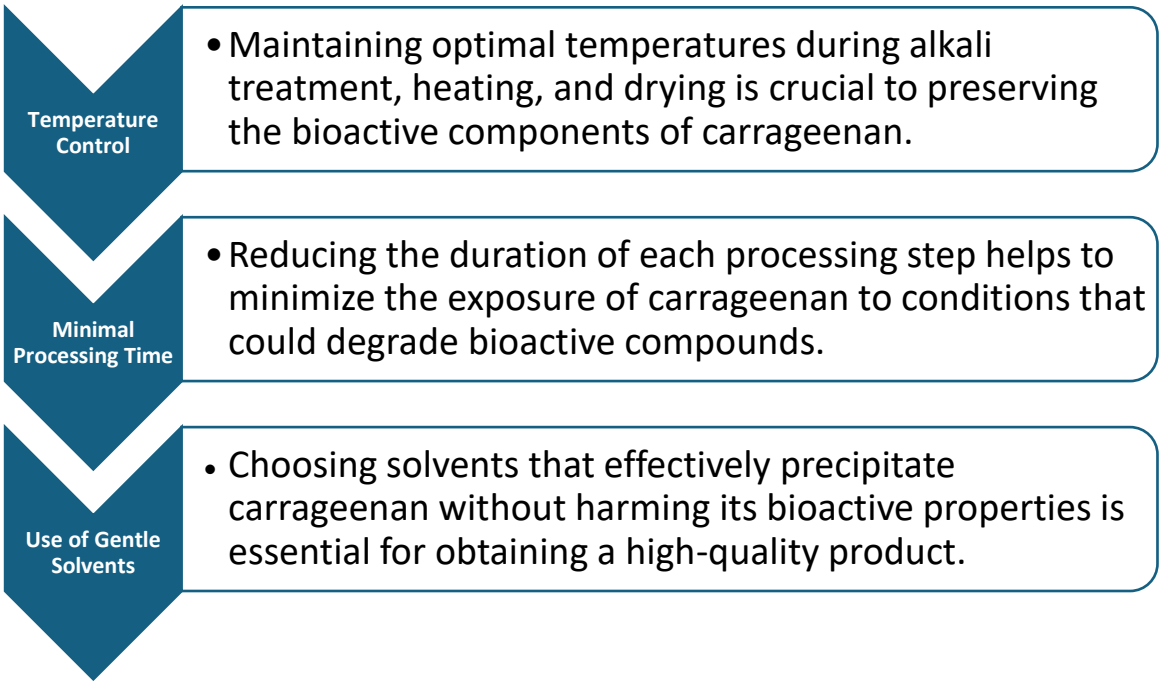

Figure S2. Key considerations for preservation of bioactive compounds