

Product Data Sheet

Product Name: κ-Carrageenan

Cat. No.: GC20004

Chemical Properties

Cas. No. 11114-20-8

Formula

M.Wt

Solubility Water : 8.33 mg/mL (ultrasonic and warming and heat to 80°C); DMSO : 8.33 mg/mL (ultrasonic and warming and heat to 80°C)

Storage Store at -20°C

General tips For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.

Structure



Protocol

Cell experiment [1]:

Cell lines Caco-2 cells

Caution: Product has not been fully validated for medical applications. For research use only.

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Caco-2 cells at passages 30-60 were cultured in Dulbecco's modified Eagle's medium/Nutrient Mix F12 supplemented with 10% fetal bovine serum, 100U/ml penicillin, and 100µg/ml streptomycin at 37°C with 5% CO₂ and 95% saturated Preparation Method atmospheric humidity. Cells were seeded into 24-well microplates at a density of 3×10^5 cells/well for 24h. Various concentrations of κ-Carrageenan (0, 1, 2, 5, and 10µM) were added to each well. At the end of the incubation period (24h at 37°C), cell viability was analyzed.

Reaction Conditions 0, 1, 2, 5, and 10µM; 24h

Applications κ-Carrageenan treatment significantly reduced the cell viability of Caco-2 cells in a dose-dependent manner.

Animal experiment [2]:

Animal models C57BL/6J mice

C57BL/6J mice, 7 weeks old, were maintained under a 12-h light and 12-h dark cycle at a temperature of 25°C and humidity of 50%±10%, free with water and diet. After one week of adaptation, all mice were randomly divided into 3 groups Preparation Method (n=8), including a normal control group (ND):10% low-fat control feed; high-fat control group (HFD):60% high-fat model feed; κ-Carrageenan group: 60% high-fat model feed added 0.2% (w/w) κ-Carrageenan. The intervention time was 8 weeks. The weight and food intake of mice were recorded every week.

Dosage form 0.2% (w/w) in 60% high-fat feed; every day for 8 weeks; p.o.

Applications κ-Carrageenan significantly reduced the weight gain caused by high-fat diet without affecting the food intake of mice.

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References:

- [1] Jiang H Y, Wang F, Chen H A I M I N, et al. κ -carrageenan induces the disruption of intestinal epithelial Caco-2 monolayers by promoting the interaction between intestinal epithelial cells and immune cells[J]. Molecular Medicine Reports, 2013, 8(6): 1635-1642.
- [2] Wang Q, Zhang L, He Y, et al. Effect of κ -carrageenan on glucolipid metabolism and gut microbiota in high-fat diet-fed mice[J]. Journal of Functional Foods, 2021, 86: 104707.

Background

κ -Carrageenan is the sulfated form of D-galactan obtained from the red algae, which is commonly used to prepare edible films^[1]. In aqueous solution at elevated temperatures, κ -Carrageenan dissolves as random coils, whereas at lower temperatures, κ -Carrageenan forms a 3D polymeric network through sulphate groups and the 3,6-anhydro- β -D-galactopyranosyl ring^[2]. κ -Carrageenan has been widely used as an emulsifier and stabilizer in beverage preservation, and to prevent fat droplets from coagulating during storage^[3]. κ -Carrageenan has been widely used as a carrier to facilitate the targeted delivery of curcumin to cancer cells^[4].

In vitro, κ -Carrageenan treatment (10 μ g/ml) for 24h significantly inhibited the viability of differentiated Caco-2 cells, and induced apoptosis and necrosis of the cells^[5].

In vivo, κ -Carrageenan treatment via oral administration at a dose of 8.3mg/kg for 24h exacerbated the intestinal inflammation induced by oxazolone in BALB/c mice, resulting in a significant decrease in body weight and a lower survival rate of the mice^[6]. A single intraperitoneal injection of a 20mg/kg dose of κ -Carrageenan for 2 days significantly induced thrombosis in the tail of mice^[7]. Feeding a high-fat diet containing 0.2% (w/w) κ -Carrageenan for 8 weeks significantly reduced high-fat diet-induced body weight gain, lowered blood lipids and systemic inflammation, and improved intestinal barrier dysfunction in mice^[8].

References:

- [1] Paula G A, Benevides N M B, Cunha A P, et al. Development and characterization of edible films from mixtures of κ -carrageenan, ι -carrageenan, and alginate[J]. Food hydrocolloids, 2015, 47: 140-145.

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- [2] Russo Spena S, Grizzuti N. κ -Carrageenan and Its Synergistic Blends: Next-Generation Food Gels[J]. Gels, 2025, 11(12): 976.
- [3] Xu H, Gao Z, Huang M, et al. Static stability of partially crystalline emulsions stabilized by milk proteins: Effects of κ -carrageenan, λ -carrageenan, ι -carrageenan, and their blends[J]. Food Hydrocolloids, 2024, 147: 109387.
- [4] Nabipour H, Aliakbari F, Volkening K, et al. Novel metal-organic framework coated with chitosan- κ -carrageenan as a platform for curcumin delivery to cancer cells[J]. International Journal of Biological Macromolecules, 2025, 301: 140027.
- [5] Jiang H Y, Wang F, Chen H A I M I N, et al. κ -carrageenan induces the disruption of intestinal epithelial Caco-2 monolayers by promoting the interaction between intestinal epithelial cells and immune cells[J]. Molecular Medicine Reports, 2013, 8(6): 1635-1642.
- [6] Wu W, Wang F, Gao X, et al. Synergistic effect of κ -carrageenan on oxazolone-induced inflammation in BALB/c mice[J]. BMC gastroenterology, 2016, 16(1): 41.
- [7] Zhou H, Zhu J, Wan H, et al. The combination of danhong injection plus tissue plasminogen activator ameliorates mouse tail thrombosis-induced by κ -carrageenan[J]. Phytomedicine, 2022, 104: 154320.
- [8] Wang Q, Zhang L, He Y, et al. Effect of κ -carrageenan on glucolipid metabolism and gut microbiota in high-fat diet-fed mice[J]. Journal of Functional Foods, 2021, 86: 104707.

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