	Experiment title: EFFECT OF HELIX AGGREGATION ON THE STRUCTURE OF CARRAGEENAN GEL	**Experiment number:** SC-295
ESRF		
D2AM	**Date of experiment:** from: May 8th to:May 10h	**Date of report:** Feb. 26 1998
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Report:

We have studied the conformation and the aggregation of kappa-carrageenan as a function of salt concentration, NaI/KI ratio and polymer concentrations.

In presence of NaI the peak previously observed by SAXS (Borgstron et al., Macromolecules 29, 5926 (1996) is well estabished. The intensity of this peak decreases as the salt concentration increased (Figure 1) and it is not possible to obtain the persistence length or the radius of the rod from a Kratky plot.

In presence of KI the gel is stronger and the polyelectrolyte peak is not observed. With these conditions it is possible (Figure 2) to determine the radius of the rod, R = 8 ± 0.5 Å and M/L = 105 g/A. These va!ues are very close to the values expected for the carraggenan double helix (R = 7 A and M/L = 100 g/A) from x-ray fibers diffraction patterns on dried agarose films. To obtain a good fit of the Kratky plot we need to assume the existence of pure double helices with a small proportion (7.5%) of aggregates. The size of the aggregates is close that of the size of a large rod made with three double helices. This small proportion is probably due to aggregates and is depends on the ageing (time, temperaure) of the sample
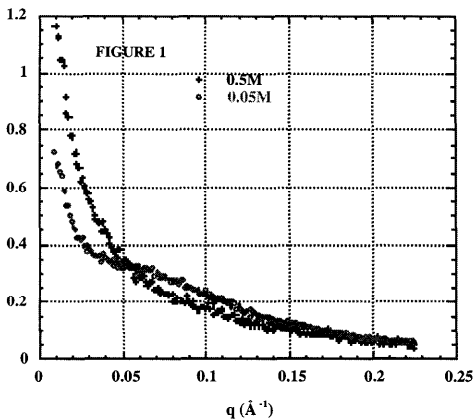
Figure 1: Intensity versus q for 3% kappa carrageenan gels in presence of sodium iodide at 20°C.
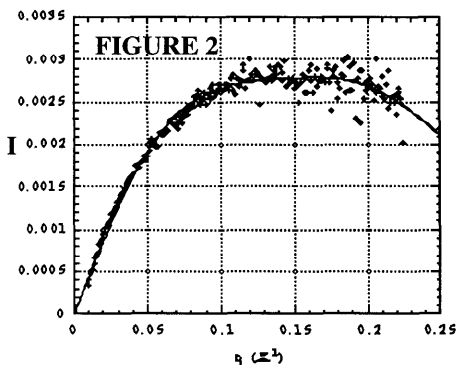
Figure 2: Kratky plot for a 3% kappa carrageenan gel with 0.1 M KI at 20°C . The cell is filled with the sample at 90°C and the cell is allowed to cool freely to room temperature before the experiment.

These results support strongly the double helix concept proposed by Rees 30 years ago.
Nevertheless this assumption is correct only for the salt conditions investigated.
In NaI/KI salt mixture aggregation increases from NaI 0.05 M/ KI 0.05 M solutions to KI O.lM. These results are in agreement with those obtained qualitatively by Borgstrom et al.(Int. J. Biol. Macromol. 18, 223 (1996) using Transmission Electron Microscopy.