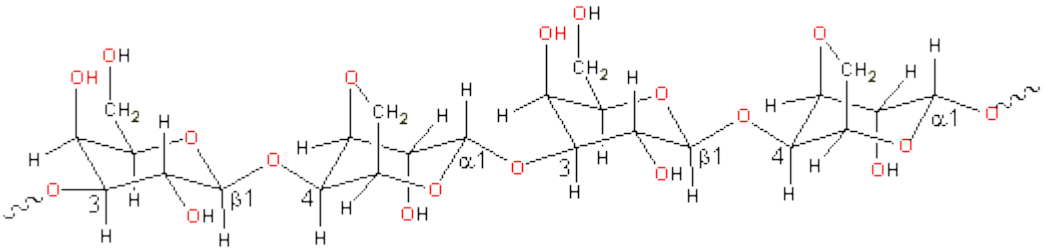
Agar

Source

Agar (E406) is prepared from the same family of red seaweeds (*Rhodophycae*) as the carrageenans. It is commercially obtained from species of *Gelidium* and *Gracilariae*

Structural unit



Agar consists of a mixture of agarose and agaropectin. Agarose is a linear polymer, of molecular weight about 120,000, based on the -(1⟶3)-β-D-galactopyranose-(1⟶4)-3,6-anhydro-α-L-galactopyranose unit; the major differences fromcarrageenans being the presence of L-3,6-anhydro-α-galactopyranose rather than D-3,6-anhydro-α-galactopyranose units and the lack of sulfate groups. Agaropectin is a heterogeneous mixture of smaller molecules that occur in lesser amounts. Their structures are similar but slightly branched and sulfated, and they may have methyl and pyruvic acid ketal substituents. They gel poorly and may be simply removed from the excellent gelling agarose molecules by using their charge. The quality of agar is improved by alkaline treatment that converts of any L-galactose-6-sulfate to 3,6-anhydro-L-galactose. [Back to Top]

Molecular structure

Agarose molecules have molecular weights about 120,000, The gel network of agarose contains double helices formed from left-handed threefold helices. These double helices are stabilized by the presence of water molecules bound inside the double helical cavity [508]. Exterior hydroxyl groups allow aggregation of up to 10,000 of these helices to form suprafibers. [Back to Top]

Functionality

Agar is insoluble in cold water but dissolves to give random coils in boiling water. Gelation is reported to follow a phase separation process [501a] (although these findings are disputed [501b]) and association on cooling (~35 °C), forming gels with up to 99.5% water and remaining solid up to about 85 °C. Agar has a major use in microbiological media as it is not easy for microorganisms to metabolize and forms clear, stable and firm gels, but in the food area it is used in icings, glazes, processed cheese, jelly sweets and marshmallows. It may be used in tropical countries and by vegetarians as a substitute for gelatin.

Interactive structures are available (Jmol).

Source : http://www1.lsbu.ac.uk/water/hyagar.html