cuisineinnovation

Science et technologie au service de la création culinaire

2 rue Claude Bernard
F – 21000 Dijon

+33 (0)9 52 13 78 69
+33 (0)9 57 13 78 69

contact@cuisine-innovation.fr
www.cuisine-innovation.fr

Agar-agar (E406)

Culinary data

Agar -agar is a gelling agent.
It enables:

- to gel preparations (foamy or not) serve at cold or hot temperatures (T°C < 90°C),
- to gel preparations that gelatin can't gel.

Technological data

Dissolution

The preparation of an agar-agar gel starts with the dissolution of the agar-agar powder in water. This is obtained only if water is heated to the boil for 1 to 2 minutes. To achieve a better dissolution, it is also recommended to allow the agar-agar to soak into water before boiling the whole.
The amount usually used is ranging from 0.3 to 2g of agar-agar for 100g of final preparation.

Gel setting

The gel set when the preparation is cooled down to temperatures close to 35°C. The slower the temperature decreases, the firmer the gel obtained is. It's advised to let the preparation gel at room temperature The formed gels withstand to temperatures up to 90°C and melt below.
The gels set again as the temperature is decreased to temperatures close to 35°C.

Effect of the acidity

The solution's *p*H control is very important. It should be preferably neutral. The polymeric chains constituting the agar-agar are degraded at acidic *p*H and elevated temperature. This is the reason why it is advised to add the acidic ingredients after heating.

Sensory properties

Gels made of agar-agar are opaque, brittle and have a neutral taste.

Preservation

The gels made of agar-agar loose water notably through evaporation at their surface.

Freezing

Gels made of agar-agar are sensitive to freezing, causing them to become destructured.

Storage

Store in a closed hermetic packaging, in a cool and dry place.

Toxicological data

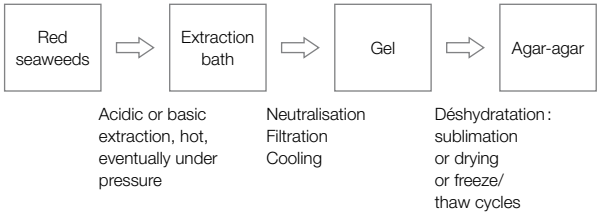
- No acceptable daily intake level.
- The used quantity shouldn't exceed the concentrations used to obtain the desired effect

Scientific data

Agar-agar is a natural product extracted from red seaweed displaying gelling properties.

Origin

Agar-agar can be extracted from various red seaweed sorts. They are commonly from the genus *Gelidium* (particularly Gelidium amansii), Pterocladia (particularly *Pterocladia tenuis*) and since the middle of the XXth century *Gracilaria* (particularly *Graciliaria verucosa*).

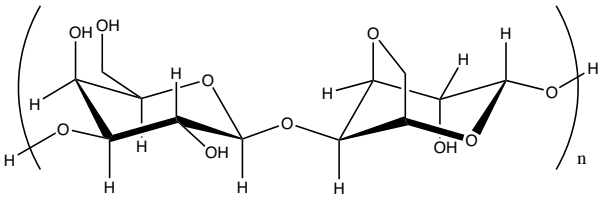


Agar-agar's extraction from red seaweeds

The traditional methods give the agar-agar as bar-style agar-agar or stringy agar-agar (whose authenticity is much appreciated in Japan), whereas the modern methods produce granulates or powders, of easier use.

Chemical composition

Agar-agar is constituted of two types of polymers (long molecules made by attaching one after the other a large number from one or several small molecules) made of carbohydrates (i.e. various sorts of sugars in chemistry's words, with a meaning not restricted to table sugar).
One of them is agarose, a polymer bearing no charges. The other type of polymer is agaropectine, having a more complex, partly charged structure.



Structure the agarose:
repetition of (1-> 3)-β-D-galactopyranose (left)
and of (1-> 4)-(3,6)-anhydro-α-L-galactopyranose (right)

Agar-agar forms gels when the polymers they are made of wrap one around the other. A tri-dimensional network is formed that traps a very large amount of water.

History

The discovery of agar-agar's the gelling properties is attributed to an inn-keeper named Tarozaemon Minoya who lived in Kyoto in the middle of the XVIIth century.
He observed that the remains of a dish made from boiled seaweed left to freeze and thaw several times formed a substance presenting gelling ability. The plain taste and the texture of agar-agar made it very popular among the Zen sect Buddhists. Agar-agar is named in Japan « kanten » after Buddhist priest named Ingen who lived at the time of the discovery. The agar-agar consumption, be it sweet or salted, remains very common in Japan. It was long the only agar-agar producing country and remains the major one.

Informations from Matsuhashi T., *Food Gels* (ed. P. Harris), Elsevier **1990**.