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APPLICATIONS

It is highly likely that you'll find gelatin in all these products!

Whether used as an ingredient or as a binding agent, gelatin has become almost indispensable for the food industry.

Its functional properties are also highly appreciated by the pharmaceutical industry and have applications in technical operations as diverse as paper-making, match manufacturing, micro encapsulation of ink or the electrolysis of metals.

The number of products and manufacturing processes in the major fields of application that require the use of gelatin is constantly increasing.

Food and Drink

Meat-based products
Fish and shellfish products
Cooked dishes, soups and sauces
Reduced-fat margarines and butters

Dairy products
Milk-based desserts
Ice creams and sorbets
Pastries
Jellies

Confectionery
Drinks
Encapsulated foods
Dietetic preparations



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Pharmaceuticals

Capsules
Microencapsulation (coating of vitamins and amino-acids)
Tablets
Sugared pills
Suppositories

Surgical appliances

Blood plasma substitutes
Hæmostatic sponges
Surgical implants
Hydrocolloidal dressings

Health foods and alternative medicines

Skin preparations and cosmetics
Auxiliary treatment for degenerative arthritic diseases

Technology

Microencapsulation of inks, colorants, perfumes, etc.
Paper
Metal electrolysis
Plastic polymerisation
Mouldings
Glues (manufacture of matches and abrasives)
Photography



How does gelatin work and in which products?

The Food Industry

Meat-based products

Since gelatin is of animal origin, it is not surprising that it is perfectly compatible with meat-based products.

Unmoulded cooked hams

Gelatin is used in the preparation of cooked hams for its binding properties. In the first stage, powdered gelatin is sprinkled in bone cavity and where excess fat has been trimmed from the meat. The gelatin swells in contact with moisture in the meat and then binds whatever amount of meat juice is released during cooking.

The effect of this is to improve the presentation of the meat and ensure a firm texture for cutting.

Corned beef

The manufacture of corned beef and other preserved meats includes a sterilisation process which involves the exudation of meat juice. Gelatin makes it possible to bind this juice.

The high temperatures required for the heat treatment of the beef mean that the type of gelatin chosen must take account of the reduction in gelling capacity.

Meat emulsions

Liver mousse is a typical example of a meat emulsion. The production of such a product often involves stabilisation problems, due mainly to water or fat infiltration. Gelatin makes it possible to fix the water and stabilise emulsions.



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Aspics

The gelatin content of aspics varies between 5% and 15%, depending on the type of product. Gelatin is used in this instance both for its flavour and for its decorative qualities, as well as for its functional properties. It ensures that the product keeps its shape when cut, even at an ambient temperature.

Coatings and coverings

Meat-based coatings and coverings are often made of gelatin. In addition to giving the product an appetisingly shiny surface, a film of gelatin extends the preservation and avoids the drying out of pâtés, pâtés in a pastry crust, galantines and similar products.

For this specialised application, Weishardt creates jellies from its gelatins.

They are designed for use in delicatessen, salting, food wholesaling and retailing and are complete ready-to-use products, of consistent content and taste, which make it possible to gain time and help with food safety. The products are marketed under the "Acimgel" and "Gélarôme" brand names, and are flavoured or unflavoured, amber-coloured or colourless.

The very wide range of our jellies and aspics covers almost all of the uses. The range is developed and changed on the basis of users' requirements.

In this sector, the Weishardt Group maintains an original position, in view of the fact that it makes the jelly-based product, the gelatin, itself. It is thus able to guarantee:

- a consistent quality thanks to the monitoring of the gelatin and auxiliary products
- the best value for money
- short delivery times.

Application	Function/effect of gelatin
Jellies/aspics	Coating Glazing Filling
Meat emulsions	Binding
Hams Canned meat	Sticking, binding
Aspics	Gelling



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Fish- and Seafood-based products

Gelatin is used in the preparation of aspics and jellies which makes fish and seafood look appetising and attractive.

It helps the products keep their shape for cutting, prevents deterioration through exposure to light and oxygen and ensures their conservation.

The criteria here for quality selection are transparency and almost complete lack of colour in the gelatin.

The most recent application involves using gelatin to stick surimi together.

Cooked dishes, soups and sauces

In cooked, ready-to-eat meals, gelatin is used to modify the texture of cold food. Solid preparations are, in fact, easier to transport and handle. Once gelled, the sauces can be liquified again merely by reheating.

Reduced-fat margarines and butters

In reduced-fat margarines and butters, gelatin is used to replace part of the fats, thus making it possible to bind the product and reducing its calorific value. It makes the product easy to spread and contributes to a pleasant mouth feel.

Dairy products

The wide range of dairy products and constant arrival of new specialities on the market is due in part to the use of gelatin.

The addition of even a small quantity of gelatin makes it possible, depending on the type and amount used, to obtain a velvety, creamy or firm texture, to prevent syneresis and improve the presentation.



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From a practical point of view, gelatin has the advantage of dissolving as soon as it is heated and adapting itself to all the manufacturing processes used for dairy products.

Application	Function/Effect of Gelatin
Yogurts	Reduction in syneresis Creamy texture Ability to bind fruit juices
Reduced-fat creams	Texture improver
Reduced-fat spreads	Binding Stabilising the emulsion
Cheeses Cheese specialities	Texture improvement

Milk-based desserts

In creamy puddings, mousses and jellied milks, gelatin is indispensable as a stabiliser.

Application	Function/Effect of Gelatin
Jelly desserts	Stabiliser Smooth and shiny appearance
Dessert creams	Stabiliser Texture improver
Mousses and whipped desserts	Improving the whipping quality Aerated and stable texture

Ice creams and water ices

Gelatin fulfils a variety of functions in the production of ice creams and water ices, very often in association with other vegetable hydrocolloids. It makes it possible to:

- improve expansion of the mixture and stabilise it during preparation
- to adjust the texture
- prevent the formation of ice crystals during storage
- to delay melting



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Cakes and pastries

In bakery, gelatin is used mainly as a stabiliser for creamy fillings and icings. Cakes may also be frozen and then defrosted without causing syneresis or softening and without creating a grainy structure.

Jellies

Jellies are refreshing desserts which are especially popular in the United Kingdom, Germany, and in both North and South America. Here again, gelatin proves that it is not merely an inert ingredient but a food in its own right with a unique texture. Depending on the country, jellies are sold as powder mixes ready for use or as concentrated blocks which merely need to be dissolved in water, and sometimes as both.



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Confectionery

Jelly babies, winegums, soft toffees, marshmallows, whipped cream walnuts, Turkish delight, liquorice allsorts, jelly creams, sugared almonds, comfits...Gelatin is an essential ingredient in a wide range of sweets and candies.

The properties and functions of gelatin used in jelly sweets as opposed to that used in whipped sweets are not necessarily the same:

Jelly Confectionery

- gelatin makes it possible to create moulded sweets which are completely transparent and whose shapes are well defined;
- the addition of gelatin means that the colours and flavours of the final product are preserved. The organoleptic qualities marry perfectly with the sweet , often slightly acid, flavours of jelly sweets;
- gelatin prevents the recrystallisation of sugar by retaining a sufficient quantity of water in the medium;
- gelatin produces that special elasticity and consistency which give the confectionery a pleasant mouth feel.

In jelly confectionery, gelatin is generally added, after swelling and dissolving, to pre-cooked mixtures of sugar and glucose syrup.

However, in manufacturing processes which use a jet-cooker, the gelatin may be incorporated into the mixture of sugar and glucose syrup prior to cooking.

Aerated confectionery

- gelatin makes it easier to incorporate air bubbles into the mixture of ingredients, thus creating a mousse, and also stabilises it;
- gelatin fixes water which cannot be not bound by other ingredients
- gelatin gives the elasticity which gives the sweet a good chewing consistency.

As in jelly confectionery, gelatin used for aerated confectionery is usually incorporated, after it is expanded and dissolved, in pre-cooked sugar and glucose syrups. It is then thoroughly beaten which makes the mixture increase considerably in volume, and after temperature stabilisation, it is extruded.



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Other applications

Gelatin's coating power is employed in the manufacture of sugared almonds and comfits, in which it protects the almond or other nut kernel. Its binding qualities ensure that the sugar coating sticks properly to the coated item.

Application	Function/effect of gelatin
Jelly sweets Jelly babies Turkish delight	Gelling Texture improvement Elasticity
Winegums	Gelling Texture improvement Elasticity
Marshmallows	Aeration Stabilisation Gelling
Meringues Whipped cream walnuts	Aeration Texture improvement
Chewing sweets	Emulsification
Toffees and caramels	Water retention
Liquorice	Binding
Sugared almonds and comfits	Coating
Nougat	Binding

Drinks

In drinks, the flocculation properties of gelatin are used to clarify but also to improve the flavour of wine, cider, apple juice and beer.

In this application, the gelatin reacts with the undesirable suspended particles which cloud the drink and with tannic acids and other bitter substances which alter the taste of the wine. These particles and substances are precipitated by flocculation and can thus be separated out of the liquid.

In certain drinks, such as wine, the gelatin is itself separated out after it has performed its function in assisting clarification.



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Encapsulated foods

Gelatin is used to encapsulate foods and ingredients whose smell needs to be protected or masked. It also preserves them from oxidation due to contact with the air.

Dietetic foods

Gelatin is a valuable nutrient in dietetic preparations. It is protein-rich and contains many of the amino-acids, while being free of lipids and carbohydrates and is rapidly digested by the human organism.

Gelatin is used in many diet foods for slimmers, because it is fat-free and low-calorie, but also because of its binding properties. Large quantities of water bound in the stomach give an impression of fullness and help to curb the appetite. Furthermore, the addition of gelatin can expand the number of dishes permitted in the diet, monotony always being a problem for people on a slimming diet.

Gelatin's lack of cholesterol means that it features prominently in all the diets designed to correct high cholesterol. It is equally useful in high-protein diets.

Nowadays, it is not so much a matter of "eating lightly to keep the figure" but "eating healthily to keep in trim". With the exception of tryptophane, gelatin contains all the "essential" amino-acids, so-called because they are essential to man. Deficiency in essential amino-acids causes serious illness. However, since they cannot be manufactured by the human body, they must be present in food. Gelatin is thus prescribed as a food supplement in certain diets such as those with a limited meat intake. It is also recommended for sportsmen and sportswomen because of its high lysine and arginine content. Lysine promotes muscle development, and arginine makes it possible to synthesise creatine which plays a vital role in transferring energy to the muscle cells.

Apart from these specialised uses, gelatin is an ideal ingredient for anyone seeking a balanced diet. It is healthy and natural and can boast of being able to combine healthy eating with enjoyable flavour and texture.



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Amino-acid content of pure gelatin (percentages)	
Glycine	22.3
Proline	13.6
Hydroxyproline	11.4
Glutamic acid	9.6
Alanine	9.1
Arginine*	7.7
Aspartic acid	5.7
Lysine*	3.5
Serine	3.5
Leucine*	2.8
Valine*	2.4
Phenylalanine*	2.2
Theronine*	1.9.
Isoleucine*	1.2
Histidine*	0.9
Hydroxylysine	0.9
Methionine*	0.8
Tyrosine	0.5
Cysteine	traces
Tryptophane	0

* Essential amino-acids

PHARMACEUTICALS

In the pharmaceutical industry, gelatin has the great advantage of being digestible and easily assimilated by the human organism. It is used mainly for its film-forming, gelling and binding properties and for its solubility in hot water.

Capsules

The term capsule designates the hard or soft soluble envelope around certain medications, which protects them from humidity and air, temperature and light. These capsules contain active principles with immediate or delayed effect which



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may be present in the form of powder, granules, paste or liquid. The capsules are made of a gelatin base with the appropriate properties to which plastifiers, opacifiers and colorants can be added.

The gelatin capsule also makes it possible to mask the unpleasant smells and flavours present in certain active principles.

Hard capsules

Hard capsules, which are also known as gelules, consist to of two cylindrical gelatin shapes which fit inside each other.

The two parts, body and cap, are manufactured by immersing lubricated metal pins into a viscous gelatin solution. This is a delicate manufacturing process because the gelatin must solidify in a very thin layer in the space of a few seconds. After the body of the gelule has been filled with the active principle, it must be sealed. The joint between the two parts must be completely hermetic.

This is where the film-forming properties of the gelatin become useful.

Soft capsules

Unlike hard capsules, the envelope of soft capsules consists of a single piece, which is thicker and in which plastifiers are generally combined with gelatin.

The manufacture and filling of soft capsules is performed simultaneously by co-extrusion of the active principle and the gelatin solution. The active principle is itself dispersed in an oily liquid or a paste, a system which makes it possible to condition the molecules which would normally be mutually incompatible.

Soft gelatin capsules may be given various shapes and be ingested orally, anally, vaginally or topically.

Here again, it is the film-forming property of gelatin which is exploited to coat and protect the active principle.

Microencapsulation

In this application, gelatin is used to stabilise the microbeads containing one or more active principles (water-soluble or fat-soluble vitamins, amino-acids, etc.) and a neutral base. The microcapsule keeps the active principle whole as well as making it possible to administer a minute dose.



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Tablets

The manufacture of tablets combines the pulverisation of a gelatine solution with the active principle, with a compression process. The binding action of the gelatin ensures the cohesion and preservation of the shape of the tablet.

Sugar-coated pills

The sugar-coated pill, like the sugared almond or comfit, consists of a centre coated with a mixture of sugar and syrup. In order to enable the coating to adhere properly to the centre, a rubbery layer of gelatin is applied to the latter. The gelatin plays the part of a binding agent in this instance. If the centre contains fat or oil, the film-forming property of the gelatin may be called upon, to prevent leakages of fat or oil into the outer coating.

Suppositories

The active principle of a suppository is held in a mixture of gelatin, water and glycerine which is shaped in a mould. The active principle can be released quickly and enters the system via the mucus membrane of the rectum.

SURGICAL APPLIANCES

Thanks to its inert nature and its excellent tolerance by the human organism which absorbs 100% of it, gelatin is a valuable aid to surgery. In the following applications, the most important criterion for the type of gelatin to be used is, of course, the maximum degree of purity.

Blood plasma substitute

Serious blood loss must be compensated for temporarily by a serum drip. Gelatin is used in the manufacture of blood plasma substitute. It has the advantage of not accumulating in the human organism.



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Hæmostatic sponges

Hæmostatic sponges are used to combat loss of blood. They are made of gelatin which is whipped into a foam, giving it a high absorbency and coagulant ability. These sponges have the particular advantage of being capable of being left in place once the wound has been stitched.

Surgical implants

Surgical implants are made from gelatin combined with a plastifier. They are used for sealing the bones when a prosthesis is inserted. They do not hinder the re-formation of bone.

Hydrocolloidal dressings

This type of dressing consists of an internal layer of gelatin and other hydrocolloids which upon contact with the exudates from the wound forms a gentle, moist gel. The wound is thus maintained in a humid environment, promoting all the phases of scar-tissue formation.

HEALTH FOODS AND ALTERNATIVE MEDICINES

Although gelatin has an important use in the pharmaceutical industry as a container for active principles or as a substitute, it is also used for its own virtues which are beneficial to health.

Skincare products and cosmetics

A daily dose of gelatin taken orally for several months is good treatment for damaged nails and hair. Soft nails, which tend to become ingrowing, will be strengthened and will grow faster, whilst hair will become thicker since the capillary roots will multiply, resulting in accelerated regrowth.

Gelatin is also used in the preparation of cosmetics and skincare products, due to its beneficial effects on the skin.



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Back-up treatment for degenerative arthritic diseases

There are numerous indications that a daily intake of gelatin has a beneficial effect in the treatment of degenerative arthritic diseases

Although the mechanism by which this treatment works is not yet clearly explained by scientific study, well-known healthcare institutions are using it. The patients who have had it claim that their pain has been reduced and that they have become more mobile.

INDUSTRIAL USES

Microencapsulation

In this packaging technique, the walls of the microcapsules consist of a mixture of gelatin and polysaccharides.

Microencapsulation is used for packaging perfumes, colorants, inks and other volatile, reactive or even incompatible products.

It protects from the effects of oxygen and moisture and makes it possible to preserve the taste and smell of microencapsulated products until they are used.

The manufacture of NCR paper is based on the microencapsulation process. The back of the paper is coated with ink-filled microcapsules as small as several microns in diameter. The effect of the pressure of writing breaks open the microcapsules and releases the ink. The same process is used in the manufacture of scented paper handkerchiefs.

Papermaking

This industry uses gelatin to improve some of the properties of paper such as water-resistance, resistance to peeling, creasing and abrasion and improving its stiffness and even its resonance.



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Metal electrolysis

Zinc and cadmium are purified by electrolysis incorporating gelatin in the electrolytic bath. Gelatin makes it possible to separate the metals from the impurities.

Polymerisation of plastics

Gelatin is used in low concentrations in the manufacture of PVC. Its colloidal, protective capacity makes it possible to control the size of the particles during polymerisation.

Mouldings

Gelatin is used to replace resin in the manufacture of small production runs of plaster mouldings or sculptures. It is economical but also enables the reproduction of intricate detail.

Animal glues

Animal glues are similar to gelatins. They use the same raw materials and are manufactured using a similar, though simpler, process.

In the production of matches, the foaming and binding properties of animal glue are used to enable the material covering the match head to cohere and reduce the density, so that it ignites evenly. Animal glue has another use in the manufacture of abrasives, making it possible to fix abrasive particles on a cloth or paper backing.

Photography

A photographic emulsion is a suspension in a colloid – gelatin – of a precipitate mixture of silver salts (chlorides, bromides and iodides).

The emulsion is overlaid on a backing (film or paper) to obtain a sensitive surface (positive, negative, transparency).

The quality of the gelatin has a major effect on the shape and size of the silver salt crystals and thus the properties of the sensitive surface (sensitivity, contrast, speed, grain, etc.). The type of gelatins used has improved at the same time as the photographic industry has made advances.

In the past, active gelatins produced from cattle hides which were treated with lime under very specific conditions were used for such specialist purposes .

Nowadays, the so-called "inert" gelatins, produced from ossein treated with lime are used to coat all the types of photographic media whether as emulsion layers or coatings for other purposes to improve picture quality (antihalo, smoothing, baryta paper).