



Modern Technologies for Innovative Products

The Production of Gelatine

GELITA
Improving Quality of Life

Gelatine – a Natural Collagen Protein

Collagen proteins from GELITA are applicable in a variety of ways and are therefore an essential component of products of daily use. Often nearly invisible, they are contained in foodstuffs like candy and dairy products, in pharmaceuticals and medical first-aid devices. They are also applied in technical applications, for example, in specific photographic processing techniques. The various types of collagen proteins improve our quality of life every day.





GELITA: The Number 1 in Every Field of Collagen Protein Applications

GELITA is a leading company in the development and production of gelatine and other highly developed collagen proteins. Our A-to-Z range of services and performances comprises the quality control of the raw materials we use, the production of various types of collagen proteins as well as the design of new products in close cooperation with our customers.

Altogether, 2,600 employees working in more than 20 business locations are producing approximately 80,000 tons of collagen proteins each year. Among our customers are companies belonging to all industrial sectors, primarily the food and drug industries, the sectors of health & nutrition and photography.

The consistent application of highest quality standards at our production facilities which are certified in accordance with ISO 9001 and ISO 14001 including an integrated HACCP system guarantee our customers all over the world a consistent and outstanding product and service quality. Among the collagen proteins, gelatine represents the most important segment by quantity.

Selected Raw Materials for the Production of Gelatine



Modern production plants guarantee a maximum of processing safety.

Gelatine is made of native collagenous raw materials which are derived from the connective tissue or the bones of mammals. Although poultry and fish are also applicable, they are of minor importance as a raw material source.

What Kind of Raw Materials do we use?

Pig Skin

Pig skins are purchased in a fresh, cooled, or frozen state from meat processing companies and further processed without delay, or temporarily stored prior to their further processing in our own or external refrigerated warehouses.

Hide Split

The hides of cattle are first intensively washed in hide-processing facilities. Then the subcutaneous connective tissue is removed by machines and the hide is horizontally split. The intermediate layer thus obtained, the so-called "split", consists majorly of collagen and is therefore excellently suited as a raw material to be employed in the production of gelatine. The split is preserved with either salt or hydrated lime in order to prevent quality losses.



All the raw materials we use originate from healthy, slaughtered animals approved for human consumption.

Bone Chips

Fresh bones are produced in meat processing companies. These bones are suited for the production of gelatine only after a careful pretreatment step. First, the bones are crushed to size of 5 to 10 millimeters, defatted in hot water, and freed from perhaps still adherent tissue. Subsequently the so-called bone chips are dried and screened to yield various grain sizes. In Germany, this processing step takes place in our company-owned degreasing plant. In the United States, however, the bone chips are manufactured directly by the big meat processing companies.

All raw materials are subject to the strict regulations of meat processing and hence to the complete control of the produce's source of origin.

Providing one's customers invariably with an optimum of quality and the best solutions requires making permanent investments in innovative technologies.



The use of fresh and safe raw materials is conditional for GELITA® Quality Gelatine.



The optimum temperature of the water baths is based on scientific experiments.

Demineralization of the Bone Chips

Treating this intermediate product with diluted hydrochloric acid at low temperatures in a counter-current process dissolves the phosphate which the bone contains. This procedure, which lasts several days, is called "maceration". The demineralized bone chips, also referred to as "ossein", are the actual raw material in bone gelatine production. Excessive acid is subsequently removed by intensive washing of the ossein.

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The critical selection and regular assessments of our suppliers, strict controls at our raw material acceptance, and optimum conditions of transport and storage guarantee the perfect quality and optimum safety of our raw materials.

Innovative Methods for Excellent Product Properties



In principle, two different methods are applied to produce gelatine, differing particularly in the pulping method applied to the raw material, i.e. the mechanism they use to break specific collagenous bonds. The respectively applied method has an impact on various properties of gelatine.

Only after conducting comprehensive physical, chemical and bacteriological tests is gelatine released for shipment.

Pretreatment of Raw Materials

Acid Treatment

Normally the pig skins are pretreated by acid pulping. Unlike cattle, pigs are relatively young when they are slaughtered. As the tissues of the skin are not yet cross-linked to a great extent, no intensive and time-consuming pretreatment with alkali is required. An acid treatment over one day is all it takes to make the collagen it contains soluble in hot water; this is conditional for the extraction process. Subsequent to acid treatment the excessive acid is partially neutralized and the salts are washed out by exchanging the water several times.

Gelatine can also be obtained from ossein by acid treatment – the concentration of the acid and the exposure time must be adjusted accordingly.

Gelatine produced this way is referred to as Type A gelatine (A = acid).

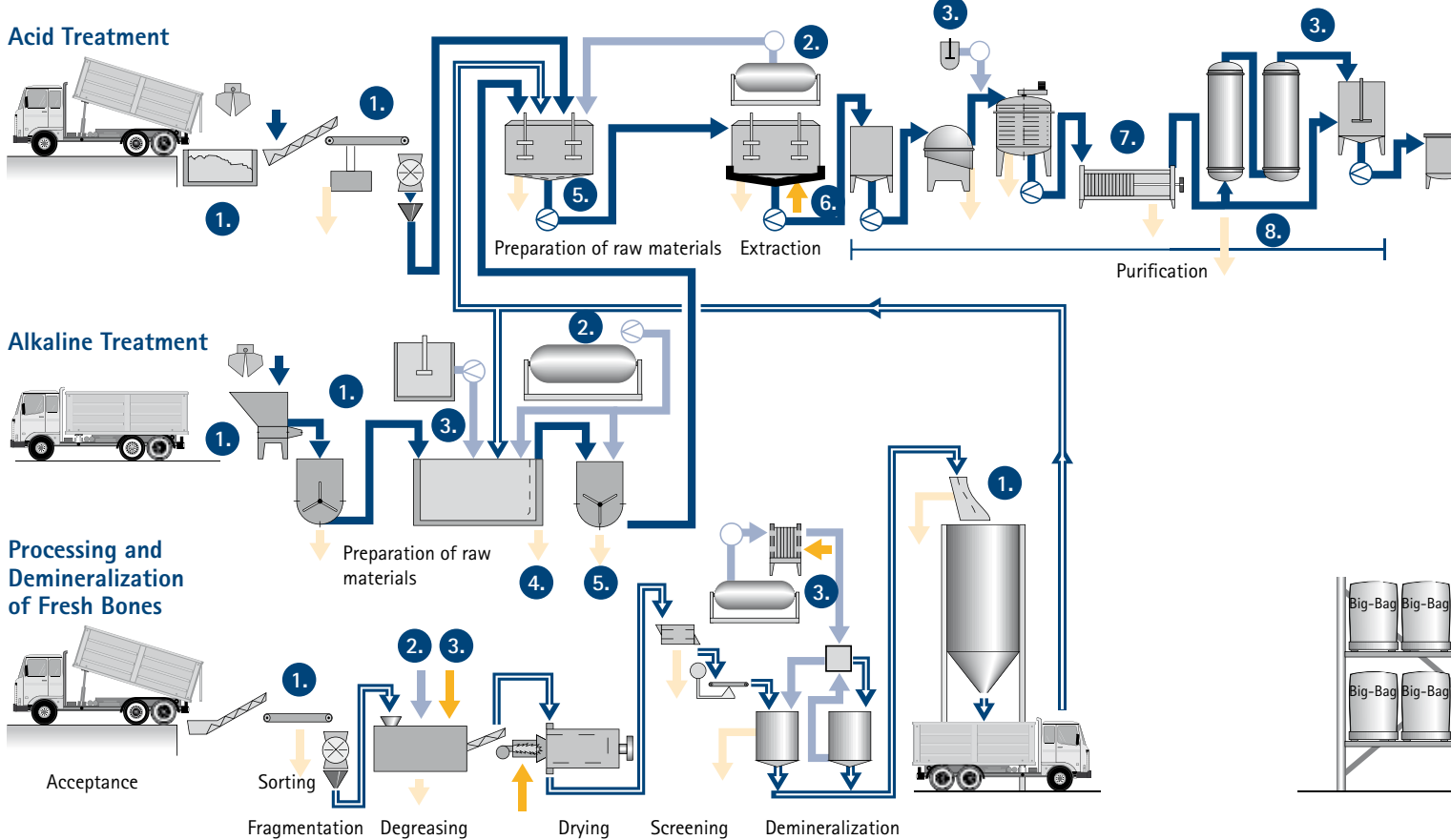
Alkaline Treatment

In this method, ossein or hide split are treated with calcium hydroxide, which is substituted a number of times, for a period of up to three months. In this treatment step, collagen bonds are partially destroyed while non-collagenous proteins and adhering matter are also removed. When producing gelatine from hide split, the raw material can be alternatively treated with diluted sodium hydroxide instead of calcium hydroxide as it produces the same results. After this processing step, called "liming", the pretreated raw material is washed once again, neutralized by the addition of acid, and freed from the arising salts by another intensive washing step.

The gelatine thus pretreated with alkali is referred to as Type B gelatine (B = basic).

Integrated quality, environment-protection and safety systems, as well as standardized production steps reliably guarantee highest quality





Pretreatment of the Raw Material

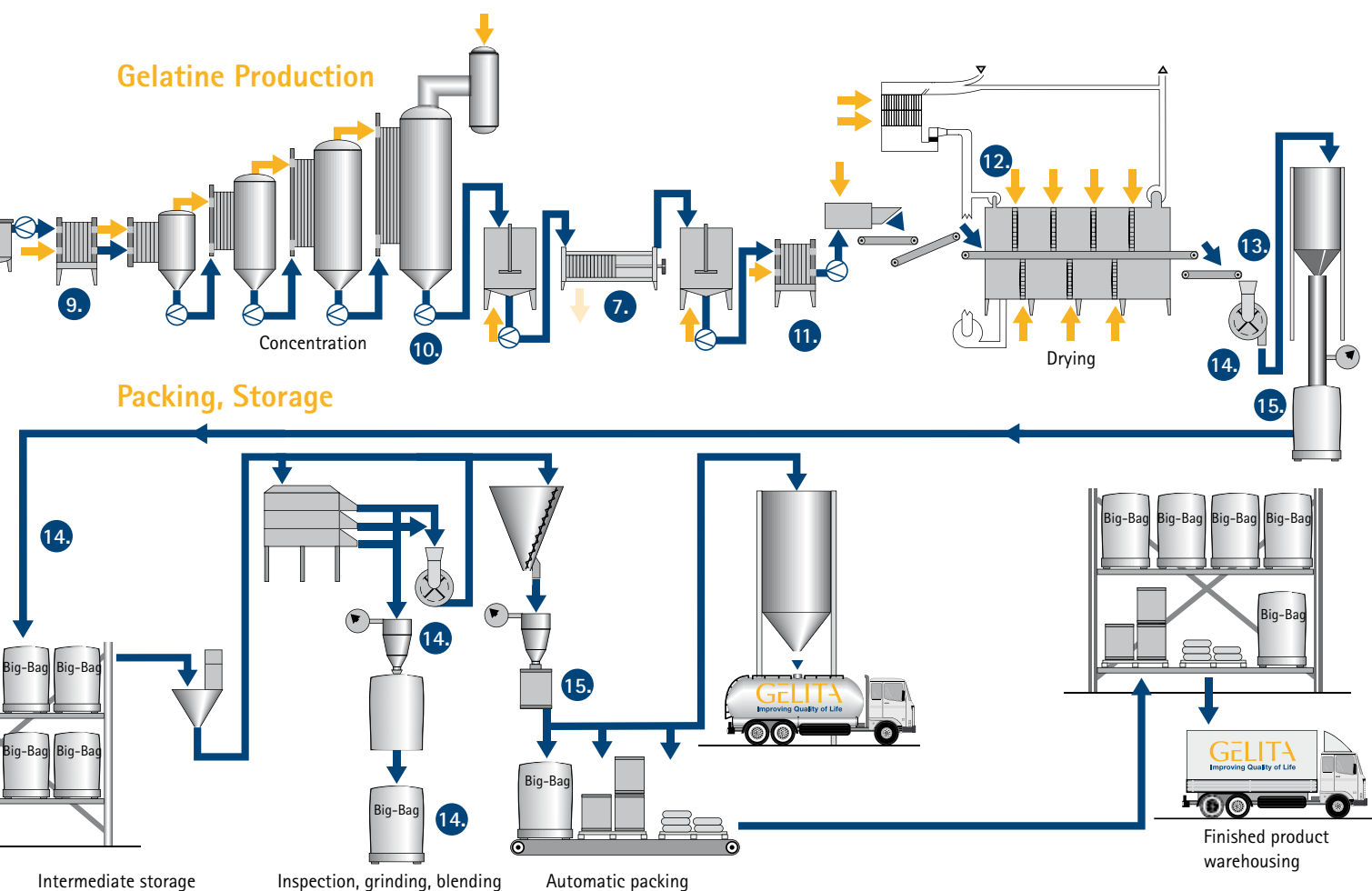


Precise, Regular In-Process Control and the Strictest Hygiene Regulations assure Product Safety.

1. Testing of raw materials for freshness and the absence of potential foreign objects.
2. Physical, chemical and bacteriological examination of the applied production water.
3. Chemical and physical tests to assure the identity and quality of auxiliary substances.
4. Physical and chemical monitoring of the process of raw-material disintegration.
5. Continuous physical and chemical monitoring of the neutralization and washing processes.
6. Automatic control of the proceeding extraction.
7. Optical tests to assure the filtration effect of each stage.
8. Automatic measurement of the degree of salt removal.
9. Continuous temperature monitoring of the first heat exposure prior to evaporation.
10. Continuous measurement of viscosity during the concentration process.
11. Continuous temperature monitoring of the high-temperature sterilizer.
12. Continuous monitoring of the air for temperature and humidity during drying.
13. Checking of the particle sizes after grinding.
14. Incoming goods inspection of packing materials.
15. Comprehensive physical, chemical, bacteriological tests to assure the finished products' compliance with the official regulations, the customer-specific requirements and the quality agreements before shipment.

Legend:

-  Flow of raw materials or products
-  Energy (heat, cooling)
-  Auxiliary substances, chemicals
-  By-products, residues
- 1. to 15.** In-process controls



ISO 9001/SPC/HACCP

In order to realize the highest quality standards consistently the stages of production, ranging from the supply of raw materials to the shipment of finished products, are controlled by an ISO 9001 quality assurance system and are subject to statistical process control (SPC). All GELITA manufacturing sites are certified in accordance with ISO 9001. In addition, control systems according to HACCP have been introduced in all factories.

Production, Packing, Storage

Extraction

Gelatine is extracted from the pretreated raw materials continuously or by the repeated addition of warm water in a multistage extraction process. Hot water is added to the partially extracted material and extraction proceeds anew. This procedure is repeated so many times till the last gelatine residue enters the solution. The result is an approximately 5% solution. The gelatine which has been obtained from the initial extractions at the lowest temperatures (approx. 55°C) in the multistage procedure possesses the highest gelatinization capacity. In the continuous method, hot water (up to 60–85 °C) is incessantly led into the extractors and gelatine with a constant gel strength is extracted continuously.

Purification

The gelatine solution gained by extraction is freed from traces of grease and collagen fibers in high-performance separators. Pre-cleaning is effected by self-cleaning alluvial filters and downstream sheet filters, as are used in the beverage industry. Membrane filters are also occasionally used. Depending on customer requirements the remnants of salt still contained in the gelatine are removed in ion-exchangers almost completely or only to some extent.

Concentration/Polishing Filtration

Heating the diluted gelatine solution up to over 90°C in multiple-stage vacuum evaporation plants removes the major proportion of water, sparing the product and saving power. To achieve a further reduction of power consumption, membrane filter systems are often applied first to effect a preliminary concentration. The highly viscous, concentrated solution is then subject to polishing filtration through sheet filters.

Drying

The purified, high-concentrated gelatine solution is sterilized at temperatures of up to 140°C in a high-temperature sterilizer, solidified in special coolers, and finally pressed through perforated disks. The noodle-shaped gel thus produced is dried on horizontal belt dryers with filtered, washed, dehumidified and sterilized air. The dried gelatine is broken at the output of the dryer, coarsely ground and temporarily stored in batches. Release for further processing is given only after the physical, chemical, and bacteriological tests have produced the desired results.



Grinding, Sieving, Blending

To ensure that GELITA® Gelatine complies with the specific applications and individual requirements of each single customer, computers control grinding and blending of the intermediate products to obtain the optimum particle sizes. After packing into silos, big-bags, sacks or drums, the completion of all necessary tests and the ultimate release by the quality control laboratory the gelatine is shipped to the customer.



Special Types

Apart from the typically granulated gelatine used for further industrial processing, there are special forms whose production proceeds as follows:

Leaf Gelatine

Gelatine powder with precisely adjusted properties is dissolved again in warm water and cast to a broadly spread jelly film onto a cooling drum. The jelly foil is cut in stripes and dried on a net with filtered, purified and dried air to produce continuous leave strips, which are finally cut to the desired lengths.

Instant Gelatine

This type of gelatine is obtained by applying spray drying or drum drying procedures, in which gelatine solutions are dried either with or without additives. Fine particles of amorphous structure are created since the gelling phase in the course of drying is passed over.

GELITA – Improving Quality of Life.



Worldwide Excellence in Collagen Proteins

GELITA is the leading company for manufacturing and marketing of Collagen Proteins. Coordinated from the headquarters in Eberbach, Germany GELITA provides customers around the world with products of highest standard, comprehensive technical expertise and sophisticated solutions. More than 20 sites and a global expert network ensure state-of-the-art know-how always available for the customers. More than 135 years of experience in the field of Collagen Proteins are the basis of GELITA's performance. A strong requirement for innovation is the driving force for the family owned company, always looking for new solutions for food, pharma, health & nutrition and technical applications.