



A-TYPE GELATIN & BY PRODUCTS - VPP*

*VIANDE - POISSON - PETFOOD

Gelatin has become a key product in the elaboration of food and beverage to gel, thicken, or smoothen all sorts of recipes.

Gelatin is a protein obtained from animal raw materials containing collagen. It is made from by-products from the meat industry, mainly from pigs' rinds, but also from bones and skins of cattle, or fish skins.

2 types of manufacturing processes are used depending on the nature of the raw material used.

- **The acid process (A-type gelatin)** is referred to when an acid process is used in particular for the treatment of pig rinds.
- **The alkaline process (B-type gelatin)**, is used in case of manufacturing from bones or cattle skins.

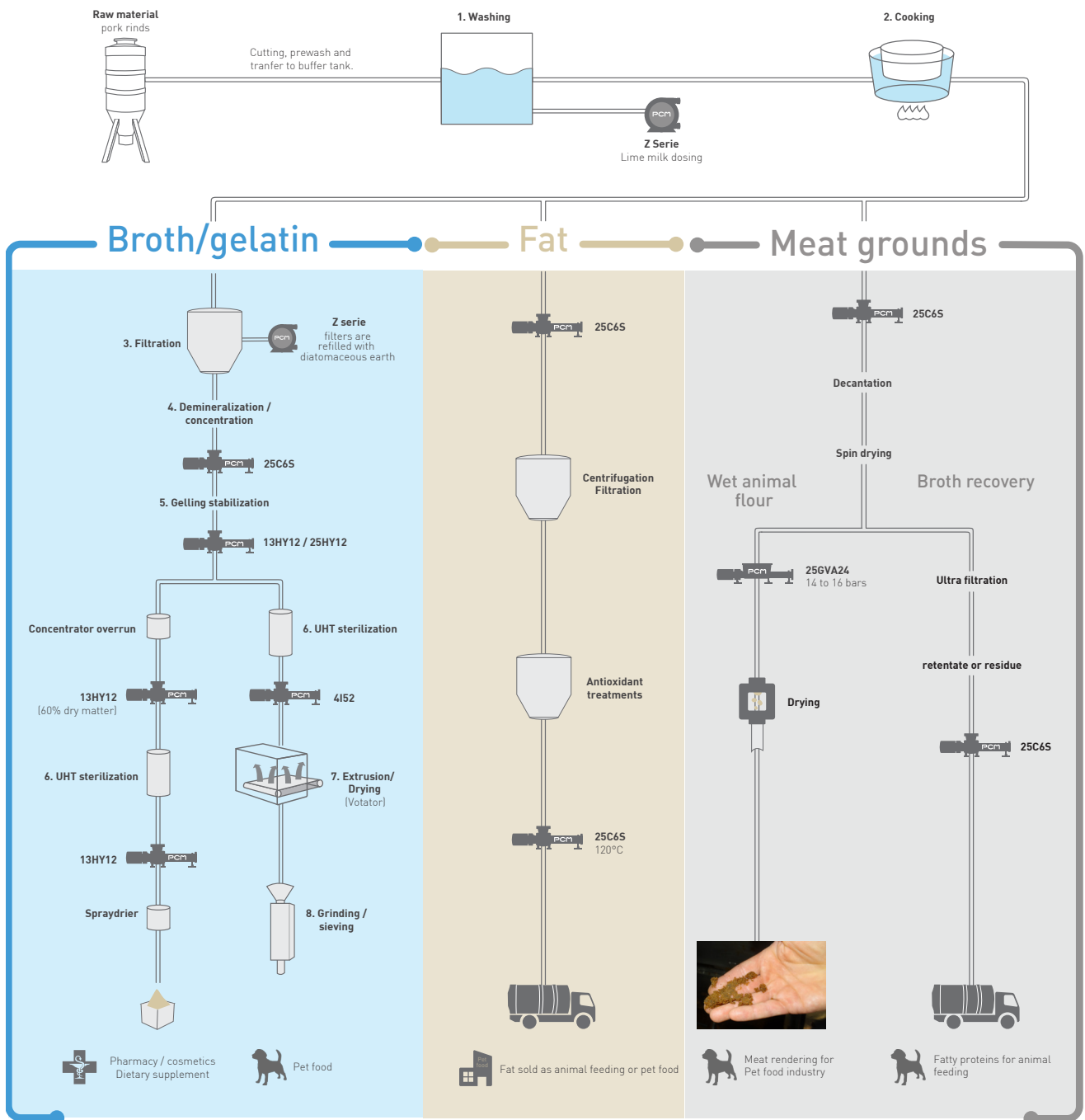
These two treatments aim is to transform, break the molecular structure in order to be able to extract the collagen. The same extraction method is used for both A-type and B-type processes.

» APPLICATIONS:

- **Food applications:** Confectionery, ice cream, dairy products and dessert creams, pastries, Jelly-type water gels, meat industry and prepared meals, gel aspic, beverages clarification, dietetics...
- **Pharmaceutical industry:** medicine capsule, tablets...
- **Others:** pet food, photographic industry, polymerization of plastics, paper industry, health



1 ACTIVITY AND MANUFACTURING PROCESS





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1- Washing:

The rinds are previously cut and then washed, stirred in an acid bath a few hours causing softening and swelling of the skins.

2- Cooking:

In a water bath, the skins break down, the molecules dissolve. From this stage the process is split into 3 workshops for 3 types of production:

- **The broth** from which the gelatin will be extracted in a multi-stage process.
- **The ground meat**, fine particles of fiber, will be transformed into wet flour and powder for Pet food.
- **The fat** which will be filtered and treated with antioxidants and then sold to food industries (pet food and animal feeding).

Gelatin will be extracted from the broth in several extraction processes.

3 - Filtration:

The broth is freed from all traces of fat and fibers.

4 - Concentration:

Elimination of water. The gelatin solution is now concentrated in a vacuum evaporation system and thickened into a honey-like mass. (from 25 up to 40% of gelatin).

5 - Stabilization:

Addition of enzymes to stop the gelatin gelling and injection of additives according to the desired recipe.

6 - UHT sterilization:

Safety sterilization in UHT equipment before cooling and setting.

7 - Setting-Drying:

Passing through a votator (scraped surface heat exchanger) which transfers the gelatin to dies. This process results in "jelly noodles". The noodles are dried, with filtered and sterile air, to become brittle.

8 - Grinding /sieving:

Depending on the desired final product (Pet food, pharmacy or cosmetics uses), this brittle gelatin will be crushed and screened more or less finely through concentrators and spray dryer.

9 - Mixing:

Each production batch is stored according to different characteristics. Depending on the final product desired by the user, mixtures will be made to obtain a stabilized product.



2 TECHNICAL DATA & PROCESSING RESTRICTIONS AND RECOMMENDATIONS

» BROTH OR LIQUID GELATIN AND CONCENTRATED GELATIN:

Viscosity: 100 Cpo (liquid gelatin) → 15 000 cpo (concentrated gelatin)

Temperature: <80°C (176°F) (Starting from the concentration stage, working under vacuum to be able to limit the T ° to 80 ° C. in order to preserve the properties of the gelatin)

Technical restrictions:

- High pressures at sterilization outlet before setting-drying (from 20 to 40 bars).
- Streamlined production: use of machines in 24h / 24h.
- The global demand for gelatin continues to grow. Search for increasing batch sizes and decreasing the total production time of a batch.

Recommendations:

Depending on the pressure and the production stage, use:

- **EcoMoineau™ C** serie (transfer between Concentration and Gelling stabilization)
- **HyCare™** serie (transfer between Gelling stabilization and Sterilization)
- **I serie High Pressure** (4I52 for transfer from sterilization to the votator, scraped surface heat exchanger).

» MEAT GROUNDS OR WET ANIMAL FLOUR:

Viscosity: 300 000 cpo at 23°C (73°F)

Discharge pressure: observed at 5/7 bars with peaks at 16 bars

Suction pression: Flooded - Screw feeding

Flow rate: 2 tons/h i.e 2.22m³ /h (density : 0.9)

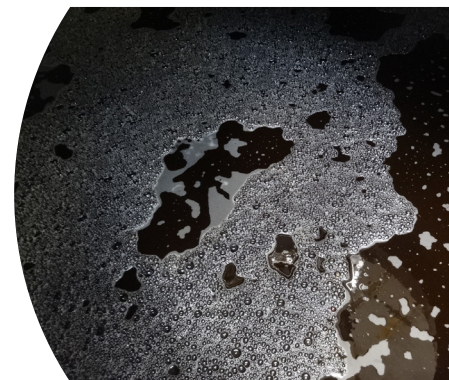
Temperature: variable from 15 to 40°C (59 to 104°F)

Technical restrictions:

- Very sticky and heterogeneous product
- Variation in fat content and moisture content in the manufacturing of flour, due to varying quality of the raw materials used.

Recommendations:

The **GVA** serie thanks to a large hopper, an open feeding screw and a feeding barrel with high hydraulic efficiency is the solution.



Broth or liquid gelatin



Gelatin brittle noddles after drying



Wet animal flour for pet food applications



FAT:

Viscosity: 1 000 up to 5 000 cpo

Discharge pressure: 2 up to 5 bars

Flow rate: 2 up to 6 m³/h (nominal : 4.5 m³/h)

Temperature: 100°C up to 120°C (212°F up to 248°F)

Technical restrictions:

- The temperature is high at the cooking outlet

Recommendations:

EcoMoineau™ C serie is the most appropriate cost saving solution.

Depending on the temperature and final destination of this product, either a certified USP NBR stator or a certified 1935/2004 NBR stator will be used.

3 EQUIPMENT RECOMMENDATIONS

GELATIN AND FAT TRANSFER :

Ecomoineau C™ pump (Construction recommendation)

- 25C6S Stainless steel body
- 164 NBR Stator for high temperature from 100°C up to 120°C. (212°F up to 248°F)
- 246 NBR Stator for temperature <90°C. (<194°F)
- Duplex stainless steel 329L rotor
- Single mechanical seal + carbide/carbide /EPDM quench. (Anticipate rinsing water from 1 to 2 liters / min under 0.1 bar).

HyCare™ pump

HyCare™ is recommended to transfer gelatine (concentrated at 30%) to ensure an optimized cleaning after gelling stabilization.

- Standard construction with single quench mechanical seal.
- 246 NBR Stator for temperature <90°C. (<194°F)

4152 pump

Used at the sterilization process outlet to bear high pressures (20 to 40 bar).

- Non standard configuration
- 316L Stainless steel body
- Single mechanical seal with quench or Dual tandem mechanical seal
- NBR stator certified USP
- 316L stainless steel rotor and flexible titanium shaft



HyCare™ pump



4152 pump



3 EQUIPMENT RECOMMENDATIONS

MEAT GROUNDS OR WET ANIMAL FLOUR TRANSFER:

GVA serie (observed application 25GVA24)

- Non standard configuration
- Stainless steel body with hopper, Ra 0.8 inside polishing, glass-blasted external side, with side CIP tangential connection
- Drain plug
- Reinforced joint with open screw ensures efficient feeding
- Single mechanical seal with quench (HyCare™ type)
- NBR stator certified 1935/2004

It will be necessary to size the gavo pump with a pressure tolerance. Even if the application case has been observed at 5/7 bar, the pump can handle pressures variations to 14 to 16 bar.



GVA pump
Inside the hopper - Archimedes screw



GVA serie



See the treatment plant application sheet for more information.

- PCM EcoMoineau™ M
- PCM Delasco™ pump for ferric chloride

For more information, please find your nearest contact:
www.pcm.eu