



# Good Manufacturing Practices: Coagulants

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## Traditional Preparation of Animal Rennet

- Coagulants derived from the abomasum of a calf, kid or lamb which is fed on milk only.
- These may be contaminated by pathogenic bacteria:
  - Arising from **poor animal hygiene** or;
  - Arising from **poor hygiene during processing**.
- However it may also be possible to **reduce the risk of presence or growth of pathogenic bacteria** during processing.



## Traditional Preparation of Animal Rennet

- The processes described in the GGHP include:

*In traditional practice, the abomasum...may be **dried, salted** or **frozen** to preserve it prior to extraction of the chymosin enzyme.*

*It is chopped or prepared as a paste (including the stomach contents) and macerated in a brine (typically **10 -20% salt w/v** and **pH 4.5-5.0**).*

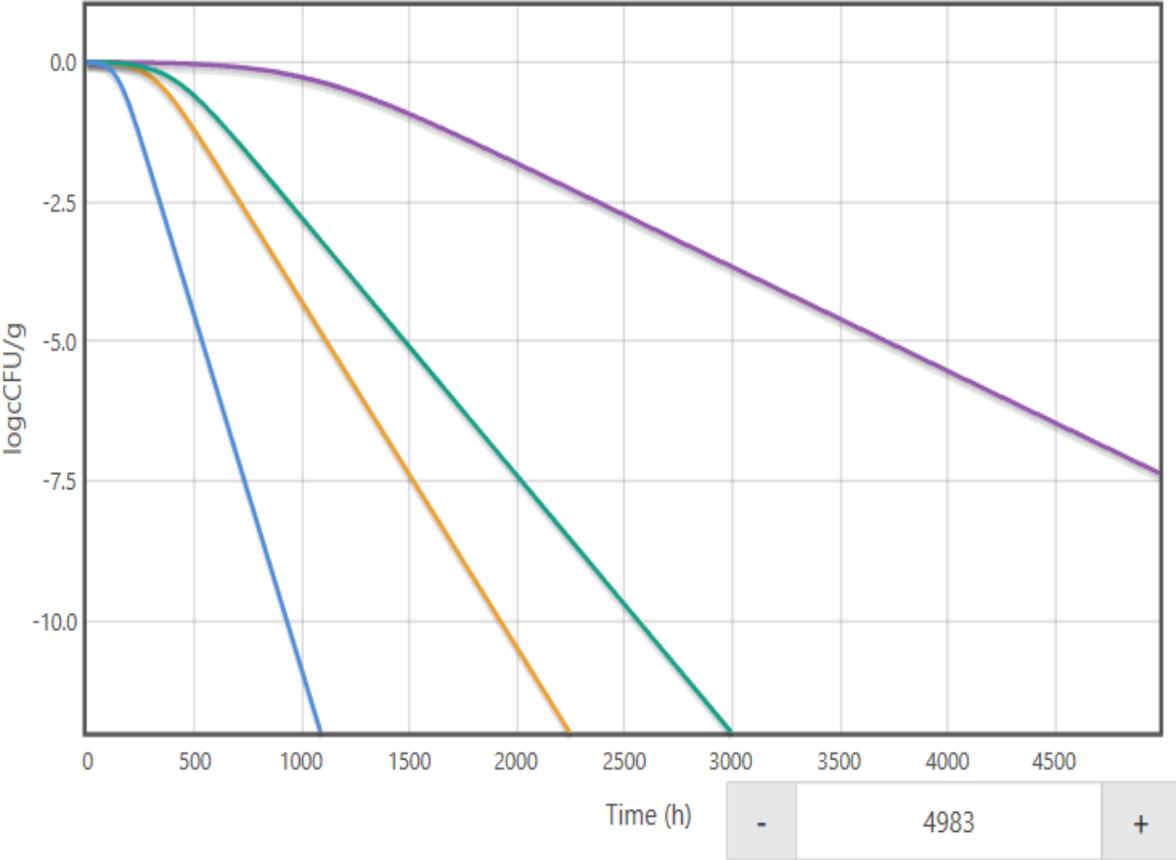


Photo: Isidoro Jiminez



# Fate of Pathogens in Rennet Preparations

Organism	pH	% Salt
<i>Listeria monocytogenes</i>	5.00	10
	4.50	20
<i>Salmonella</i>	5.00	10
	4.50	20



[www.combase.cc](http://www.combase.cc)

Non-thermal Survival Model @8°C



## Animal Rennet: Primary Production

- Good manufacturing practice **begins with healthy animals.**  
The abomasum should be taken from a **milk-fed** animal which is in a **good state of health.**
- **Milk** used to feed the animal should not be contaminated with **veterinary medicines.**
- Both mother and calf/kid/lamb/etc should be free from signs of **diarrhoea** or **infectious disease.**
- For more information, see:

**GGHP: “*risk analysis for primary production*”**



## Preparation of the Abomasum

- The abomasum should be **removed carefully** to avoid contamination.
- **Reject** the abomasum where it is **damaged**.
- The abomasum should be **light brown** in colour, with **white fat**, but **without gas**.



Photo: VHM



## Traditional Preparation of Animal Rennet

- Abomasa can be dehydrated by drying or smoking but:  
**avoid contamination by insects or their larvae.**
- Abomasa should be stored in a **dry container**, they can be covered with **salt**, or **brined**.
- It is recommended to **use abomasa within 1-2 years**, for technological reasons.
- Store in a **cool place**, with an appropriate quantity of **salt**.
- The preparation should be **acidic**, with appropriate colour:  
Light **gold** (rennet extract) or;  
Light **brown** (rennet paste)



## Traditional Preparation of Vegetable Rennet

There are many different species of plants identified as milk coagulants (eg *Cynara*).

Coagulant is prepared from *Cynara* by:

- **collecting** and **drying** the flower,
- maceration of the pistil in water (eg for 4-8 hours)
- **filtration**
- **immediate** use or **cold storage** for up to 7 days to prevent the growth of harmful bacteria.



Photo: Isidoro Jiminez



# Traditional Preparation of Vegetable Rennet

Plant material should be free from **contamination** with:

- pesticides
- mycotoxins
- other chemical pollutants
- microbiological contaminants
- physical contaminants



Photo: Isidoro Jimenez



# Traditional Preparation of Vegetable Rennet

This can be achieved by:

- Careful selection of plant material
  - **Undamaged** plants; **clean** & free from signs of pest activity
  - Sourced from areas which are free from chemical pollution
- Drying or **rejection of wet or mouldy** plant material
- **Dry storage** conditions
- Good personal hygiene (eg **hand washing**)
- Use **clean** equipment
- Use **potable** water



## Bought-in Rennet Preparations

Hygiene is just as important when handling rennet that is **bought-in** from a **manufacturer**.

- Obtain rennet from a **reputable supplier**.
- Where possible, obtain a **certificate of conformity** from the manufacturer.
- Store according to the manufacturers **instructions**.  
(Protect dried abomasa from moisture)
- Use **clean equipment** to measure out rennet.
- Exceeding a **best-before date** will not pose a risk to food safety... but it may lead to slower coagulation.