



# Gelatin and its applications

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# Nitta Gelatin India Limited



- Joint Venture of Nitta Gelatin Inc. Japan and Kerala State Industrial Development corporation, Govt. of Kerala
- Main business activity
  - Bovine bone Gelatin for pharmaceutical, edible and photographic applications
  - Ossein for Gelatin manufacturing
  - Collagen Peptide
- Part of Nitta Gelatin Group Worldwide

# Products from Cattle bones



- Ossein
- Gelatin
- Collagen peptide
- Dicalcium Phosphate

# Gelatin



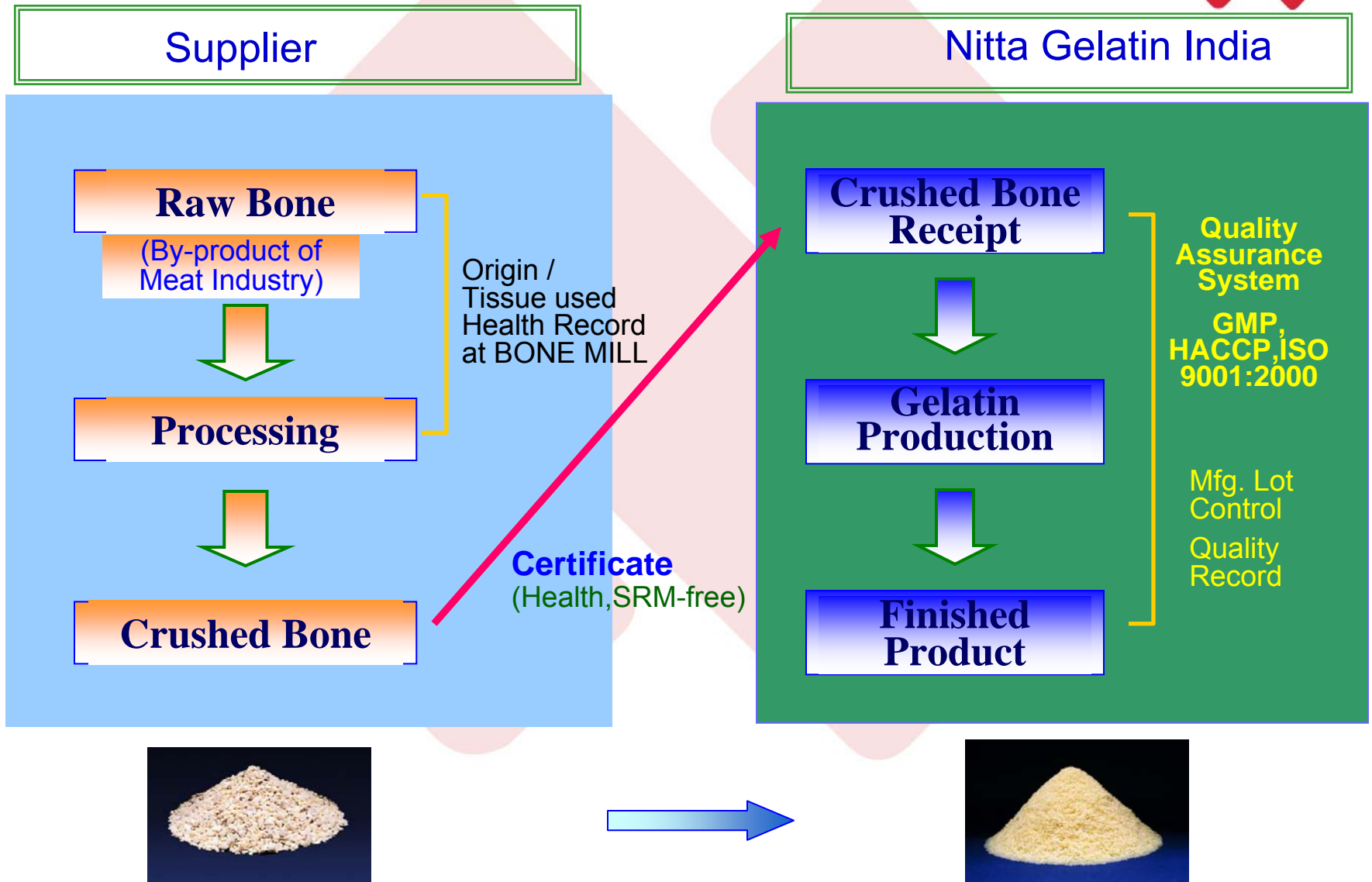
- Gelatin is originated from collagen, a fibrous protein widely distributed in connective tissues, bones and skin of animals.
- Nitta Gelatin India manufactures Type B Gelatin from crushed cattle bones

# Manufacturing Process



- Demineralisation with dilute hydrochloric acid (conc: 4%): Removes Calcium, Phosphorous and other minerals
- Prolonged alkaline process with saturated hydrated lime: Partial hydrolysis of collagen matrix
- Extraction, Purification and Sterilisation at 145°C for min 8 sec.

# Quality Assurance of Crushed Bone and Gelatin



# Properties of Gelatin



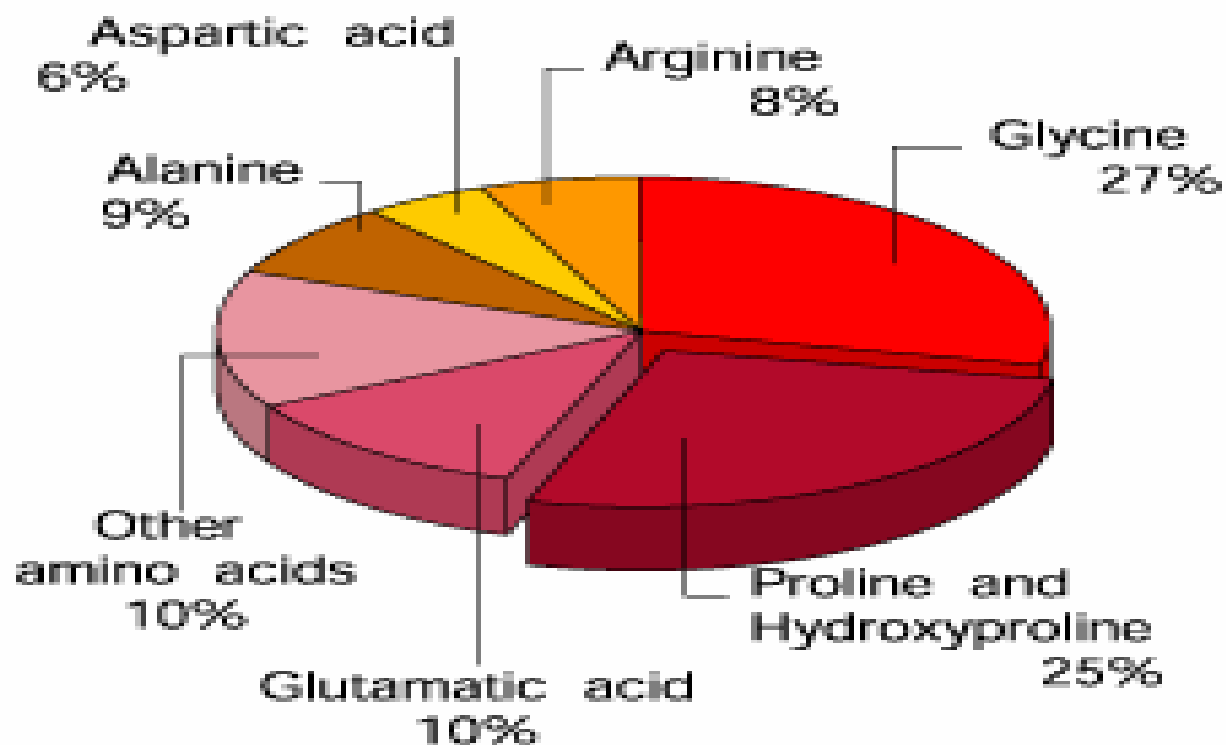
Gelatin possesses the following basic properties:

- Gelatin forms thermally reversible gels with water
- It is non-toxic, widely used in foodstuffs and acceptable for use worldwide (GRAS status)
- It is readily soluble in biological fluids at body temperature.
- It is good film-forming material, producing a strong flexible film
- The unique property of gelatin among other proteins is that it contains highest concentration of amino acids Proline and Hydroxy Proline

# Amino acid composition



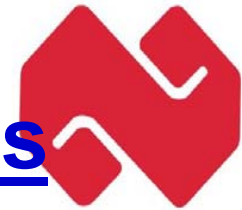
## The Amino Acid Composition of Gelatin



Essential Amino acid Tryptophan is absent in Gelatin



# Gelatin properties and applications



Sl.No.	Properties	Applications
1	Gelling properties	Table Jelleys, Jelly binders etc.
2	Foaming property	Gelatin patch for wound bandage
3	Film forming properties	Hard and Soft Gelatin capsules
4	Milk and Food stabilizing property	Used as stabilizer in yoghurts, cheese manufacture
5	Clarifying property	Wine and Juice clarifications
6	Nutritional property	Good for nail and hair growth

# Applications of Gelatin



## Pharmaceutical

- Hard and Soft Gelatin capsules as drug delivery systems
- Gelatin patch for wound dressings
- Blood plasma expander: A life saving drug to compensate excess blood loss.

## Edible

- Jelly mix
- Yoghurt and ice-cream
- Confectionaries

## Photographic

- In silver halide emulsions
- Coating for photographic film and printing paper

# Hard Gelatin Capsules



- Capsules occupy important role in drug development
- Capsules provide tasteless, odorless delivery system that does not require a coating
- Capsules provide unique capabilities and numerous options for dosage form design and formulation.

# Soft Gelatin Capsules



- Softgel is a hermetically sealed, one-piece capsule with a liquid or semisolid fill
- Soft gelatin capsules are effective drug delivery vehicles for poorly soluble oral dosage forms.
- The softgel formulations are able to mask odor and unpleasant taste and are easy to swallow.
- Softgels are suitable for encapsulation of lipid solutions, suspensions or paste like formulations

# Wound healing applications



- Gelatin haemostatic sponge: Can stop bleeding and enhance healing process
- Gelatin film with EGF growth factor is found to accelerate the wound healing process
- Gelatin sponge are completely resorbed in the body

# Blood plasma expander



- Gelatin is used as colloid in solutions as substitute for plasma
- The plasma substitute is used for controlling the circulating blood volume in the management of shock resulting from hemorrhages or burns
- The gelatin solution should be free from pyrogen and sterile
- The size of gelatin molecules is controlled to prevent gel formation and to maintain sufficient osmotic pressure

# Collagen peptide



- Hydrolyzed form of collagen or gelatin
- Molecular weight: 3000 – 5000 Da
- Same amino acid distribution as that in collagen/gelatin
- Contains di, tri peptides and free amino acids which are easily absorbed in body

# Applications of Collagen peptide



- Dietary supplement to improve joint health
- Dietary supplement to improve the rate of pressure ulcer healing

The presence of Pro-Hyp and Pro-Hyp-Gly peptides stimulate the collagen formation during wound healing process.



# Application of Collagen Peptides



- Cosmetic applications: Numerous scientific studies have demonstrated the fact that a diet containing Collagen Peptide can improve the structure and appearance of skin, hair, and fingernails
- Functional Ingredients' in nutritional applications such as Protein enrichment, Osteoarthritis prophylaxis, substitution of carbohydrates and fats, low fat foods, sport nutrition, beauty products

# Regulatory requirements



- BSE / TSE status
- OIE categorization: Status of India
- Initiatives taken by Govt. of India
- Restrictions in using the animal tissues
- Removal of Specified Risk Material (SRM)
- Validated process requirements

# Regulatory requirements



- European Union regulations
  - EC 853/2004: for marketing Gelatin & raw material for Gelatin intended for human consumption
  - EC 1774/2002: for marketing Gelatin and Raw material for Gelatin not intended for human consumption
- EDQM: European Pharmacopoeia TSE chapter
- USFDA Code of Federal Regulations
- Canadian Food Inspection Agency: Guidelines for Highly Processed Products.
- OIE (Office of International Epizooties) code on Bovine Spongiform Encephalopathy

## Regulatory compliance at Nitta Gelatin



Following International authorities inspected and approved manufacturing facilities.

- USFDA (United States Food and Drug Administration) inspection in 2005
- EDQM (European Directorate for Quality of Medicine) inspection in 2005
- FVO (Food and Veterinary Office, Europe) inspection in 2008.

# Certifications for regulatory compliance at Nitta Gelatin



- EDQM certificate of Suitability for TSE risk free Gelatin
- CAPEXIL certificate exporting Gelatin to EU countries
- Halal certifications from IFANCA and MUI
- GMP approval
- IP/BP/EP/USP license
- ISO 9001:2000
- HACCP

## Products under development



- Collagen peptide from Hide trimmings
- Collagen peptide from fish scales
- Meat meal, a high protein content supplement as ingredient in Pet food
- NUTRRICH - Cost effective Phosphorous Supplement in poultry feed . Tamil Nadu Veterinary and Animal Science University
- OMEGA - Useful manure for food crops and plantation crops  
Kerala Agricultural University Project
- SEEDAID - Seed Growth Promoter using process residue from gelatin. Tamil Nadu Agricultural University, Coimbatore Project

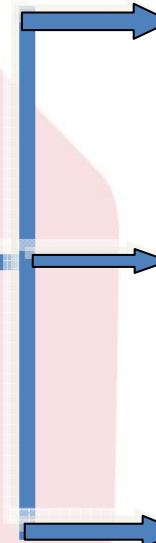
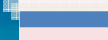
# NGIL Market Presence



 Collagen Peptide Market



Gelatin Market



Thank You