U.S. FDA
21CFR/110
cGMP For Food

EDQM
C.O.S.
European Directorate for
the Quality of Medicines

ISO 9001 SYSTEM CERTIFICATION SGS

GELATIN &
COLLAGEN
TECHNOLOGY

NATURAL PRODUCT

Customers Satisfaction Through Up-to-Date Technology

GELTECH

HISTORY

A leading Gelatin & Collagen Manufacturer in Korea

1998. 07 Company Establishment
1999. 11 Mechanical completion
2000. 06 ISO 9001 certified by SGS
2001. 07 HACCP certified by SGS
2001. 11 Granted COS (Certificate Of Suitability) by E.D.Q.M (European Directorate for the Quality of Medicines)
2003. 03 Started production of Collagen Peptide
2003. 11 Started production of Fish Gelatin
2004. 03 Audited by U.S. FDA in accordance with 21 CFR/110(cGMP)
2005. 09 Audit by Catalent
2006. 11 Registration of patent "Process for preparing sterilized pure water - Soluble collagen peptide" (Registration No. 1006470330000)
2010. 11 Certified by MOH from Islamic Republic of Iran

Geltech-Challenging Infinite Possibilities in the 21st Century

Our company's spirit stems from a love for life and a respect for nature.

As an affiliated company of Suheung, Geltech united with love and harmony makes best efforts to produce the highest quality of gelatin and collagen with awareness of the dignity of human life.

Since operation with consistent efforts for the research and development, Geltech's technology recognized as the best all over the world playing a role as a leading gelatin and collagen manufacturer.

We, Geltech believe our achievement is made by the cooperation and support from our customers and will continuously make our efforts for research to contribute the improvement of human's health and life.

Factory View

A Leading Gelatin & Collagen Manufacturer in Korea

Geltech is a leading gelatin & collagen manufacturer in Korea approved by U.S. FDA in accordance with 21 CFR/110 (cGMP for Food) and C.O.S (Certificate Of Suitability) granted by E.D.Q.M (European Directorate for the Quality of Medicines).

Gelatin Manufacturing Process

Geltech maintains its manufacturing process control with features such as immediate usage of fresh raw materials with fully automated facilities meeting optimum production standards, strict inspections during production to ensure uniform finished products and applications of validated testing procedures.

Cooking

Filtration

Ultra Filtration

Ion Exchange

Evaporation

Noodling

Drying

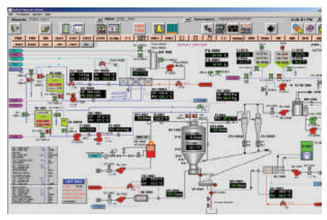
Warehouse

Computerized Process

Geltech's superiority begins with state-of-the-art facilities and full automation of all processes from the treatment of raw materials to the output of final product, making it possible produce gelatin free from any contamination by microbes.

Dozens of tests during each process, from pre-control of incoming raw materials to inspection of finished products, contributes to Geltech's top quality gelatin.

Computerized Process



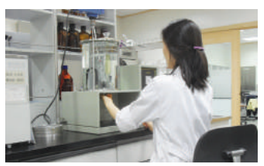
Research & Development

Geltech is committed to customer satisfaction by continuing to develop new products maintaining strict quality control. Geltech is doing our best efforts to make the highest quality fulfilling a close validation of our facilities and testing equipment in accordance with 21 CFR/110 (cGMP for food) by U.S. FDA.
Geltech creates new technologies through internal development and continuous investment.

AAS
[Atomic Absorption Spectrophotometer]

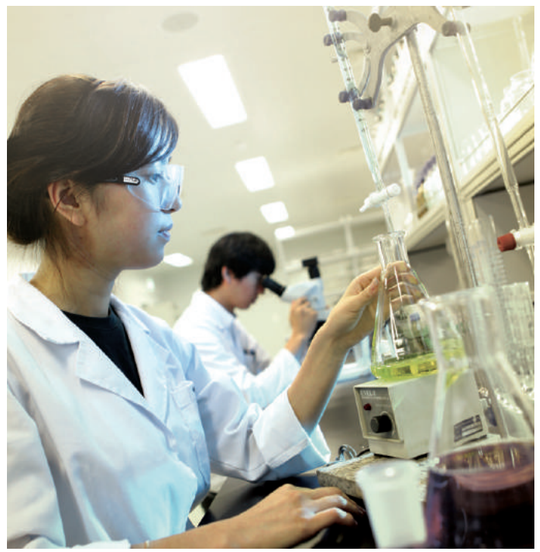
GPC [Gel Permeation Chromatography]

Texture Analyzer



Pipette Viscosimeter

The highest quality is attained by closely monitoring production.
With strict quality control, Geltech combines the most advanced testing equipment with special expertise to make the highest quality gelatin, assuring customer's satisfaction.

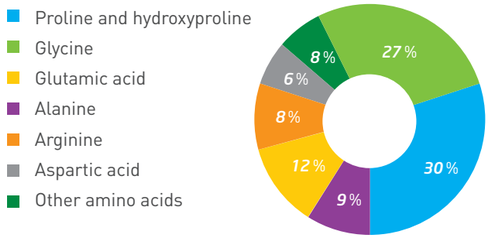


Gelatin Properties

What Is Gelatin?

Gelatin is extracted from collagen, the major structural protein in connective tissues in the animal bones or skin.
It is classified as a protein being composed of twenty amino acids.

[Gelatin amino-acid composition]



Gelatin Properties

[Gel Strength]

The value of gel strength is measured at 6.67% concentration of gelatin after 16-17 hour setting at the temperature of 10℃.
Gel strength which is one of the most important physical properties with viscosity varies by the gelatin concentration, pH, temperature and setting time.

[Viscosity]

Gelatin viscosity varies by pH, temperature and concentration. Viscosity of gelatin solution reaches its minimum at isoelectric point.
The viscosity of gelatin drops when the solution is heated at high temperature for a long time. pH influences the viscosity of gelatin as well.

[Viscosity Breakdown]

Gelatin in solution is subject to thermal degradation or enzymatic hydrolysis. The extent of thermal degradation is a function of temperature, time and pH and is minimal at near-neutral pH.

[pH]

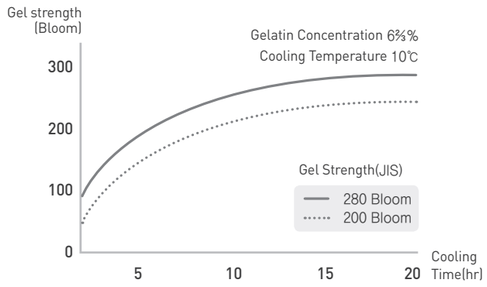
Gelatin is generally supplied with pH in the range of 5.0~6.0 since this represents a reasonable compromise between the greater thermal stability at near-neutral pH and the greater resistance to bacterial growth at low pH.

[Isoelectric Point]

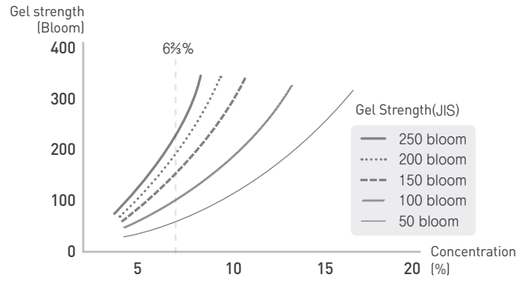
This is the pH of a gelatin solution at which the gelatin molecules have zero net charges and thereby shows no net migration on application of an electric field.
The swell of gelatin gets slower and its viscosity gets lower at isoelectric point.

Gel Strength

[The effect of setting time on gel strength]

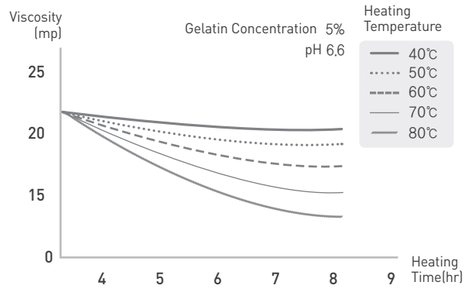


[The effect of concentration on gel strength]

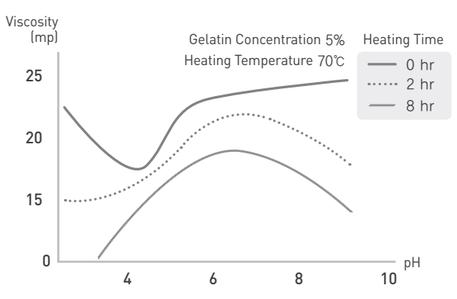


Viscosity

[The effect of temperature on viscosity]



[The effect of pH on gel change of viscosity]



Gelatin Applications

Various Grades of Gelatin Leads to Satisfied Customers

Geltech produces various grades of gelatin for a broad range of applications, from edible and pharmaceutical uses to industrial.

Edible Gelatin

Gelatin is used to make jelly, chocolate, gum and other desserts since its foaming properties can be added to the manufacturing of marshmallow, gummy candy, cakes. Gelatin is often used in ham and sausage because of its cohesive powder.
Gelatin is added to transparent juice and wines as well.

Pharmaceutical Gelatin

The major consumption of gelatin in the pharmaceutical application is for hard capsule and soft capsule with the film forming characteristic of gelatin to protect its content from being oxidized and vaporized when encapsulated and its disintegration characteristic in the human stomach. Gelatin is also used in the tablets, suppositories and pills, etc.

Industrial Gelatin

Gelatin is used in the banknote and paper sizing in order to improve folding properties and its quality. It also acts as an adhesive agent to enhance the value of goods including musical instruments, furniture, artificial fruits and books.

Gelatin Product List

Bovine Bone & Skin Gelatin

Application	Grade	Gel strength	Viscosity	Transmittance	Ash	Particle size
Edible	100 Bloom	90~110 Bloom	20~30 mps	≥90%	≤2%	10~60 U.S Mesh
	150 Bloom	140~160 Bloom	25~35 mps			
	200 Bloom	190~210 Bloom	28~34 mps			
	220 Bloom	210~230 Bloom	28~34 mps			
	250 Bloom	240~260 Bloom	30~40 mps			
Pharmaceutical	Soft Capsule	140~160 Bloom	34~38 mps	≥90%	≤1.5%	10~60 U.S Mesh
	Soft Capsule	190~210 Bloom	27~32 mps			8~40 U.S Mesh
	Hard Capsule	250 Bloom	45~48 mps			8~40 U.S Mesh

Fish Gelatin

It is derived from fish scales and/or skins. Our fish gelatin is free from unpleasant fish odor and has very light in color.

Application	Grade	Gel strength	Viscosity	Color	Ash
Pharmaceutical	Soft Capsule	200 Bloom	30~36 mps	≥40%	≤1%
	Hard Capsule	250 Bloom	35~42 mps	≥50%	
Edible	Edible	150~250 Bloom	35~42 mps	≥40%	≤1%

※Note : Above specification is manufacturer's standard and subject to change to meet customer's requirements

Succinyl Gelatin

A modified gelatin for prevention of cross linking of gelatin capsules.
Cross links of gelatin capsules occurs primarily by the reaction of aldehyde in the liquid fill or in the plasticizer such as glycerine and NH3 branch in the gelatin. But succinylated gelatin eliminates the chances of cross linking by the substitution of NH3 to COOH and very useful for the liquid encapsulation which are subject to the cross linking problems such as multi-vitamine product, minerals, herb extraction and mixture, etc.

Application	Grade	Gel strength	Viscosity	Transmittance	Ash
Pharmaceutical	Soft Capsule	200 Bloom	37~45 mps	≥90%	≤3.5%

Collagen Manufacturing Process

Computerized Process

Spray Dryer

Superiorities Of Geltech Collagen

- Geltech's collagen peptide is produced by further hydrolysis of the gelatin produced at state-of-the-art facilities in the Geltech factory which is approved by U.S. FDA in accordance with 21CFR/110 granted by the EDQM(European Directorate for the Quality of Medicines).
- Free from unpleasant odor and disagreeable taste through the de-odoring process such as activated carbon filtering and deaeration system.
- Low molecular weight (ca 2,000) product makes easy to be digested by the human body.
- Molecular weight is subject to change to meet customer's requirements. (1000, 2000, 4000 etc)
- Various grades of collagen is supplied to meet customer's requirements (Regular, Granule)
- Consistent quality supply through the strict quality control by a modern computer system.

Hydrolysis

Activated Carbon Filtering

Filtration

Deaeration

Ultra-heat Sterilization

Packaging

Collagen Properties

Amino Acid Properties In Collagen Peptide

Collagen hydrolysate or collagen peptide is composed of 20 amino acids. Out of 20 amino acids glycine, proline and hydroxyproline represent more than 50% of total amino acids which is very unique and much higher than in other protein. Glycine function in deep sleep and inhibiting cholesterol. Hydroxyproline helps to be produced of collagen in the human body and it's more effective taking with Vitamin C.

Major Functions Of Amino Acid

- Amino acid is source material composed of muscle and it creates energy.
- Amino acid helps for metabolism.
- Amino acid helps for the regeneration and restoration of human tissues.

Gelatin → HYDROLYSIS ENZYMES → Collagen (Collagen peptide)

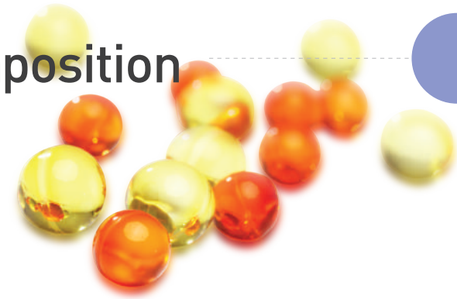
Ca. M.W. 〉50,000 — Ca. M.W. 〈2,000

Distribution And Functions Of Collagen In The Body

Collagen is the major structural protein constituent of skin, tendon, cartilage, bone and connective tissues in the mammalia representing about 30% animal protein. And it accounts for 70% of skin and 20% of bone's weight.

Skin	Collagen accounts for 70% of dermis of human skin. It improves skin moisture and prevents deep wrinkles.
Bone	Collagen helps your body absorb calcium because of its cell adhesion's functions.
Cartilage	Collagen accounts for 50% of cartilage.
Fascia	Retain the body's elasticity by composing strong membrane protecting intestine and muscle.
Others	Tendon, Hair, Nails

Collagen Product List & Composition



Collagen Product List

Product	Grade	Particle Form	Bulk Density	Protein	Viscosity	pH	Moisture	Average M.W	Application
Fish collagen	FCP-R	Regular	0.36~0.40	≥90%	10~25mps	5.0~6.5	≤8%	1,000 or 2,000	Drinks and Powder Mix
	FCP-G	Granule	0.30~0.35						
Bovine collagen	HCP-R	Regular	0.36~0.40						
	HCP-G	Granule	0.30~0.35						

※ Note : Finer particle (Bulk density ≥0.45) is available by the customer's requirements

Collagen Amino Acid Composition

Amino acid	Fish collagen	Bovine collagen
Glycine	24.4 ~26.7	21.0 ~27.5
Proline	9.3 ~ 13.3	13.5 ~15.7
Hydroxyproline	7.3 ~ 7.7	12.0 ~14.5
Glutamic acid	5.7 ~ 9.3	10.0 ~11.6
Arginine	5.4 ~ 8.9	8.0 ~ 9.0
Alanine	9.1 ~ 12.0	8.0 ~9.0
Aspartic acid	4.6 ~ 5.5	4.5 ~ 7.0
Serine	3.0 ~ 3.5	3.2 ~ 4.2
Lysine	2.7 ~ 3.2	3.5 ~ 4.6
Threonine	2.9 ~ 3.0	2.0 ~ 2.4
Leucine	2.1 ~ 2.9	3.0 ~ 3.5
Valine	1.9 ~ 2.3	2.2 ~ 3.4
Methionine	1.0 ~ 1.6	0.6 ~ 0.9
Isoleucine	0.9 ~ 1.5	1.5 ~ 1.8
Phenylalanine	1.4 ~ 1.4	2.2 ~ 2.5
Hydroxylysine	0.5 ~ 0.7	0.8 ~ 1.2
Tyrosine	0.2 ~ 0.6	0.2 ~ 1.0
Histidine	0.4 ~ 0.5	0.7 ~ 0.8
Cystine	0.0 ~ 0.5	0.0 ~ 0.0

Collagen Peptide Applications

Recently, products using collagen peptide are launched in diverse industries.

- Beauty : Cosmetic, Beauty mask pack, Drinks
- Food : Drinks, Yogurt, Powder stick products etc,
- Health : Health functional food

GELATIN &
COLLAGEN
TECHNOLOGY

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Revision version