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Product Information

Gelatin

Catalog Number **G6650, G9382, G1393, G9391, G6144, G2625, G2500, G8150, G1890, G9136, G0411, G7765, and G7041**

CAS RN: 9000-70-8
Synonyms: Gelatine, Teleostean gelatin (G7765 and G7741)

Product Description

Gelatin is a heterogeneous mixture of water-soluble proteins of high average molecular masses, present in collagen. The proteins are extracted by boiling skin, tendons, ligaments, bones, etc. in water.[1] Type A gelatin is derived from acid-cured (acid-hydrolyzed) tissue. Type B gelatin is derived from lime-cured (base/alkaline-hydrolyzed) tissue.

Physical Properties:
Isoelectric point (pI): The charge on a gelatin molecule and its isoelectric point are primarily due to the carboxyl, amino, and guanidino groups on the side chains.

- Type A gelatin has 78-80 millimoles of free carboxyl groups per 100 g of protein and a pI of 7.0-9.5.
- Type B has 100-115 millimoles of free carboxyl groups per 100 g of protein and a pI of 4.7-5.3.[2]

Bloom number:
The Bloom number, as determined by the Bloom gelometer, is an indication of the strength of a gel formed from a solution of known concentration.[2] The Bloom unit is a measure of the force (weight) required to depress a given sample area of gel a distance of 4 mm;[3] the higher the Bloom number, the stronger the gel. A method of determining Bloom strength has been described.[4] Bloom number is proportional to the average molecular mass:

Bloom Number	Average Molecular Mass (Da)
50−125 (Low Bloom)	20,000−25,000
175−225 (Medium Bloom)	40,000−50,000
225−325 (High Bloom)	50,000−100,000

The pH of a 1.5% solution at 25 °C is 3.8 - 5.5 for Type A, and 5.0-7.5 for Type B.

Applications using gelatin include:

- Coating cell culture plates to improve cell attachment for a variety of cell types
- Addition to PCR to help stabilize Taq DNA polymerase[5]
- Use as a blocking reagent in Western blotting, ELISA, and immunohistochemistry[6]
- In bacteriology, gelatin can be used as a component of culture media for species differentiation.[7]
- As a biocompatible polymer, gelatin has been used as a delivery vehicle for the release of bioactive molecules[8]
- Generation of scaffolds for tissue engineering applications.[9]

Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

Dry gelatin stored in airtight containers at room temperature remains unchanged for many years. When heated at 100 °C in the presence of air, gelatin swells, becomes soft, and disintegrates to a carbonaceous mass with evolution of pyridine bases and ammonia. Below 35−40 °C, gelatin swells in and absorbs 5−10 times its weight of water to form a gel.

Gelatin is soluble in glycerol and acetic acid, and more soluble in hot than in cold water.[1] It is practically insoluble in most organic solvents such as alcohol, chloroform, carbon disulfide, carbon tetrachloride, ether, benzene, acetone, and oils.[10]

Sterile solutions of gelatin, stored cold, remain unchanged indefinitely. However, at elevated temperatures, hydrolysis or rupture of peptide bonds occurs, increasing the number of free amino groups. Gel strength and viscosity gradually weaken upon prolonged heating in solution above 40 °C.[11] Extremes in pH, proteolytic enzymes, and bacterial action can accelerate gelatin degradation in solution.[12]

Procedure

Cell Culture Using 2% Solution (Catalog Number G1393): Optimal conditions for attachment must be determined for each cell line and application.

1. Allow gelatin solution to completely liquefy at 37 °C.
2. Coat culture surface with 5-10 mL gelatin solution/cm^2 (i.e., 0.1-0.2 mg/cm^2 gelatin).
3. Allow surface to dry at least 2 hours before introducing cells and medium.

References

1. *The Merck Index*, 12th Ed., p. 742, #4388 (1996).
2. (new 2) "GMIA Gelatin Handbook 2019", Gelatin Manufacturers Institute of America.
3. Osorio, F.A. *et al*., Effects of Concentration, Bloom Degree, and pH on Gelatin Melting and Gelling Temperatures Using Small Amplitude Oscillatory Rheology. *Int. J. Food Properties*, **10(4)**, 841-851 (2007).
4. *United States Pharmacopeia* XX, p. 1017 (1990).
5. Cha, R.S. and Thilly, W.G., "Specificity, efficiency and fidelity of PCR", in *PCR Primer: A Laboratory Manual* (Dieffenbach, C.W., and Dveksler, G.S., eds.). Cold Spring Harbor Laboratory Press (New York), pp. 37-51 (1995).
6. Vogt, R.F. Jr. *et al*., Quantitative differences among various proteins as blocking agents for ELISA microtiter plates. *J. Immunol. Methods*, **101(1)**, 43-50 (1987).
7. Levine, M., and Carpenter, D.C., Gelatin liquefaction by bacteria. *J. Bacteriol.*, **8(4)**, 297-306 (1923).
8. Young, S. *et al*., Gelatin as a delivery vehicle for the controlled release of bioactive molecules. *J. Control Release*, **109(1-3)**, 256-274 (2005).
9. Huang Y, *et al*., *In vitro* characterization of chitosan-gelatin scaffolds for tissue engineering. *Biomaterials*, **26(36)**, 7616-7627 (2005).
10. *Martindale The Extra Pharmacopeia*, 29th Edition (J.E.F. Reynolds, ed.). The Pharmaceutical Press (London), p. 818 (1989).
11. Lieben, F., On the Hydrolysis of Proteins and Peptones at High Temperatures and on the Catalytic Effect of Metal Ions on the Rate of Hydrolysis. *J. Biol. Chem.*, **151(1)**, 117-121 (1943).
12. Croome, R.J., Acid and Alkaline Hydrolysis of Gelatin. *J. Appl. Chem*., **3(6)**, 280-286 (1953).

Related Products

- Gelatin Blocking Buffer, for molecular biology, powder blend (Catalog Number G7663): provides 1 liter of blocking buffer after reconstitution
- Glycerol Gelatin (Catalog Number GG1), prepared with gelatin, glycerol, and phenol: an aqueous slide mounting medium for histological use
- Gelatin Veronal Buffer (Catalog Number G6514)
- Gelatin Iron Medium, for microbiology (Catalog Number G0289)
- Lactose Gelatin Broth (Base), for microbiology (Catalog Number 61348)
- Gelatin Hydrolysate Enzymatic (Catalog Number G0262)
- Nutrient Gelatin, for microbiology (Catalog Number 70151)

CS,MAC,KTA,MAM,GCY,SM 10/20-1

Gelatin Selection Guide

Catalog Number	Description	Bloom	Storage Temperature	Notes	Applications
G6144	Gelatin from porcine skin, Type A	80-120	Room temperature	Derived from acid-cured tissue	Recommended for use as a cell culture substratum.*
G2625	Gelatin from porcine skin, Type A	~175	Room temperature	Derived from acid-cured tissue	Recommended for use as a cell culture substratum.*
G2500	Gelatin from porcine skin, Type A	~300	Room temperature	Derived from acid-cured tissue	Recommended for use as a cell culture substratum.*
G1890	Gelatin from porcine skin, Type A, powder, cell culture tested	~300	Room temperature	Derived from acid-cured tissue	Recommended for use as a cell culture substratum.*
G9136	Gelatin from porcine skin, Type A, lyophilized powder, γ-irradiated, cell culture tested	~300	Room temperature	Derived from acid-cured tissue	Recommended for use as a cell culture substratum.*
G0411	Prionex® Highly purified Type A, aqueous solution		Room temperature	Aseptically proceesed; derived from porcine source	A protein stabilizer, an alternative to BSA and HSA.
G6650	Gelatin from bovine skin, Type B	~75	Room temperature	Derived from lime-cured tissue	Recommended for use as a cell culture substratum.*
G9382	Gelatin from bovine skin, Type B	~225	Room temperature	Derived from lime-cured tissue	Recommended for use as a cell culture substratum.*
G1393	2% Gelatin solution, Type B (from bovine skin), cell culture ested		2-8 °C	Derived from lime-cured tissue. Prepared in tissue culture grade water. Endotoxin-tested	Recommended for use as a cell culture substratum.*
G9391	Gelatin from bovine skin, Type B, powder, cell culture tested	~225	Room temperature	Derived from lime-cured tissue	Recommended for use as a cell culture substratum.*
G7765	Gelatin from cold water fish skin, ~45% in H2O		2-8 °C	Contains 0.15% propyl *p*-hydroxybenzoate and 0.2% methyl *p*-hydroxybenzoate as preservatives. Molecular mass: ~60 kDa	Used as a blocking agent in immunochemistry.
G7041	Gelatin from cold water fish skin, solid		Room temperature		Used as a blocking agent in immunochemistry.

*Recommended for use as a cell culture substratum at 0.1-0.2 mg/cm^2 or 5-10 mL/cm^2. Optimal concentration will depend on cell type as well as the application or research objectives.

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