

Product Information

Gelatin

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

CAS RN: 9000-70-8

Synonyms: Gelatine, Teleostean gelatine (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 research 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:

(Cat No. 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/cm² (for example, 0.1-0.2 mg/cm² 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 (Cat No. G7663): provides 1 liter of blocking buffer after reconstitution.
- Glycerol Gelatin (Cat No. GG1), prepared with gelatin, glycerol, and phenol: an aqueous slide mounting medium for histological use.
- Gelatin Veronal Buffer (Cat No. G6514).
- Gelatin Iron Medium, for microbiology (Cat No. G0289).
- Lactose Gelatin Broth (Base), for microbiology (Cat No. 61348).
- Gelatin Hydrolysate Enzymatic (Cat No. G0262).
- Nutrient Gelatin, for microbiology (Cat No. 70151).

Notice

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

The information in this document is subject to change without notice and should not be construed as a commitment by the manufacturing or selling entity, or an affiliate. We assume no responsibility for any errors that may appear in this document.

Technical Assistance

Visit the tech service page at [SigmaAldrich.com/techservice](https://www.sigmaaldrich.com/techservice).

Standard Warranty

The applicable warranty for the products listed in this publication may be found at [SigmaAldrich.com/terms](https://www.sigmaaldrich.com/terms).

Contact Information

For the location of the office nearest you, go to [SigmaAldrich.com/offices](https://www.sigmaaldrich.com/offices).

Gelatin Selection Guide

| Cat No. | 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 processed; 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 tested | | 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 H ₂ O | | 2-8 °C | Contains 0.15% propyl <i>p</i> -hydroxybenzoate and 0.2% methyl <i>p</i> -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/cm². Optimal concentration will depend on cell type as well as the application or research objective.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

The vibrant M, Millipore, and Sigma-Aldrich are trademarks of Merck KGaA, Darmstadt, Germany or its affiliates. All other trademarks are the property of their respective owners. Detailed information on trademarks is available via publicly accessible resources.
© 2021 Merck KGaA, Darmstadt, Germany and/or its affiliates. All Rights Reserved.

G6650 et al pis Rev 05/21

