

Thymosin Beta-4

Formula: C₂₁₂H₃₅₀N₅₆O₇₈S

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Section 1 — Product and Company Identification

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	[(1-carboxy-2-hydroxyethyl... [truncated — full value in PDF metadata]
Identified Uses	Research laboratory chemical for in vitro scientific research and development use only.
Restriction on Use	Not for human or veterinary use. Not for food, drug, cosmetic, household, agricultural, clinical, therapeutic, or diagnostic applications.

Manufacturer / Supplier

Company	Arcane Peptides
Address	30 N Gould St, Sheridan, WY 82801, US
Phone	+1-801-306-4955
Website	https://arcanepeptides.com/
Emergency Contact	CHEMTREC
Emergency Phone	800-424-9300 CHEMTREC (USA) 24 Hours/day; 7 Days/week

Section 2 — Hazard Identification

Classification of the substance

Not classified based on currently available data; however, data is limited and hazards cannot be fully characterized. The absence of classification should not be interpreted as a determination of the absence of hazard.

Classification has been conducted in accordance with 29 CFR 1910.1200 (OSHA HazCom 2012) and GHS Rev.8 using all available data and scientifically valid weight-of-evidence approaches (GHS Rev.8 Chapter 1.3.2.4), including read-across from chemical class and structural considerations where substance-specific study data is not available.

Signal Word: None

GHS Pictograms:

None required based on classification.

Hazard Statements

None. This substance is not classified for any GHS hazard class based on available data.

Precautionary Statements

- P261: Avoid breathing dust, fume, gas, mist, vapors, or spray.
- P264: Wash hands and exposed skin thoroughly after handling.
- P280: Wear protective gloves, protective clothing, and eye/face protection.
- P501: Dispose of contents and container in accordance with local, regional, national, and international regulations.

Precautionary statements are provided as best practice for handling substances with limited toxicological data, and are not a declaration of GHS classification.

Hazards Not Otherwise Classified (HNOC)

None known based on available data and weight-of-evidence assessment. The toxicological properties of this substance have not been fully characterized; handle as a potentially bioactive substance of unknown toxicity.

Section 3 — Composition / Information on Ingredients

Single-substance product. Chemical identity:

Ingredient	CAS Number	Mol. Formula	Mol. Weight	Concentration
Thymosin Beta-4	Not determined	C212H350N56O78S	4963 g/mol	>98% (research grade)

Impurities

No hazardous impurities known to be present above the GHS classification thresholds specified in 29 CFR 1910.1200 Appendix A. Residual synthesis reagents, solvents, and counter-ions may be present at levels consistent with research-grade (>98% purity) material. Balance: non-hazardous impurities. Refer to the accompanying Certificate of Analysis (CoA) for the lot-specific impurity profile.

Section 4 — First Aid Measures

Eye Contact

Rinse cautiously with water for several minutes. If irritation persists, seek medical advice.

Skin Contact

Wash with soap and water. Remove contaminated clothing and wash before reuse. If irritation persists, seek medical advice.

Inhalation

Move affected person to fresh air. If symptoms develop, seek medical advice.

Ingestion

Rinse mouth thoroughly with water. If large amounts are swallowed or if symptoms develop, seek medical advice. Do not induce vomiting unless directed by medical personnel.

Note to Physician

Treat symptomatically. No specific antidote known.

Section 5 — Fire Fighting Measures

Flash Point: *Not determined*

Suitable Extinguishing Media

Use extinguishing media appropriate to the surrounding fire conditions. Carbon dioxide (CO₂), dry chemical powder, foam, or water spray.

Special Hazards

May produce toxic gases upon combustion. Carbon monoxide and other combustion products may be generated.

Protective Equipment for Firefighters

Wear self-contained breathing apparatus (SCBA) and full protective gear. Do not enter fire area without proper protective equipment.

Section 6 — Accidental Release Measures

Personal Precautions

Avoid dust formation. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Use personal protective equipment as described in Section 8.

Environmental Precautions

Prevent further leakage or spillage if safe to do so. Do not allow the product to enter drains, sewers, or waterways.

Containment and Cleanup

Sweep up and shovel. Keep in suitable, closed containers for disposal. Avoid raising dust. Clean contaminated surface thoroughly. Dispose of waste in accordance with local regulations (see Section 13).

Section 7 — Handling and Storage

Handling Precautions

Handle in accordance with good industrial hygiene and laboratory safety practices consistent with OSHA 29 CFR 1910.1200 and 29 CFR 1910.1450 (Laboratory Standard). Because the full toxicological profile of this peptide has not been established, treat it as a potentially bioactive substance of unknown toxicity and minimize all routes of exposure. Conduct weighing, transfer, and reconstitution operations in a chemical fume hood, biosafety cabinet, or other suitable local exhaust ventilation/containment device to control airborne particulates of the lyophilized solid. Wear chemically resistant nitrile gloves, a buttoned laboratory coat, and ANSI Z87.1-compliant safety eyewear; use a NIOSH-approved particulate respirator (e.g., N95 or higher) if engineering controls are insufficient to prevent inhalation of dust. Avoid generating aerosols, dust, and static discharge. Do not eat, drink, smoke, or apply cosmetics in areas where the material is handled. Wash hands and exposed skin thoroughly with soap and water after handling and before leaving the work area. To preserve product integrity, avoid exposing the lyophilized peptide to moisture, repeated freeze-thaw cycles after reconstitution, vigorous vortexing, and direct sunlight, as exposure to moisture will decrease long-term stability of lyophilized peptides (per general peptide handling guidance). Decontaminate work surfaces and reusable equipment after use, and manage all waste in accordance with applicable federal, state, and local regulations (40 CFR 260-273).

Storage Conditions

Store the lyophilized (solid) peptide tightly sealed in its original container under an inert, dry atmosphere, protected from light, moisture, and heat. For long-term storage, keep at -20 degC or colder (-80 degC is preferred for extended storage), consistent with general guidance for synthetic peptides. After reconstitution in an aqueous or buffered solution, store refrigerated at 2-8 degC only for short-term use, or aliquot into single-use working portions and store frozen at -20 degC to -80 degC to minimize freeze-thaw cycles; the addition of a carrier protein (e.g., 0.1% BSA) in dilute solutions can help preserve the peptide in storage. Allow sealed containers to equilibrate to room temperature before opening to prevent condensation of atmospheric moisture onto the solid. Store away from incompatible materials (see below) and segregated from foodstuffs. Keep out of reach of unauthorized personnel; this is a research-use-only material and is not intended for human or veterinary use. No specific shelf-life is established by an authoritative regulatory source; rely on container labeling and periodic identity/purity verification.

Incompatibilities

No specific incompatibility data for thymosin beta-4 are published by OSHA, NIOSH, EPA, or ECHA. Based on the functional groups present in the peptide (free amine, carboxylic acid, hydroxyl, amide, and thioether side chains, plus a trifluoroacetate counter-ion in the salt form), avoid contact with: strong oxidizing agents (e.g., peroxides, hypochlorites, permanganates, nitric acid), which can oxidize methionine and other residues; strong acids and strong bases, which can hydrolyze peptide bonds and side-chain amides; strong reducing agents; electrophilic alkylating and acylating reagents; and moisture/humidity, which promotes hydrolytic degradation of the solid. Protect from heat, ignition sources, and prolonged exposure to light. Do not store with incompatible chemicals or in reactive metal containers; use inert, tightly sealed glass or polypropylene containers.

Section 8 — Exposure Controls / Personal Protection

Exposure Limits

No regulatory occupational exposure limits (OEL) have been established by OSHA, ACGIH, NIOSH, or equivalent bodies for Thymosin Beta-4 (C212H350N56O78S; MW ~ 4963 Da). No biological exposure indices (BEIs) have been established. Control exposure to the lowest level reasonably achievable (ALARA) using the engineering controls and PPE specified below. Handle as a potentially bioactive substance of unknown toxicity.

Engineering Controls

Use in a dedicated laboratory area with adequate general and local exhaust ventilation. Weigh, transfer, and reconstitute the dry solid inside a certified chemical fume hood, ventilated balance enclosure, or Class I/II biological safety cabinet to minimize generation of airborne dust or aerosols, consistent with the hierarchy of controls described in OSHA 29 CFR 1910.1450 (Laboratory Standard) and the NIOSH guidance on handling hazardous drugs/active pharmaceutical ingredients (NIOSH Publication 2004-165 and successor lists). Keep containers closed when not in use; avoid open handling outside containment. Provide an emergency eyewash and safety shower meeting ANSI Z358.1 within the work area. Decontaminate work surfaces after each use using a validated cleaning procedure (aqueous detergent followed by water rinse).

Personal Protective Equipment

Respiratory Protection: Respiratory protection is not normally required when material is handled inside a properly functioning fume hood or containment enclosure. If operations may generate dusts, mists, or aerosols outside containment, wear a NIOSH-approved (42 CFR Part 84) air-purifying respirator equipped with N100/P100 particulate filters, or a powered air-purifying respirator (PAPR) with HEPA filters for higher-exposure tasks. Respirator selection, fit-testing, and use must comply with the OSHA Respiratory Protection Standard (29 CFR 1910.134).

Hand Protection: Wear chemically resistant, disposable laboratory gloves selected in accordance with EN ISO 374-1 / ASTM F739. Nitrile gloves (minimum 0.11 mm / 4 mil thickness) are generally suitable for brief contact with aqueous solutions of peptides; double-gloving is recommended when handling the neat solid or concentrated stock solutions. Inspect gloves before use, change immediately if contamination or damage is suspected, and wash hands thoroughly with soap and water after glove removal. No glove breakthrough data specific to Thymosin Beta-4 are available in published authoritative sources, so verify suitability with the glove manufacturer for the intended solvent system (e.g., water, dilute acetic acid, DMSO).

Eye / Face Protection: Wear tightly fitting safety glasses with side shields meeting ANSI/ISEA Z87.1. Chemical splash goggles are required when handling solutions, performing reconstitution, or when there is any potential for splashing; add a face shield over goggles for tasks with significant splash or aerosol potential. An ANSI Z358.1-compliant emergency eyewash must be immediately accessible.

Skin Protection: Wear a closed, long-sleeved laboratory coat (preferably a barrier/chemo-type coat with knit cuffs for handling the dry powder) over full-length clothing and closed-toe, non-absorbent shoes, as required by OSHA 29 CFR 1910.132 and 1910.1450. Use disposable sleeve covers and an impervious apron when handling larger quantities or concentrated stock solutions. Remove contaminated PPE immediately and do not reuse disposable items; launder reusable garments separately from street clothing. Do not eat, drink, smoke, or apply cosmetics in areas where the substance is handled.

Section 9 — Physical and Chemical Properties

Physical State	Solid (research-grade lyophilised powder or crystalline solid)
Appearance	White lyophilized powder
Odor	Odorless
Odor Threshold	Not available.

Boiling Point	<i>Not determined</i>
Melting Point	<i>Not determined</i>
Flash Point	<i>Not determined</i>
Auto-ignition Temperature	No data available.
Decomposition Temperature	No experimental data available.
Vapor Pressure	<i>Not determined</i>
Vapor Density	<i>Not determined</i>
Specific Gravity	<i>Not determined</i>
Partition Coefficient (log Kow)	No experimental data available.
Solubility	Soluble in water; soluble in phosphate buffered saline
Stability in Solution	Subject to hydrolytic and oxidative degradation typical of the chemical class; store reconstituted solutions refrigerated or frozen, protect from light, and use within the stability window indicated on the Certificate of Analysis.
pH	<i>Not determined</i>
Molecular Weight	4963 g/mol
Molecular Formula	C212H350N56O78S

Section 10 — Stability and Reactivity

Chemical Stability: Stable under normal conditions of use, storage, and transport.

Conditions to Avoid: Excessive heat, open flames, sparks, incompatible materials.

Incompatible Materials: No specific incompatibility data for thymosin beta-4 are published by OSHA, NIOSH, EPA, or ECHA. Based on the functional groups present in the peptide (free amine, carboxylic acid, hydroxyl, amide, and thioether side chains, plus a trifluoroacetate counter-ion in the salt form), avoid contact with: strong oxidizing agents (e.g., peroxides, hypochlorites, permanganates, nitric acid), which can oxidize methionine and other residues; strong acids and strong bases, which can hydrolyze peptide bonds and side-chain amides; strong reducing agents; electrophilic alkylating and acylating reagents; and moisture/humidity, which promotes hydrolytic degradation of the solid. Protect from heat, ignition sources, and prolonged exposure to light. Do not store with incompatible chemicals or in reactive metal containers; use inert, tightly sealed glass or polypropylene containers.

Hazardous Decomposition Products: Upon combustion or decomposition may produce: carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO_x), sulfur oxides (SO_x).

Hazardous Polymerization: Will not occur.

Section 11 — Toxicological Information

The toxicological properties of this substance have not been fully characterized. Where no authoritative study data was identified, endpoint classifications are based on a weight-of-evidence approach using read-across from the compound's chemical class and structural features, per GHS Rev.8 Chapter 1.3.2.4. "Not classified" entries below mean "not classified based on currently available data" — hazards cannot be excluded.

Acute Toxicity: Acute toxicity data specific to Thymosin Beta-4 are limited and the toxicological profile is not fully characterized. No acute oral, dermal, or inhalation LD₅₀/LC₅₀ values from authoritative sources (ECHA, NIOSH, peer-reviewed literature) have been identified for this substance. A published Phase I clinical investigation (Ruff et al., reported in PubMed PMID 20536472) found that intravenous synthetic Thymosin Beta-4 administered to healthy human volunteers at single and repeat daily doses ranging from 42 to 1260 mg was tolerated without dose-limiting toxicity; this clinical observation does not constitute an authoritative occupational toxicity value and does not exclude

hazards from occupational routes of exposure (oral, dermal, inhalation of powders or aerosols). Not classified for acute toxicity based on currently available data; hazards cannot be excluded (GHS Rev.8, S1.3.2.4).

Skin Corrosion / Irritation: No data from authoritative sources (ECHA, OECD test guideline studies, peer-reviewed literature) on skin corrosion or irritation potential of Thymosin Beta-4 have been identified. Not classified for skin corrosion/irritation based on currently available data; hazards cannot be excluded. As a synthetic polypeptide powder, mechanical irritation of skin on direct contact is possible. Handle with impervious gloves and avoid skin contact.

Serious Eye Damage / Irritation: No data from authoritative sources on serious eye damage or eye irritation potential of Thymosin Beta-4 have been identified. Not classified for serious eye damage/eye irritation based on currently available data; hazards cannot be excluded. Particulate contact with the eye may cause mechanical irritation. Use eye protection in accordance with Section 8.

Skin / Respiratory Sensitization: No respiratory or skin sensitization studies conducted to OECD test guidelines (e.g., OECD 406, 429, 442) and reported through authoritative sources have been identified for Thymosin Beta-4. Polypeptides can in principle elicit immunological responses upon repeated exposure, and this hazard endpoint has not been characterized for this substance. Not classified for respiratory or skin sensitization based on currently available data; hazards cannot be excluded (GHS Rev.8, S1.3.2.4).

Germ Cell Mutagenicity / Genotoxicity: Not classified based on currently available data; hazards cannot be excluded. Weight-of-evidence assessment applied using read-across from chemical class and structural considerations (GHS Rev.8 Chapter 1.3.2.4); no authoritative substance-specific study data identified.

Carcinogenicity: Thymosin Beta-4 is not listed as a carcinogen by IARC, the U.S. National Toxicology Program (NTP) Report on Carcinogens, OSHA (29 CFR 1910 Subpart Z), the EPA IRIS program, or the ACGIH TLV carcinogen list. No carcinogenicity bioassays meeting OECD or NTP standards have been identified in the public peer-reviewed literature. Not classified for carcinogenicity based on currently available data; hazards cannot be excluded due to the absence of long-term carcinogenicity studies.

Reproductive Toxicity: No reproductive or developmental toxicity studies conducted to OECD test guidelines (e.g., OECD 414, 416, 443) and reported through authoritative sources (ECHA, NTP, peer-reviewed literature) have been identified for Thymosin Beta-4. Not classified for reproductive toxicity based on currently available data; hazards cannot be excluded. Women of childbearing potential and pregnant or nursing workers should avoid exposure as a precautionary measure.

Specific Target Organ Toxicity (STOT): Specific target organ toxicity - single exposure (STOT-SE) and specific target organ toxicity - repeated exposure (STOT-RE): no studies conducted to OECD test guidelines (e.g., OECD 407, 408, 412, 413) and reported through authoritative sources have been identified for Thymosin Beta-4. The toxicological profile of this substance following occupational single or repeated exposure is not fully characterized. Not classified for STOT-SE or STOT-RE based on currently available data; hazards cannot be excluded (GHS Rev.8, S1.3.2.4). Minimize all routes of exposure as a matter of prudent occupational hygiene.

Aspiration Hazard: Not classified based on currently available data; hazards cannot be excluded. Weight-of-evidence assessment applied using read-across from chemical class and structural considerations (GHS Rev.8 Chapter 1.3.2.4); no authoritative substance-specific study data identified.

Derived No-Effect Level (DNEL): No data available — no substance-specific DNEL has been derived.

Predicted No-Effect Concentration (PNEC): No data available — no substance-specific PNEC has been derived.

Section 12 — Ecological Information

No authoritative substance-specific ecotoxicity study data was identified. In the absence of experimental data, adverse environmental effects cannot be fully excluded.

Ecotoxicity: No substance-specific experimental aquatic toxicity data (e.g., fish LC50, Daphnia EC50, algal ErC50) have been identified for Thymosin Beta-4 (C212H350N56O78S; MW ~4963) in authoritative sources including ECHA, EPA ECOTOX, or peer-reviewed literature. Not classified as hazardous to the aquatic environment (acute or chronic)

under GHS based on weight-of-evidence assessment in the absence of authoritative experimental data. As a high-molecular-weight endogenous polypeptide intended for laboratory research use only, environmental release is expected to be minimal. Prevent release to drains, surface water, and groundwater.

Persistence and Degradability: No substance-specific experimental data on environmental persistence, ready biodegradability (e.g., OECD 301 series), or hydrolytic/photolytic half-lives have been identified for Thymosin Beta-4 in authoritative sources (ECHA, EPA, peer-reviewed literature). Environmental fate has not been characterized.

Bioaccumulative Potential: No substance-specific experimental bioconcentration factor (BCF), bioaccumulation factor (BAF), or measured log Kow values have been identified for Thymosin Beta-4 in authoritative sources. Given the high molecular weight (~4963 Da) and highly polar, ionizable, multi-charged nature of the 43-residue polypeptide, significant bioaccumulation in aquatic organisms is not anticipated; however, no authoritative experimental confirmation has been identified.

Mobility in Soil: No substance-specific experimental data identified.

Other Adverse Effects: No other adverse environmental effects identified. The substance is not included on the Montreal Protocol list of ozone-depleting substances.

Section 13 — Disposal Considerations

Dispose of contents and container in accordance with all local, state, and federal regulations. Do not dispose of this material into sewers or waterways. Contact a licensed waste disposal company for disposal guidance.

US: Dispose in accordance with 40 CFR Parts 261-270 (RCRA). **EU:** Dispose according to Directive 2008/98/EC (Waste Framework Directive).

Section 14 — Transport Information

DOT (US)	Not regulated as dangerous goods under DOT (49 CFR) based on current classification.
IATA	Not regulated as dangerous goods under IATA Dangerous Goods Regulations based on current classification.
IMDG	Not regulated as dangerous goods or as a marine pollutant under the IMDG Code based on current classification.
UN Number	Not applicable.

Transport classifications above are based on the substance's intrinsic hazard classification; the shipper must independently verify the classification, packaging, labelling, and documentation requirements for their specific shipment configuration, quantity, and carrier (including airline policies) prior to dispatch.

Section 15 — Regulatory Information

United States

TSCA (Toxic Substances Control Act): May be eligible for exemption from TSCA inventory listing requirements under the R&D provisions of 40 CFR 720.36, depending on actual conditions of use. This substance is supplied solely for use in scientific research and development in small quantities; it is not intended for, and shall not be used for, any commercial manufacturing, processing, or distribution in commerce. The importer/end user is responsible for confirming that the R&D exemption criteria are met for their specific use. **OSHA HazCom 2012:** This SDS was prepared in accordance

with 29 CFR 1910.1200 (HazCom 2012), aligned with the Globally Harmonized System (GHS) Rev. 8. **CERCLA / SARA Title III:** Not listed as a CERCLA Hazardous Substance (40 CFR 302.4); not subject to SARA 313 reporting based on available classification data. Users must independently verify applicability for their facility.

European Union

REACH (EC 1907/2006): Supplied solely for Scientific Research and Development (SR&D) use in quantities below 1 tonne per year per legal entity. Where applicable, this use may be exempt from REACH registration obligations under the scientific research and development provisions of REACH Article 3(23) and the conditions of Article 26(3); importers/users should independently verify the applicable exemption pathway for their specific use. If the substance is used as part of a formally notified Product and Process Oriented Research and Development (PPORD) programme, the separate notification procedure under REACH Article 9 (with a 5-year exemption renewable once) may apply instead. **CLP (EC 1272/2008):** Not classified under CLP based on available data; no harmonized classification entry identified in Annex VI of CLP or the ECHA Classification and Labelling (C&L) Inventory.

Canada

WHMIS 2015 / HPR: Not classified as a hazardous product under the Hazardous Products Act and Hazardous Products Regulations (SOR/2015-17) based on available data and weight-of-evidence assessment. Supplied for laboratory research use only. **DSL/NDSL:** Research-use exemption applies; substance is not intended for commercial import or manufacture in Canada.

Note: The regulatory statements above reflect the intended use of this substance for scientific research and development only and do not constitute a legal determination of regulatory status. If the substance is used outside the R&D exemption scope, users are solely responsible for independently verifying applicable regulatory obligations (TSCA, REACH, WHMIS, state, and local) for their specific use and jurisdiction prior to any such use.

Section 16 — Other Information

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Revision Date	2026-05-28
Version	1.0
Prepared By	Prepared in accordance with GHS Rev.8 and OSHA HazCom 2012 (29 CFR 1910.1200). Independent review by a qualified chemical safety professional is recommended prior to use.

Revision History

Revision date: 2026-05-28

Version: 1.0

Change description: Initial issue. Document prepared in 16-section GHS Rev.8 / OSHA HazCom 2012 format.

Sources Used

- PubChem (U.S. National Library of Medicine / NCBI) — <https://pubchem.ncbi.nlm.nih.gov>
- Peer-reviewed chemistry and toxicology literature (class-based read-across and weight-of-evidence assessment per GHS Rev.8 Chapter 1.3.2.4)
- OSHA HazCom 2012 / 29 CFR 1910.1200 Appendix A–C; GHS Rev.8; OECD Test Guidelines

Key to Abbreviations

CAS = Chemical Abstracts Service; GHS = Globally Harmonized System of Classification and Labelling of Chemicals; OSHA = U.S. Occupational Safety and Health Administration; HazCom = Hazard Communication Standard; REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals; CLP = Classification, Labelling and Packaging Regulation; TSCA = Toxic Substances Control Act; WHMIS = Workplace Hazardous Materials Information System; OEL = Occupational Exposure Limit; PEL = Permissible Exposure Limit; TLV = Threshold Limit Value; REL = Recommended Exposure Limit; STOT = Specific Target Organ Toxicity; LD50 = Median Lethal Dose; LC50 = Median Lethal Concentration; PPE = Personal Protective Equipment; SCBA = Self-Contained Breathing Apparatus; R&D = Research and Development.

Disclaimer

DISCLAIMER: The information in this Safety Data Sheet is compiled from the authoritative sources cited above, supplemented by weight-of-evidence assessment based on the compound's chemical class and published literature. It is believed to be accurate as of the revision date but is provided "as is" without warranty of any kind, express or implied, including fitness for a particular purpose. The preparer of this document has not independently tested the substance described herein. Users bear sole responsibility for verifying all information, ensuring safe handling, and compliance with all applicable federal, state, provincial, and local regulations. This SDS is not a substitute for independent chemical safety assessment by a qualified professional. This product is intended for scientific research and development use only and is not for human consumption, drug, food, cosmetic, agricultural, or household use.

This SDS complies with GHS Revision 8 / UN GHS Rev.8 and OSHA HazCom 2012 (29 CFR 1910.1200).