

RESEARCH MONOGRAPH . COMPOUND PROFILE

L-Tryptophan

*An essential aromatic amino acid
precursor of serotonin, melatonin, and
niacin; supplemented for sleep and mood
applications.*

DOCUMENT	KDC-MN-183
ISSUED	2026-05-09
REVISION	1.0
AUTHOR	Kodiac bioLabs Research
COMPOUND CLASS	Essential aromatic amino acid

ABSTRACT

L-Tryptophan (CAS 73-22-3; molecular formula $C_{11}H_{12}N_2O_2$; molecular weight 204.23) is an essential aromatic amino acid and the precursor of serotonin, melatonin, and (via niacin) NAD^+ . Tryptophan hydroxylase is the rate-limiting enzyme in serotonin biosynthesis; supplementation can increase substrate availability when the enzyme is operating below saturation. The compound has been used for sleep, depression, and anxiety with modest efficacy. Bioavailability is reduced by competing large neutral amino acids (LNAAAs); taking tryptophan with carbohydrate (which raises insulin and lowers competing LNAAAs) improves CNS uptake. Doses are typically 500 mg to 2 grams per day. The 1989 EMS (eosinophilia-myalgia syndrome) outbreak from contaminated L-tryptophan led to FDA restrictions; modern products are pharmaceutical grade.

1. Compound Identification

L-Tryptophan is described as essential aromatic amino acid. An essential aromatic amino acid precursor of serotonin, melatonin, and niacin; supplemented for sleep and mood applications.

1.1 Class summary

Essential aromatic amino acid

1.2 Subtitle

An essential aromatic amino acid precursor of serotonin, melatonin, and niacin; supplemented for sleep and mood applications.

2. Abstract

L-Tryptophan (CAS 73-22-3; molecular formula $C_{11}H_{12}N_2O_2$; molecular weight 204.23) is an essential aromatic amino acid and the precursor of serotonin, melatonin, and (via niacin) NAD^+ . Tryptophan hydroxylase is the rate-limiting enzyme in serotonin biosynthesis; supplementation can increase substrate availability when the enzyme is operating below saturation. The compound has been used for sleep, depression, and anxiety with modest efficacy. Bioavailability is reduced by competing large neutral amino acids (LNAA); taking tryptophan with carbohydrate (which raises insulin and lowers competing LNAAs) improves CNS uptake. Doses are typically 500 mg to 2 grams per day. The 1989 EMS (eosinophilia-myalgia syndrome) outbreak from contaminated L-tryptophan led to FDA restrictions; modern products are pharmaceutical grade.

3. Mechanism of Action

Tryptophan hydroxylase substrate; precursor for serotonin, melatonin, niacin biosynthesis.

The mechanistic profile described above represents the consensus position from peer-reviewed literature where available; for compounds with sparse formal characterization, this section reflects vendor-grade reports and structurally-related class pharmacology and should be interpreted with appropriate caution.

4. Pharmacokinetics and Routes of Administration

Pharmacokinetic data are summarized within the abstract for compounds with formal Phase 1 records. Compounds without published human pharmacokinetic studies are noted as such; investigators should treat the absence of data as a research limitation.

5. Reported Research Dose Ranges

500 mg to 2 g per day; CNS uptake competes with other LNAAs.

Doses are scaled from clinical use where the compound is approved as a medicine, from Phase 2/3 trials where development advanced, or from rodent dose-response data scaled by allometric assumptions where the compound has no human clinical record. Investigators should treat dose ranges from research-chemical-grade vendors as starting points for their own pharmacokinetic and tolerability characterization rather than validated dosing recommendations.

6. Sourcing and Quality Verification

Investigators should obtain analytical confirmation of identity (mass spectrometry; for peptides, additionally amino acid analysis or N-terminal sequencing) and purity (HPLC area-percent, ideally greater than 95 percent) on every lot. Vendor certificates of analysis vary in quality; third-party analytical confirmation through independent laboratories (e.g., Janoshik Analytical, Anabolic Lab) is the gold standard for research-grade peptides and small molecules.

For compounds with established pharmaceutical-grade marketing in any jurisdiction, sourcing from the marketed product (where legal and accessible) provides the highest quality assurance.

7. Reconstitution and Handling

Peptides should be reconstituted in bacteriostatic water or sterile water for injection in the volume appropriate to the desired concentration; lyophilized peptides should be allowed to come to room temperature before reconstitution to minimize precipitation. Reconstituted peptides should be stored refrigerated and used within the timeframe specified by the manufacturer (typically 14 to 30 days for bacteriostatic water reconstitutions, shorter for sterile water).

Small molecules: storage conditions vary by compound; consult the certificate of analysis for the specific product. Most are stable at room temperature in dry, dark conditions; oxidation-sensitive compounds (e.g., catecholamine precursors) require cool storage and protection from light.

8. Stack Interaction Considerations

Investigators combining this compound with other research substances should consider receptor-level interactions (additive effects at shared targets), enzyme-level interactions (CYP-mediated drug-drug interactions where applicable), and pharmacodynamic interactions (additive sedation, additive serotonergic activity, additive hemodynamic effects).

The stack interaction section in published monographs of well-characterized compounds is necessarily incomplete for any specific combination; investigators should treat novel combinations with elevated caution and titrate gradually.

9. References

1. Fernstrom JD. Effects and side effects associated with the non-nutritional use of tryptophan by humans. J Nutr 2012.

This monograph is provided for research use only. Not for medical, diagnostic, or therapeutic purposes. Not for human consumption. Compound class generalizations are noted where compound-specific data are sparse; investigators should weight the evidence accordingly.