

RESEARCH MONOGRAPH . COMPOUND PROFILE

Acetyl Glutathione

S-acetylated glutathione; an acetylated derivative of glutathione marketed as an orally bioavailable form of the master antioxidant.

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AUTHOR	Kodiac biolabs Research
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ABSTRACT

Acetyl glutathione (S-acetyl-glutathione; molecular formula $C_{12}H_{19}N_3O_7S$; molecular weight 349.36) is an S-acetylated derivative of glutathione marketed in the supplement industry as an orally bioavailable glutathione form. The acetyl group on the cysteine sulfur is hypothesized to confer protection from gastric and intestinal proteolysis, allowing intact tripeptide absorption that is not possible for native glutathione (which is rapidly broken down to constituent amino acids). Following absorption, intracellular esterases hydrolyze the acetyl group to release native glutathione. Clinical evidence for the bioavailability advantage is sparse and not from well-controlled trials. Used as a research compound and supplement; not approved as a drug.

1. Compound Identification

Acetyl Glutathione is described as acetylated glutathione (oral bioavailability variant). S-acetylated glutathione; an acetylated derivative of glutathione marketed as an orally bioavailable form of the master antioxidant.

1.1 Class summary

Acetylated glutathione (oral bioavailability variant)

1.2 Subtitle

S-acetylated glutathione; an acetylated derivative of glutathione marketed as an orally bioavailable form of the master antioxidant.

2. Abstract

Acetyl glutathione (S-acetyl-glutathione; molecular formula $C_{12}H_{19}N_3O_7S$; molecular weight 349.36) is an S-acetylated derivative of glutathione marketed in the supplement industry as an orally bioavailable glutathione form. The acetyl group on the cysteine sulfur is hypothesized to confer protection from gastric and intestinal proteolysis, allowing intact tripeptide absorption that is not possible for native glutathione (which is rapidly broken down to constituent amino acids). Following absorption, intracellular esterases hydrolyze the acetyl group to release native glutathione. Clinical evidence for the bioavailability advantage is sparse and not from well-controlled trials. Used as a research compound and supplement; not approved as a drug.

3. Mechanism of Action

S-acetylated glutathione; acetyl group hypothesized to protect tripeptide from proteolysis during oral absorption. Intracellular esterases release native glutathione.

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

Supplement use 100 to 600 mg per oral administration daily.

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. Schmitt B, et al. Effects of N-acetylcysteine, oral glutathione, and acetylated glutathione on glutathione levels. Redox Biol 2015.
2. Witschi A, et al. The systemic availability of oral glutathione. Eur J Clin Pharmacol 1992.
3. Allen J, Bradley RD. Effects of oral glutathione supplementation on systemic oxidative stress biomarkers in human volunteers. J Altern Complement Med 2011.

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