Tyrosinase, Sterile Lyophilized

Oxidoreductase

Cat. No. EV-OXR-003 | Version 1.0 | April 2026

Cat. No.	EV-OXR-003	**Size**	100KU/bottle	**Storage**	-20°C

1. Overview

Tyrosinase (EV-OXR-003) is a sterile-grade, copper-containing monooxygenase (EC 1.14.18.1) with dual catalytic activities: cresolase activity (hydroxylation of monophenols to o-diphenols) and catecholase activity (oxidation of o-diphenols to o-quinones). It is the key enzyme in melanin biosynthesis in vivo and a critical tool for biosensor development, skin pigmentation research, food browning studies, and cosmetic active ingredient generation. Applications span diagnostics, cosmetics, environmental monitoring, and specialty chemistry.

2. Mechanism of Action

Tyrosinase operates via a binuclear copper center (CuA and CuB). Cresolase activity: monophenol (e.g., L-tyrosine) + O_2 → o-diphenol (e.g., L-DOPA). Catecholase activity: o-diphenol (e.g., L-DOPA) + O_2 → o-quinone (dopaquinone) + H_2O. Quinones spontaneously polymerize to form melanin. Optimal at pH 6.5–7.0, 25–37°C. Inhibited by thiourea, kojic acid, arbutin (depigmenting agents used in cosmetics), and EDTA (copper chelation).

3. Applications

- Melanin biosynthesis pathway research and pigmentation studies
- Phenol-detection biosensors for environmental monitoring
- Cosmetic active ingredient development — oxidized precursors for hair dye formulations
- Food browning mechanism research and anti-browning reagent screening
- Synthesis of L-DOPA and related catechol compounds from inexpensive precursors
- Testing of depigmenting cosmetic actives (kojic acid, arbutin, resveratrol screening)

4. Recommended Protocol

Step	Details
1. Reconstitute in 50 mM phosphate pH 6.5 to 1,000 U/ml	Stock preparation
2. L-tyrosine oxidation assay: 1 mM L-tyrosine + 10 U/ml enzyme, 37°C, monitor A■■■ (dopachrome)	Activity assay
3. For L-DOPA synthesis: 10 mM L-tyrosine + 200 U/ml tyrosinase, 0.■■ ascorbate, 25°C, 2h; HPLC analysis	Synthesis application

Sterile grade: handle aseptically. Include reducing agent (e.g., 1 mM ascorbic acid) in reaction buffer to control rapid quinone polymerization duri

5. Unit Definition / Activity Specification

One unit (U) is the amount of Tyrosinase that causes ΔA_{475} = 0.001/min at 25°C, pH 6.5, in a 3 ml reaction with L-DOPA as substrate.

6. Quality Control

Test / Parameter	Specification	Lot Result	Status
Appearance	Brown lyophilized powder	Conforms	**PASS**
Activity	≥500 U/mg	≥520 U/mg	**PASS**
Cresolase Activity	≥200 U/mg (L-tyrosine substrate)	≥210 U/mg	**PASS**
Catecholase Activity	≥500 U/mg (L-DOPA substrate)	≥525 U/mg	**PASS**
Sterility	No microbial growth (7-day incubation)	No growth	**PASS**
Endotoxin	<1.0 EU/mg (LAL)	<0.5 EU/mg	**PASS**
Moisture content	≤6%	<4%	**PASS**

7. Storage & Stability

- **Storage temperature:** -20°C
- **Stability:** 2 years at -20°C
- **Formulation:** Lyophilized from 50 mM phosphate pH 6.5; reconstitute in 50 mM phosphate pH 6.5
- **Shipping:** Dry ice
- **General:** Avoid repeated freeze-thaw; aliquot upon receipt for multi-use formats

8. Troubleshooting

Problem	Possible Cause	Suggested Action
Rapid browning/polymerization in assay	Uncontrolled quinone polymerization	Add 1 mM ascorbic acid as quinone trap; use short incubation times
Low activity on monophenol substrates	Lag phase in cresolase activity	Pre-incubate with 0.1 mM L-DOPA for 5 min to bypass lag phase
EDTA inhibition	Copper chelation	Avoid EDTA in reaction buffer; use chelator-free buffers

9. Safety Information

For Research Use Only. Handle according to standard laboratory safety guidelines. Refer to the accompanying SDS for full hazard information. Dispose in accordance with local, state, and federal regulations.