Product Information

Luciferase from *Photinus pyralis* (firefly)

Recombinant, expressed in *E. coli*, lyophilized powder, ≥10×10^{10} units/mg protein

SRE0045

Product Description

CAS Registry Number: 61970-00-1

Enzyme Commission (EC) Number: 1.13.12.7

Synonyms: Luciferin 4-monooxygenase, Firefly Luciferase

Storage Temperature: –20 °C

Firefly luciferase is a 62 kDa protein that catalyzes the production of light. The enzyme requires ATP, molecular oxygen, and luciferin, a heterocyclic compound, to generate light in a two-step process.[1] The light-producing reaction is initiated by luciferin activation (adenylation of its carboxylate group) and proceeds in the presence of molecular oxygen to yield a photon of yellow-green light.[1,2]

Firefly luciferase is used extensively in molecular and cell biology, in particular for the efficient detection and quantitation of ATP and as a reporter for genetic function.[3,4]

This product is a recombinant luciferase from *Photinus pyralis* (American firefly) produced from the *luc* gene expressed in *E. coli*. Several references[5-12] and dissertations[13,14] have cited use of this product in their research.

Product

This product is lyophilized from a buffered solution that contains HEPES (pH 7.5), NaCl, $MgCl_2$, EDTA, DTT, and a carbohydrate stabilizer.

Specific Activity: ≥10 × 10^{10} light units/mg protein

Unit definition: One luciferase enzyme unit will produce one Relative Light Unit (RLU) at 20-25 °C over a 10-second period, measured in a 100 µL assay mixture that contains 40 pmole ATP and 15 nmole luciferin in Tris-glycine buffer (pH 7.6), using a GloMax™ 20/20 Luminometer.

Precautions and Disclaimer

This product is for R&D 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

Store the product at –20 °C.

Preparation Instructions

The enzyme can be prepared at a concentration of up to 5 mg protein/mL. To obtain maximal solubility, it is important to reconstitute the enzyme at a high salt concentration, such as 1 M Tris buffer with any counterion at pH 7-8. **Do not vortex. Avoid agitation.**

After reconstitution, the enzyme solutions can kept at 4-8 °C for up to 2 days or frozen in working aliquots at –20 °C for at least one month. Repeated freezing and thawing is not recommended. Do not store in a frost-free freezer.

References

1. DeWet, J. R. *et al*., *Mol. Cell. Biol*., **7(2)**, 725-737 (1987).
2. Stanley, P. E., *J. Biolumin. Chemilumin*., **4(1)**, 375-380 (1989).
3. Kricka, L. J., *Anal. Biochem*., **175(1)**, 14-21 (1988).
4. Chappelle, E. W. *et al*., *Meth. Enzymol*., **57**, 65-72 (1978).
5. Chen, D. *et al*., *Nat. Commun*., **8(1)**, 2265 (2017).
6. Tariq, A. *et al*., *Cell Rep*., **28(8)**, 2080-2095 (2019).

7. Adelöf, J. *et al*., *Aging Cell*, **20(4)**, e13336 (2021).
8. Harada, L. *et al*., *Biosensors (Basel)*, **11(4)**, 124 (2021).
9. Yevtodiyenko, A. *et al*., *Nat. Commun*., **12**, 2680 (2021)
10. Bhadra, A. K. *et al*., *Nat. Commun*., **13(1)**, 4570 (2022).
11. Vyas, P. *et al*., *J. Am. Chem. Soc*., **145(15)**, 8344-8354 (2023).
12. Greiser, M. *et al*., *eLife*, **12**, e84204 (2023).
13. Godinat, Aurélien, "The Split Luciferin Reaction: From Bioorthogonal Chemistry to Bioluminescence Imaging". École Polytechnique Fédérale de Lausanne, Ph.D. dissertation, pp. 38, 61 (2017).
14. Coustets, Mathilde, "La lectine de *Xerocomellus Chrysenteron*, un nano-objet théranostique pour l'imagerie et le traitement des cancers épithéliaux: preuve de concept appliquée aux carcinoses péritonéales d'origine ovarienne" ("*Xerocomellus Chrysenteron* lectin, a theranostic nano-object for imaging and treatment of epithelial cancers: proof of concept applied to peritoneal carcinomatosis of ovarian origin"). Université de Toulouse, Ph.D. dissertation, p. 216 (2020).

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