Nitrocefin
PRODUCT DATA SHEET

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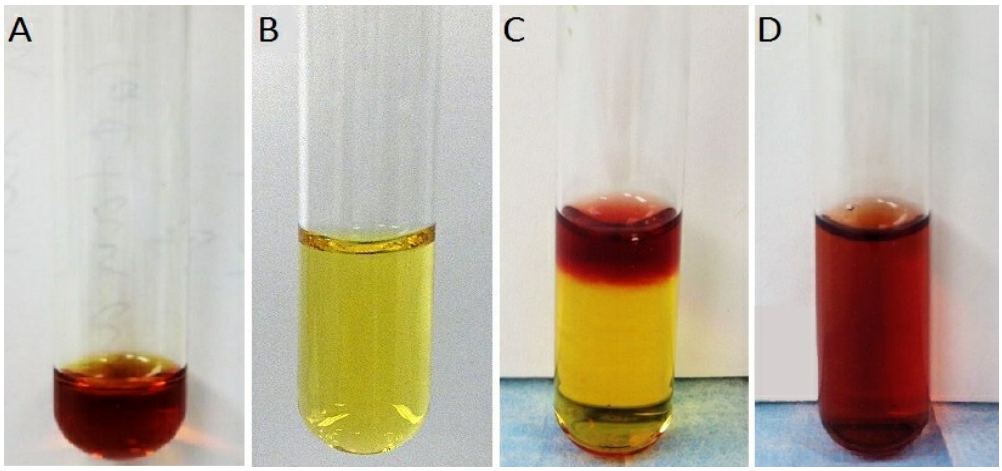
Product Name:	Nitrocefin
Product Number:	N005
CAS Number:	41906-86-9
Molecular Formula:	$C_{21}H_{16}N_4O_8S_2$
Molecular Weight:	516.51
Form:	Powder
Appearance:	Orange or yellow powder
Solubility:	soluble in DMSO
Source:	Synthetic
Storage Conditions:	-20°C; Protect from light; Store with inert gas.
Description:	Nitrocefin is a chromogenic cephalosporin used to detect β-lactamases produced by β-lactam resistant bacteria. It does not appear to have antimicrobial properties, but has useful diagnostic properties. It can be used as a reagent in beta-lactamase activity studies. Nitrocefin is soluble in DMSO. This product is considered a dangerous good. Quantities above 1 g may be subject to additional shipping fees. Please contact us for details.
Mechanism of Action:	β-lactamases hydrolyze the amide bond between the carbonyl carbon and the nitrogen in the β-lactam ring of Nitrocefin. Intact Nitrocefin is converted to hydrolyzed Nitrocefin under visible light (~ 380-500 nm) and a color change from yellow (max at pH 7.0 = 390 nm) to red (max at pH 7.0 = 486 nm).
Microbiology Applications	Nitrocefin is used to detect β-lactamase activity from suspected β-lactam resistant bacteria (see protocol below). It is commonly used at a working concentration of 0.5 - 1.0 mg/ml.

Technical Data:



Example of Nitrocefin color change before and after exposure to β-lactamase.

(A) Concentrated Nitrocefin (10.0 mg/mL) in DMSO before dilution with PBS buffer. (B) Nitrocefin diluted with PBS buffer to working concentration (1.0 mg/mL). The yellow color is indicative of intact, undegraded Nitrocefin. (C) 25 units of β-lactamase added to Nitrocefin (1.0 mg/mL in PBS). The red color is the result of β-lactamase-mediated cleavage of the Nitrocefin. (D) Vortexed mixture of contents shown in (C).

References:

Nitrocefin from TOKU-E was used to study:

TEM-1 ß-lactamase activity:
"Label-Free Measurements of Reaction Kinetics Using a Droplet-Based Optofluidic Device." Zhangming et al.

Biosensor development:
Parts-per-Million of Polyethylene Glycol as a Non-Interfering Blocking Agent for Homogeneous Biosensor Development." Liu et al.

Surrogate ß-lactamase-nitrocefin assay:
"A Cell-Free Fluorometric High-Throughput Screen for Inhibitors of Rtt109-Catalyzed Histone Acetylation." Dahlin et al.

EstG34 ß-lactamases.:
"An unusual feruloyl esterase belonging to family VIII esterases and displaying a broad substrate range" Ohlhoff et al.

VIM-2 Metallo-ß-lactamases (MBLs):
"Inhibiting the VIM-2 Metallo-ß-Lactamase by Graphene Oxide and Carbon Nanotubes." Huang et al.

ß-lactamase production in *E. coli* and *Klebsiella* species:
"Occurrence of Beta-Lactamases and the Antibiogram Pattern of Clinical Isolates of Escherichia coli and Klebsiella Species in Nsukka Metropolis." Eze E et al.

Engineered protein switches:
"Electrochemical Activation of Engineered Protein Switches." Choi et al.

ß-lactamases (various):
Molecular Determinants for Protein Stabilization by Insertional Fusion to a Thermophilic Host Protein." Pierre et al.

Enzymatic protein switches:
"Enzymatic protein switches built from paralogous input domains." Tullman and Nicholes

References

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O'Callaghan CH et al (1972) Novel Method for detection of B-Lactamases by using a chromogenic cephalosporin substrate." *Antimicrob. Agents. Chemother* 1(4):283-288

Parr, TR et al (1984) Simple Screening Method for Beta-lactamase-positive and -negative Ampicillin-resistant Haemophilus Influenzae Isolates." *J. Clin. Microbiol.* 20(1): (131-132