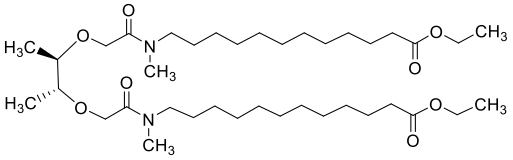
Product Information



21192 Calcium ionophore I

(ETH 1001; (−)-(*R*,*R*)-*N*,*N*'-Bis-[11-(ethoxycarbonyl)undecyl]-*N*,*N*',4,5-tetramethyl-3,6-dioxaoctanediamide; Diethyl *N*,*N*'-[(4*R*,5*R*)-4,5-dimethyl-1,8-dioxo-3,6-dioxaoctamethylene]bis(12-methylaminododecanoate))
Selectophore®, function tested

Electrochemical Transduction

Ion-Selective Electrodes

Application 1 and Sensor Type[1,2,3]

Assay of Ca^{2+} activity in whole blood, plasma, serum (ionized or total calcium) with solvent polymeric membrane electrodes based on Calcium ionophore I.

Recommended Membrane Composition

3.30 wt%	Calcium ionophore I (21192)
63.70 wt%	Bis(1-butylpentyl)decan-1,10-diyl diglutarate (30585)*
2.10 wt%	Potassium tetrakis(4-chlorophenyl)borate (60591)
30.90 wt%	Poly(vinyl chloride) high molecular weight (81392)

* The use of bis(1-butylpentyl)adipate (02150) or bis(2-ethylhexyl)sebacate (84818) leads to membrane electrodes of similar performance.

Recommended Cell Assembly

Reference || sample solution || ion-selective membrane | 0.001 M $CaCl_2$ | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K_{Ca,M}^{Pot}$ as obtained by the separate solution method (0.1 M solutions of the chlorides).

	Required[a]	found
$\log K_{Ca,H}^{Pot}$	<-2.3	-2.9
$\log K_{Ca,Na}^{Pot}$	<-3.6	-3.7
$\log K_{Ca,K}^{Pot}$	<-0.6	-3.7
$\log K_{Ca,Mg}^{Pot}$	<-1.9	-4.7

Stability:	Drift 0.01 mV/h	
Standard deviation:	0.03 mV	
Reproducibility:	0.13 mV	
Lifetime:		
log P_{TLC}[b] ionophore:	>8.4	7.5
plasticizer:	>12.8	10.8

[a] for measurements in whole blood (1% interference, worst case)[4,5]
[b] lipophilicity, determined by thin-layer chromatography

Ion-Selective Field Effect Transistors

Application 1 and Sensor Type[6]

Assay of Ca^{2+} activity with Urushi matrix ion-selective field effect transistors of good durability based on Calcium ionophore I.

Recommended Membrane Composition:

5.0 wt%	Calcium ionophore I (21192)
44.0 wt%	2-Nitrophenyl octyl ether (73732)
50.0 wt%	Urushi latex
1.0 wt%	Sodium tetraphenylborate (72018)

Electrode Characteristics and Function

Selectivity coefficients $\log K_{Ca,M}^{Pot}$ as obtained by the fixed interference method in Ca^{2+}-buffered solutions (for M: Na^+, K^+) or Ca^{2+}-unbuffered solutions (for M: Mg^{2+}).[7]

$\log K_{Ca,Na}^{Pot}$	-4.8
$\log K_{Ca,K}^{Pot}$	-5.8
$\log K_{Ca,NH_4}^{Pot}$	-4.4
$\log K_{Ca,Mg}^{Pot}$	-4.6

Slope of linear regression: 25 mV ($10^{-5.5}$ to $10^{-1.5}$ M Ca^{2+})

Optical Transduction

Application 1 and Sensor Type[8,9]

Assay of Ca^{2+} activity in aqueous pH-buffered solutions with polymeric optode membranes based on Chromoionophore I (ETH 5294) and Calcium ionophore I.

Recommended Membrane Composition

2.20 wt%	Chromoionophore I (27086)
8.01 wt%	Calcium ionophore I (21192)
4.49 wt%	Bis(2-ethylhexyl)sebacate (84818)
57.27 wt%	Poly(vinyl chloride) high molecular weight (81392)
28.03 wt%	Sodium tetrakis[3,5-bis(trifluoromethyl)phenyl]borate (72017)

Recommended pH Buffer

0.16 M sodium acetate, adjusted with acetic acid to pH 5.3 for recording the calibration curve.[10]

Optode Characteristics and Function

Selectivity coefficients $\log K_{Ca,M}^{Opt}$ as obtained by the separate solution method in pH buffered solutions.

$\log K_{Ca,Na}^{Opt}$	-3.6
$\log K_{Ca,K}^{Opt}$	-3.8
$\log K_{Ca,Mg}^{Opt}$	-4.1

Application 2 and Sensor Type[11,12]

Assay of Ca^{2+} activity in aqueous pH-buffered solutions and in diluted blood plasma with solvent polymeric optode membranes based on Chromoionophore II (ETH 2439) and Calcium ionophore I.

Recommended Membrane Composition

1.47 wt%	Chromoionophore II (27087)
5.98 wt%	Calcium ionophore I (21192)
2.56 wt%	Sodium tetrakis[3,5-bis(trifluoromethyl)phenyl]borate (72017)
60.90 wt%	Bis(2-ethylhexyl)sebacate (84818)
29.09 wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended pH Buffer

0.02 M sodium hydroxide adjusted to pH 3.3 with acetic acid.

Application 3 and Sensor Type[13]

Assay of Ca^{2+} activity in diluted human plasma with solvent polymeric optode membranes based on Chromoionophore I (ETH 5294) and Calcium ionophore I.

Recommended Membrane Composition

2.20 wt%	Chromoionophore I (27086)
8.01 wt%	Calcium ionophore I (21192)
4.49 wt%	Bis(2-ethylhexyl)sebacate (84818)
57.27 wt%	Poly(vinyl chloride) high molecular weight (81392)
28.03 wt%	Sodium tetrakis[3,5-bis(trifluoromethyl)phenyl]borate (72017)

Recommended pH Buffer

Sodium acetate type at pH 3.52

Optode Characteristics and Function

Selectivity coefficients $\log K_{Ca,M}^{Opt}$ as obtained by the fixed interference method.[8]

$\log K_{Ca,Li}^{Opt}$	-3.1
$\log K_{Ca,Na}^{Opt}$	-3.6
$\log K_{Ca,K}^{Opt}$	-3.8
$\log K_{Ca,Mg}^{Opt}$	-4.1

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