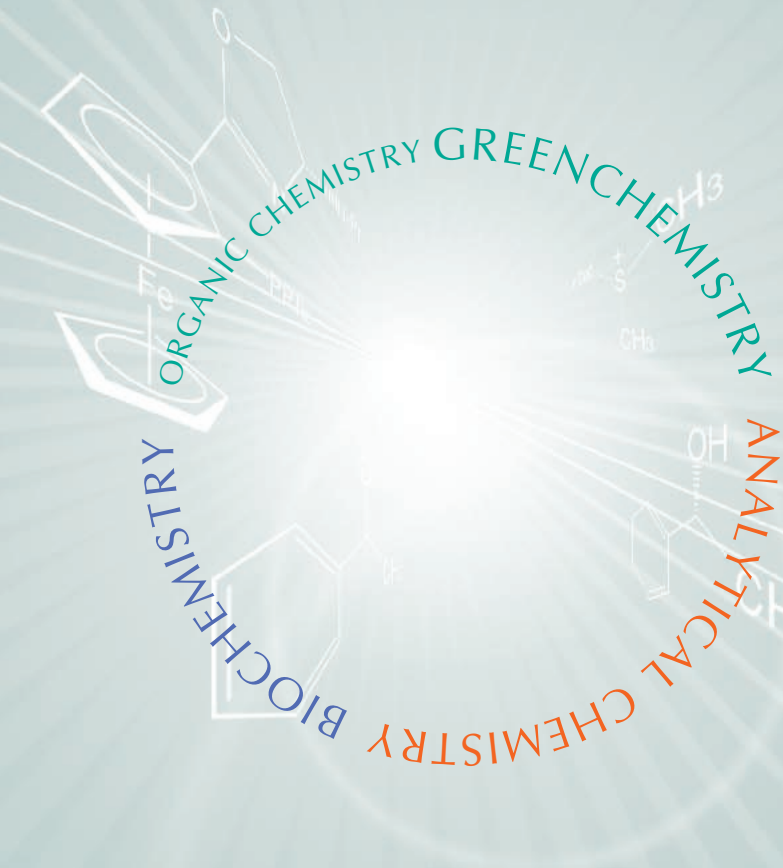
Wako Product Update



Please visit the Wako Online Catalog
http://search.wako-chem.com

Wako

No.8

Organic Chemistry
- Asymmetric Ligand
- Solid Super-Acid Catalysts
- Sulfur Compounds with Less Odor
- Custom Synthesis

Analytical Chemistry
- Chromatography
- Dioxins Analysis
- Standards

Biochemistry
- Proteome
- Immunology
- Cancer Research
- Molecular Biology
- Antibiotic

2004

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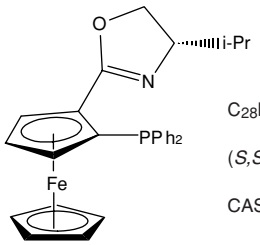
ALPHABETICAL INDEX

Asymmetric Ligand for Organic Synthesis

ip-FOXAP (Ferrocenyl OXAzolinyl Phosphine)

Asymmetric synthesis using transition metal catalysts have attracted attention in recent years. Various kinds of metal catalysts coordinated optically active ligands have been developed to achieve high yield of asymmetric product. Among them, FOXAP[1], with both planar and central chirality, is one of the best ligand for asymmetric hydrosilylation[2] of ketones, imines and ketoximes catalyzed by a Rh(I), Ir(I) or Ru(II), asymmetric hydrogen transfer[3] of ketones catalyzed by a Ru(II) and asymmetric cross coupling reaction[4] catalyzed by Ni(0) or Pd(0).



ip-FOXAP

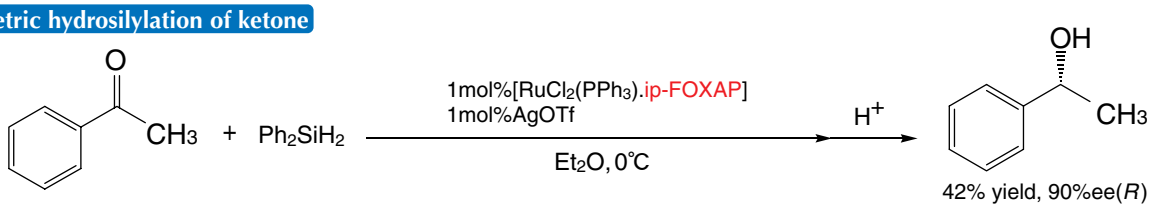
$C_{28}H_{28}FeNOP$ = 481.35

(*S*,*S*)-[2-(4'-Isopropyloxazolin-2'-yl)ferrocenyl]diphenylphosphine

CAS No. [163169-10-6]

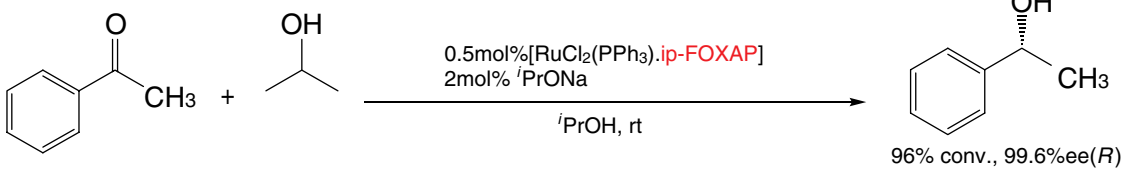
[Example reactions]

Asymmetric hydrosilylation of ketone



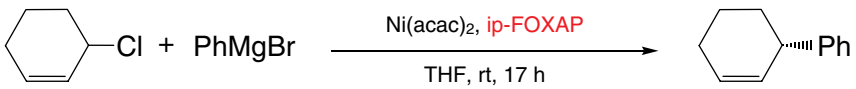
42% yield, 90%ee(*R*)

Asymmetric hydrogen transfer of ketone



96% conv., 99.6%ee(*R*)

Asymmetric cross coupling reaction



97% yield, 84%ee(*S*)

Wako catalog No.	Description	Grade	Package Size
065-04331	ip-FOXAP	for Organic Synthesis	100mg
061-04333			500mg

[References]

1) Nishibayashi,Y. and Uemura, S. : *Synlett*, **1**, 79 (1995).
2) a) Nishibayashi,Y., Takei, I., Uemura, S. and Hidai, M. : *Organometallics*, **17**, 3420 (1998).
b) Takei, I., Nishibayashi, Y., Arikawa, Y. and Uemura, S. : *Organometallics*, **18**, 2271 (1999).
c) Takei, I., Nishibayashi, Y., Ishii, Y., Mizobe, Y., Uemura, S. and Hidai, M. : *Chem. Commun.*, **22**, 2360 (2001).
3) Nishibayashi, Y., Takei, I., Uemura, S. and Hidai, M. : *Organomatallics*, **18**, 2291 (1999).
4) Chung, K.-G., Miyake, Y. and Uemura, S. : *J. Chem. Soc., Perkin Trans.*, **1**, 2725 (2000).

Zirconia, Sulfated (SO_4 / ZrO_2)
Zirconia Tungstate (WO_3 / ZrO_2)

Zirconia, Sulfated and Zirconia Tungstate are solid yet have higher acid strength than sulfate and exhibit excellent catalytic efficiency in various acid catalysis reactions such as esterification, acylation[1)], isomerization, ether synthesis, alkylation, disproportionation, polymerization and degradation.

These products can be used at relatively high reaction temperature. Since these can be treated as solids, the corrosivity for apparatuses is low and the acid treatment is rarely required. Therefore these are superior catalysts from the perspective of environmental protection. Wako provides 2 types of products, powder and pellet, for use at various reaction conditions

[Example reactions]

Esterification

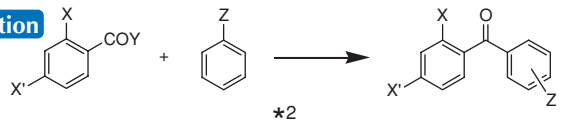
R^1-COOH + R^2-OH → R^1-COOR^2

(1) R^1 = methyl, R^2 = methyl, ethyl, propyl, butyl
(2) R^1 = acryl, R^2 = ethyl
(3) R^1 = salicyl, R^2 = methyl
(4) R^1 = phthal, terephthal, R^2 = octyl, 2-ethylhexyl
(5) R^1 = methacryl, R^2 = methyl *1
(6) R^1 = heptyl, R^2 = methyl

*1

Temp.	130 ℃
Methanol/Methacrylic Acid	3 mol/mol
LHSV	1 h^{-1}
Methacrylic Acid Conv.	99
Methyl Methacrylate Select.	>99

Acylation



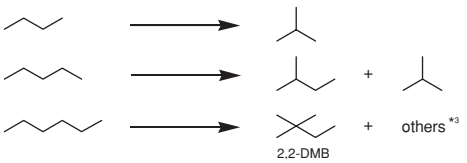
(1) X = H, X' = H, Y = Cl, Z = CH_3
(2) X = H, X' = H, Y = OOCPh, Z = CH_3
(3) X = H, X' = H, Y = OH, Z = CH_3
(4) X = Cl, X' = H, Y = Cl, Z = CH_3
(5) X = Cl, X' = H, Y = Cl, Z = Cl
(6) X = H, X' = Cl, Y = Cl, Z = Cl *2

*2

Catalyst	Yield (%)
SO_4/ZrO_2	31.7
WO_3/ZrO_2	10.5
SiO_2-Al_2O_3	<0.1

Reaction condition: *p*-chlorobenzoyl chloride 20 mmol, Chlorobenzene 200 mmol, Catalyst 2.0 g, Temp.135℃, Time 3 h

Isomerization

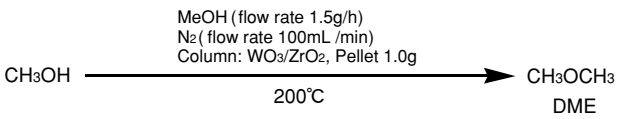


*3

Catalyst	Conversion (wt %)	2,2-DMB/Σ C6 (wt %)
Pt-SO4/ZrO2 (Pellet)	89.8	27.5
Pt-SO4/ZrO2 (Powder)	84.5	15.6

Reaction condition: Temp. 200℃, Press. 1.08 Mpa, LHSV 1.5 h^{-1}, H_2/Hexane 5 mol/mol

Synthesis of ether by dehydration



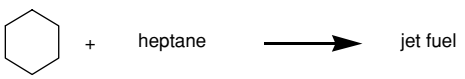
Activity at just after start of reaction (GC) DME/(DME+MeOH): 50%
Activity at 20 hours after start of reaction (GC) DME/(DME+MeOH): 40%

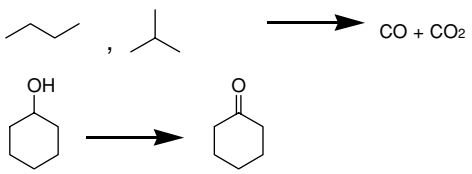
Alkylation

isobutane + butenes → C_5-C_{11} alkylates
xylenes + styrene → phenylxylylethane

Others

1-octene, 1-decene, β-pinene → dimer, trimer





Just before use, this product should be left to dry for 1 hour at an air temperature of 300 ~ 500℃ to obtain sufficient expression activity.

[References]

1) Matsuzawa, K. : *Prepr. Am. Chem. Soc. Div. Pet. Chem.*, **42**(4), 734 (1997).

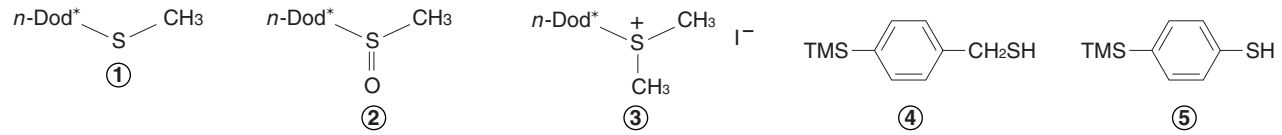
Wako Catalog No	Description	Grade	Package Size
269-01471	Zirconia, Sulfated	Wako 1st Grade	5 g
267-01472			25 g
268-01762	Zirconia, Sulfated, Pellet	for Organic Synthesis	25 g
260-01761			100 g
267-01771	Zirconia Tungstate	Wako 1st Grade	5 g
265-01772			25 g
262-01782	Zirconia Tungstate, Pellet	for Organic Synthesis	25 g
264-01781			100 g

3. Sulfur Compounds with Less Odor

These sulfur compounds with less odor are made by replacing one of alkyl chains bound to a sulfur atom by a dodecyl radical. Each has less volatility and smells less disagreeable.

Recently, sulfur compounds with less odor have been investigated[1) 2)], and Sulfide ① and Sulfoxide ② are each applicable to alcohol oxidation reaction, typified by Corey-Kim oxidation and Swern oxidation. Especially in Corey-Kim oxidation, the reaction progresses even in solvents that are easy to treat. Moreover, Sulfide ① can be applied to dealkylation of ethers and esters. Sulfonium salt ③ can also be used as a methylation agent for micell formation[4) 5)] in addition to synthesis of oxirane[3)].

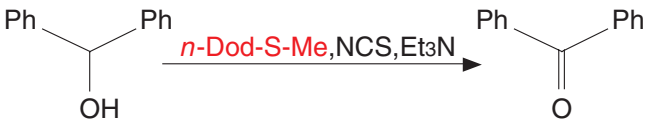
Thiol ④ and ⑤ that introduced the trimethylsilyl (TMS) group, which readily induces functional group conversion, to the benzene ring will be released soon[6)].



∗: *n*-Dod=$CH_3(CH_2)_{11}$–

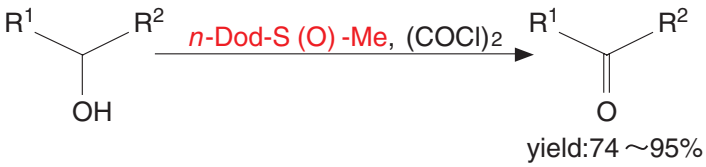
[Example reactions]

Corey-Kim Oxidation

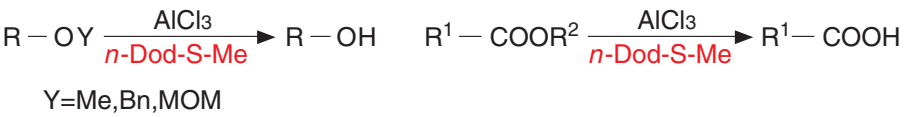


Solvent	Yield (%)
CH_2C_2	96
Toluene	98
AcOEt	97
THF	99
CH_3CN	93
Acetone	100

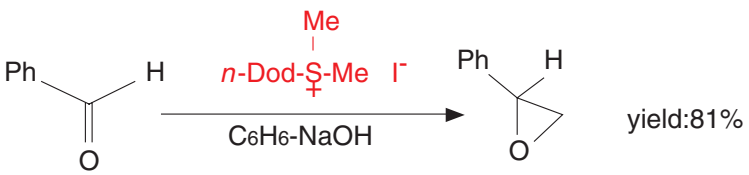
Swern Oxidation



Dealkylation



Oxirane synthesis



Wako Catalog No	Description	Package Size
040-28581	Dodecyl Methyl Sulfide	10g
047-28591	Dodecyl Methyl Sulfoxide	10g
040-28601	Dodecyldimethylsulfonium Iodide	10g
209-15961	*p*-(Trimethylsilyl)benzenethiol	1g
205-15963		5g
206-15971	*p*-(Trimethylsilyl)phenylmethanethiol	10g

[References]

1) K. Nishide, S. Ohsugi, H. Shiraki, H. Tamakita, M. Node: *Org. Lett.*, **3**, 3121 (2001).
2) M. Node, K. Kumar, K. Nishide, S. Ohsugi, T. Miyamoto: *Tetrahedron Lett.*, **42**, 9207 (2001).
3) Y. Yano, T. Okonogi, M. Sunaga, W. Tagaki: *J. Chem. Soc., Chem. Commun.*, 527 (1973)
4) K. Yamauchi, Y. Hisanaga, M. Kinoshita: *J. Am. Chem. Soc.*, **105**, 538 (1983),
5) K. Yamauchi, Y. Hisanaga, M. Kinoshita:*J. Chem. Soc. Perkin Trans.*, **1**, 1941 (1983).
6) K. Nishide, T. Miyamoto, K. Kumar, S. Ohsugi, M. Node: *Tetrahedron Lett.*, **43**, 8569 (2002).

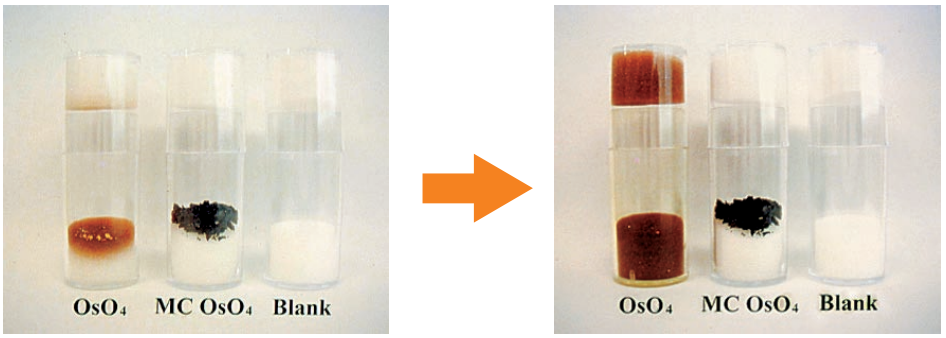
Custom synthesis using Microencapsulated Osmium (VIII) oxide (OsO_4)

Wako offers custom synthesis of (chiral) diol on an industrial scale using Microencapsulated Osmium (VIII) OsO_4, which has less volatility.

[Features]

1. **We offer custom synthesis on an industrial scale using Microencapsulated Osmium (VIII) OsO_4.**
2. **Residual OsO_4 in synthetic products is fewer than when simple OsO_4 is used. (Actual concentration of residual OsO_4 is reported)**
3. **Microencapsulated Osmium (VIII) OsO_4 can be designed for various reaction systems.**
4. **Microencapsulated Osmium (VIII) OsO_4 can be used for asymmetric reaction with asymmetric ligands.**

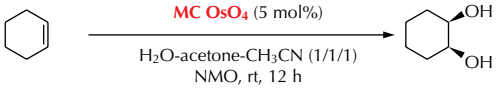
Low Toxicity due to Low Volatility



[Before] [After 3 days]

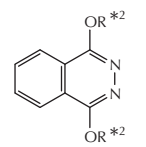
[Reactions]

Dihydroxylation 1

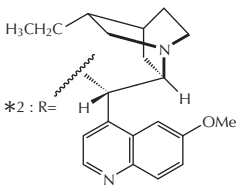


Recovery and reuse of MC OsO_4

Run	1	2	3	4	5
Yield of Product (%)	84	84	83	84	83
Recovery of Catalyst (%)	quant.	quant.	quant.	quant.	quant.

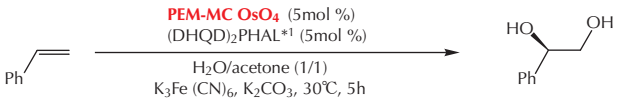


*1 : $(DHQD)_2PHAL$



Dihydroxylation 2

- PEM-MC OsO_4, which has hydrophilic polymer as a carrier, can be used to reoxidize in a 2-phase system using potassium ferricyanide as a reoxidizing agent. PEM-MC OsO_4 can be applied for asymmetric dihydroxylation when asymmetric ligands are used.



Run	1	2	3
Yield of Product (%)	85	66	84
ee (%)	78	78	78
Recovery of Catalyst (%)	quant.	quant.	quant.

Sample Pretreatment

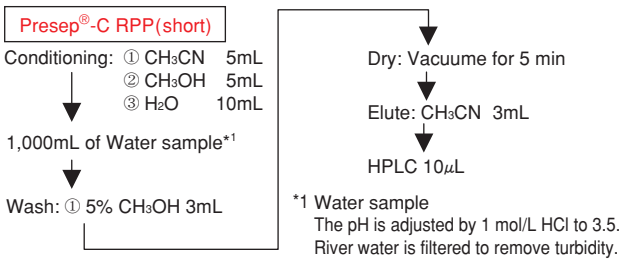
Solid Phase Extraction Cartridge

Presep®-C RPP [RPP: Reverse Phase Polymer]

Presep®-C RPP, packed with hydrophilic reverse phase polymer, has been newly added to the cartridge type solid phase extraction column "Presep®-C series". This product consists of optimized styrene vinyl benzene polymethacrylate. Compared with silica system fillers, it has advantages such as high retention of polar compounds and low absorption due to interaction with basic compounds.

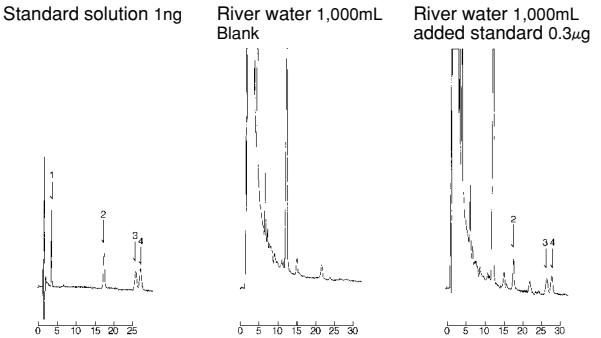
Analysis of estrogen in water samples

[Solid phase extracting condition]



*1 Water sample
The pH is adjusted by 1 mol/L HCl to 3.5.
River water is filtered to remove turbidity.

[Analysis of estrogen]



HPLC conditions
Column : Wakopak® Navi C18-5, 4.6x150mm
Eluent : CH_3CN/50mmol/L $NaClO_4$
($pH2.6 \leftarrow H_3PO_4$) =34/66 (v/v)
Flow rate : 1.0mL /min. at 35℃
Detection : ECD 900mV, RANGE=1, ATTEN=5
Injection vol. : 10μL

Sample :
1) Estriol (E3)
2) 17β-estradiol (E2)
3) Ethynylestradiol (EE2)
4) Estron (E1)

Specification of filler

Description	Filler	Packing	Pore Size	Pore Volume	Specific Surface Area	Particle Size
Long	Styrene vinyl benzene polymethacrylate	360 mg	9 nm	1.2 mL/g	600m^2/g	60μm
Short		190 mg				

Wako Catalog No.	Description	Grade	Package Size
293-41951	**Presep®-C RPP (Long)**	for Sample Pretreatment	10 pieces × 3
297-41851	**Presep®-C RPP (Short)**	for Sample Pretreatment	10 pieces × 5

Related Products

Wako Catalog No.	Description	Grade	Package Size
294-36851	Presep® RPP (60 mg/3mL)	for Sample Pretreatment	10 pieces × 5
290-36951	Presep® RPP (200 mg/6mL)	for Sample Pretreatment	10 pieces × 5
290-37051	Presep® RPP (500 mg/6mL)	for Sample Pretreatment	10 pieces × 5

Clean up of Dioxins measuring samples using Wako Presep® Series !

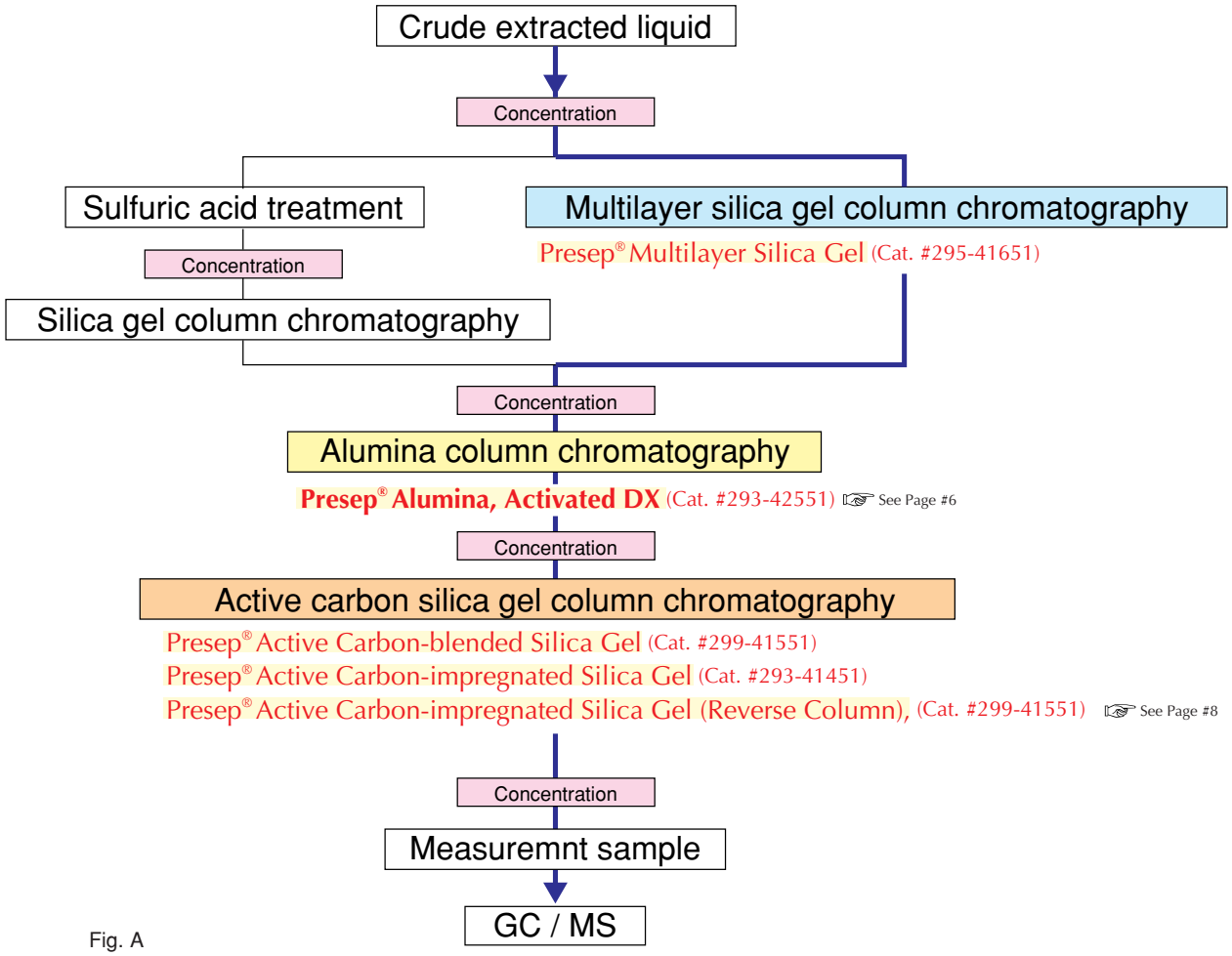


Fig. A

Sample Preatretment on Dioxins Analysis

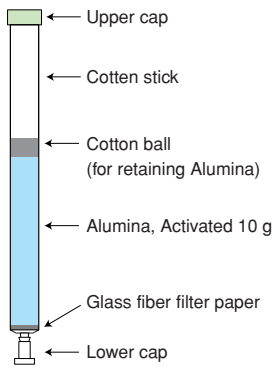
Presep® Alumina, Activated DX

Alumina columns are used for pretreatment processes of dioxins analysis (Fig.A ☞see page #6) but there are problems not being able to obtain satisfactory reproducibility data by fractionation performance test and the need to confirm its activity by fractionation test at every use. Presep® Alumina, Activated DX, a column packed with activated alumina, is a solution to these problems. Attached are data of fractionation performance test of dioxins (PCDD/DFs) and Co-PCBs to be used for pretreatment processes of dioxins analysis.

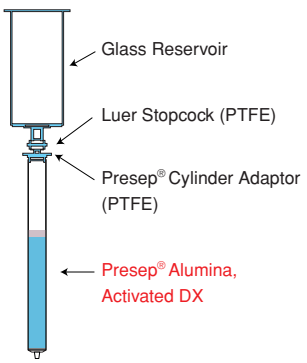
[Features]

1. **Prevention of quality degradation by damp proof aluminum packaging. Realization of stable fractionation performance at all times.**
2. **Guarantee of the fractionation performance of dioxins and Co-PCBs and blank value by high resolution GC-MS analysis.**
3. **Attached data of fractionation performance with each product allow for easy determination of satisfactory fractionation condition.**
4. **Design that conforms to JIS K 0311 and JIS K 0312**

[Sketch of column]



[Example apparatus]



[Example of use : Fractionation performance test using soil extract]

[Sample]

Solution treated with multilayer silica gel column after Soxhlet extraction of 2.0 g of soil sample (reference material JSAC 0422; Japan Society for Analytical Chemistry)

[Conditioning]

Pass 100 mL of Hexane through column and degas column before sample application.

[Operation condition]

(Eluent composition for each fractionation test)

Condition I : (1)2vol% CH_2Cl_2/Hexane (2) 50vol% CH_2Cl_2/Hexane (Fig.1)
Condition II : (1)3vol% CH_2Cl_2/Hexane (2) 50vol% CH_2Cl_2/Hexane (Fig.2)
Condition III : (1)5vol% CH_2Cl_2/Hexane (2) 50vol% CH_2Cl_2/Hexane (Fig.3)
Condition IV : (1)Hexane (2)5vol% CH_2Cl_2/Hexane
(3) 50vol% CH_2Cl_2/Hexane (Fig.4)

The figures below show the flowrate of each eluent (volume of fractions). Fig.1~4 show the results of high resolution GC-MS analysis of PCDD/DFs and Co-PCBs under each condition. In these figures, PCDD/DFs are 2,3,7,8,-TeCDD/DF and OCDD/DF.

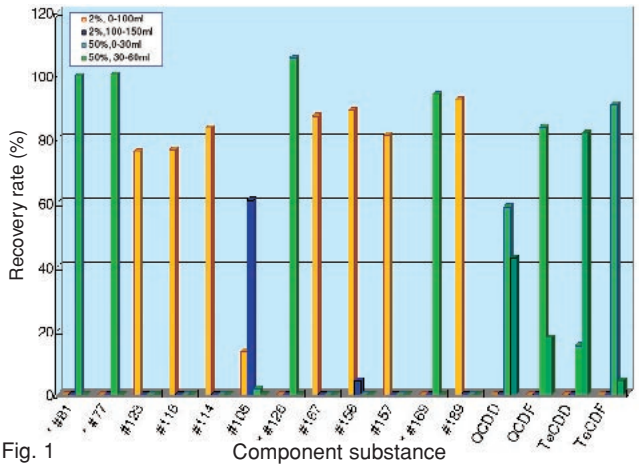


Fig. 1

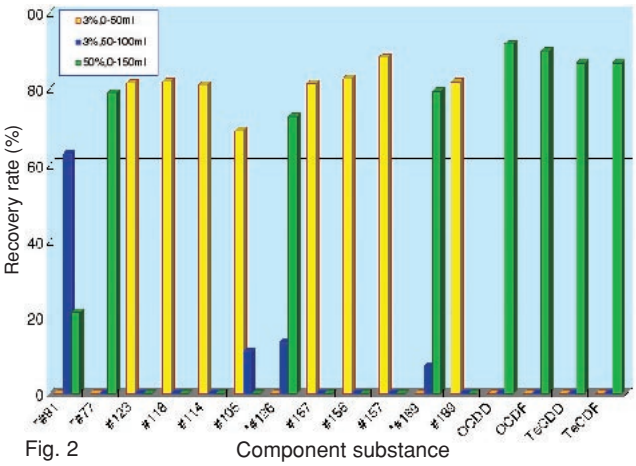


Fig. 2

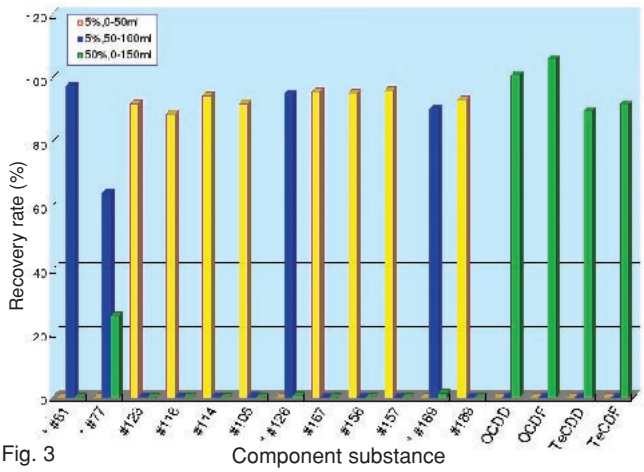


Fig. 3

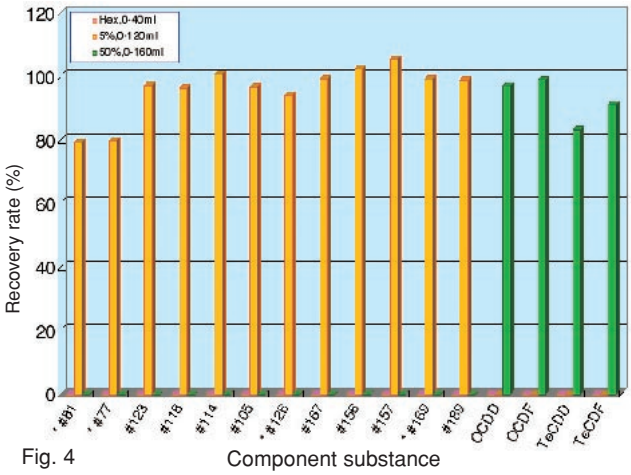


Fig. 4

Table 1. Example of reagent blank of Dioxinsof Alumina Column (Unit: pg/column)

Dioxins	reagent blank
TeCDD	0.5 ↓
PeCDD	0.5 ↓
HxCDD	0.7 ↓
HpCDD	0.7 ↓
OCDD	1.0 ↓
TeCDF	0.5 ↓
PeCDF	0.5 ↓
HxCDF	0.7 ↓
HpCDF	0.7 ↓
OCDF	1.0 ↓

Dioxins	reagent blank
3,4,4',5-TeCB (#81)	0.7 ↓
3,3',4,4'-TeCB (#77)	0.7 ↓
3,3',4,4',5-PeCB (#126)	0.7 ↓
3,3',4,4',5,5'-HxCB (#169)	0.7 ↓
2',3,4,4',5-PeCB (#123)	0.7 ↓
2,3',4,4',5-PeCB (#118)	0.7 ↓
2,3,3',4,4'-PeCB (#105)	0.7 ↓
2,3,4,4',5-PeCB (#114)	0.7 ↓
2,3',4,4',5,5'-HxCB (#167)	0.7 ↓
2,3,3',4,4',5-HxCB (#156)	0.7 ↓
2,3,3',4,4',5'-HxCB (#157)	0.7 ↓
2,3,3',4,4',5,5'-HpCB (#189)	0.7 ↓

[Result]

Presep® Alumina, Acrivated DX satisfactorily separated PCDD/DFs and Co-PCBs under all above conditions. mono-ortho Co-PCBs were all eluted in 3vol%CH_2Cl_2/ Hexane or 100ml of 5vol% CH_2Cl_2/Hexane fraction and PCDD/DFs were eluted in 50vol% CH_2Cl_2/Hexane under Condition II and Condition III. In particular, under Condition III, 3 (#81, #126, #169) of the 4 kinds of non-ortho Co-PCBs (* in the figures) were eluted in the latter fraction of 5vol% CH_2Cl_2/Hexane before separating from PCDD/DFs. 1,3,6,8- TeCDF and PCDD/DFs were eluted in same fraction under every condition (data not shown).

Wako Catalog No.	Description	Package Size
293-42551	**Presep® Alumina, Activated DX**	5 pieces
291-41751	Presep® Cylinder Adaptor (PTFE)	5 pieces
297-41753		20 pieces
635-04191	Luer Stopcock (PTFE)	10 pieces

Sample Preatretment on Dioxins Analysis

You can reduce the volume of eluent !

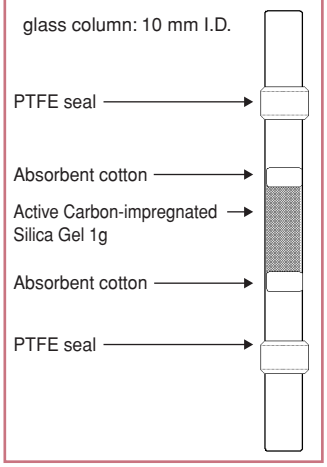
Presep® Active Carbon-impregnated Silica Gel (Reverse Column)

Active Carbon-impregnated Silica Gel of good repute has been packed in single glass tube. By using "Reverse flow through column" (Column backflushing), you can reduce the volume of eluent and the pretreatment time!!!

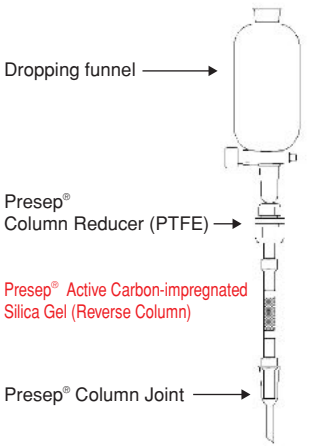
[Features]

1. **Suitability for Dioxins determination has been carried out Blank of dioxins is assured by high resolution GC-MS.**
2. **The product is individually packed in an aluminum package. You can use as many columns as you need.**
3. **You can reduce the volume of eluent. By reversing the flow through the column, you can reduce the volume of eluent.**

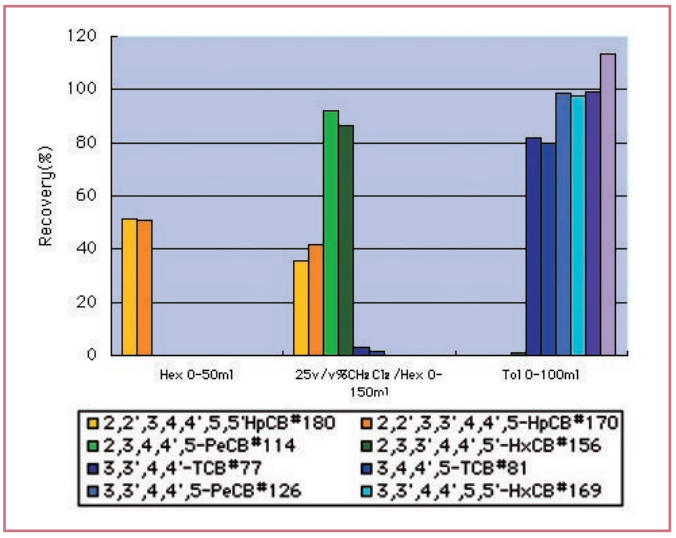
[Sketch of glass column]



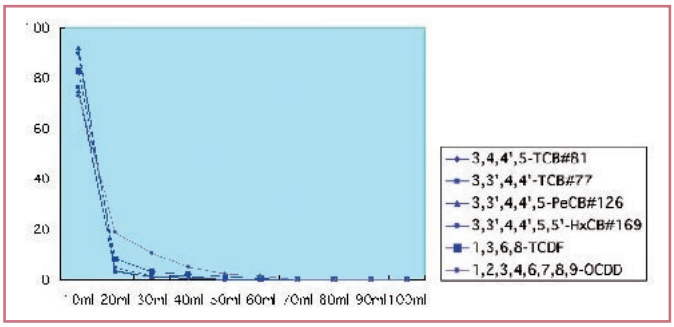
[Example apparatus]



[Fractionation Performance Test (reference data)]



[Elution of dioxins and non-ortho Co-PCBs in toluene fraction]



[Fractionation test conditions]

1) Charge 1 mL of the load sample (14 kinds of Co-PCBs: 10 ng/mL, 1,3,6,8-TCDF and OCDD: 15 ng/mL dissolved in hexane) to the upper layer of Active Carbon-impregnated Silica Gel (Reverse Column).
2) After washing the glass wall surface with a small volume (about 0.5 mL) of hexane, allow it to stand for 10 minutes.
3) Elute with 50 mL of hexane and 150 mL of 25v/v% dichloromethane/hexane. (fractionation of di-ortho and mono-ortho Co-PCBs)
4) Reverse the column and flush with 100 mL (10 fractions of 10 ml each) of toluene. (fractionation of non-ortho Co-PCBs and dioxins)

[Product List]

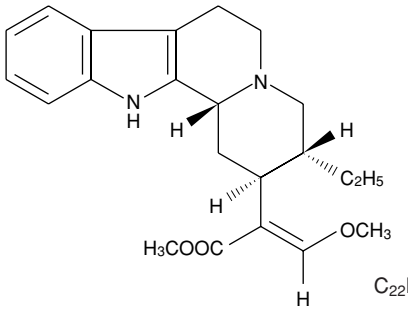
Wako Catalog No.	Description	Grade	Package Size
297-43051	**Presep® Active Carbon-impregnated Silica Gel (Reverse Column)**	for Dioxins Analysis	5 pieces
295-42751	Presep® Column Reducer (PTFE)	–	1 piece
291-42851	Presep® Column Joint (TS15/25)	–	1 piece
297-42951	Presep® Column Joint (TS19/38)	–	1 piece

Crude Drug Standards that Conform to the Japanese Pharmacopoeia

Hirsutine Standard

Hirsutine Standard is used for HPLC analysis of the component content of Hirsutine listed in Supplement I to the Japanese Pharmacopoeia Fourteenth Edition. Hirsutine Standard is an alkaloid isolated and purified from Uncaria Thorn, a crude drug.

Source: *Uncaria rhynchophylla Miquel, Uncaria sinensis Haviland, Uncaria macrophylla Wallich (Rubiaceae)*
Chemical Name: (3β, 16*E*)-16, 17-Didehydro-17-methoxycorynan-16-carboxylic acid methyl ester
CAS No.: 7729-23-9
Solubility in methanol: Clear
Assay (HPCL): 98.0+%

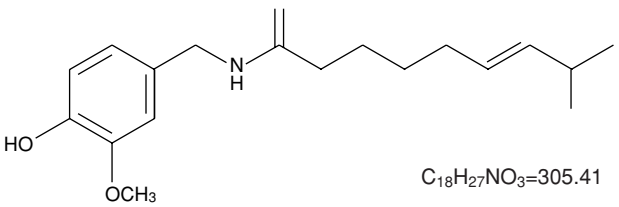


$C_{22}H_{28}N_2O_3$=368.47

Wako Catalog No.	Description	Grade	Package Size
082-08081	Hirsutine Standard	for Crude Drugs Test	5 mg

Capsaicin Standard

Source: *Capsicum annuum Linné*
Chemical Name: *N*-[(4-Hydroxy-3-methoxyphenyl) methyl]-8-methyl-6-nonenamide
CAS No.: 404-86-4
Solubility in methanol: Clear
Assay (HPCL): 99.0+%

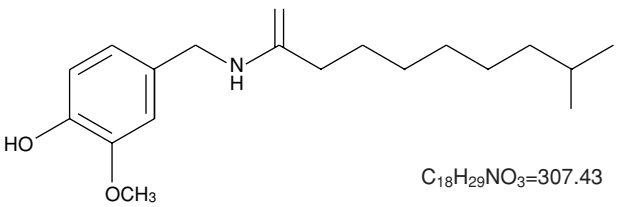


$C_{18}H_{27}NO_3$=305.41

Wako Catalog No.	Description	Grade	Package Size
039-18981	Capsaicin Standard	for Crude Drugs Test	20 mg

Dihydrocapsaicin Standard

Source: *Capsicum annuum Linné*
Chemical Name: 8-Methyl-*N*-vanillylnonanamide
CAS No.: 19408-84-5
Solubility in methanol: Clear
Assay (HPCL): 99.0+%



$C_{18}H_{29}NO_3$=307.43

Wako Catalog No.	Description	Grade	Package Size
045-28911	Dihydrocapsaicin Standard	for Crude Drugs Test	20 mg

For Proteome Research!

Lysyl Endopeptidase, Mass Spectrometry Grade

Among the most important techniques in proteome analyses is the in-gel digestion of protein spots/bands that have been resolved by electrophoresis using digestive enzymes, such as trypsin and lysyl endopoptidase. Proteins can be identified by mass spectrometry analysis of the peptides produced by in-gel digestion, and further information regarding post-translational modifications can be obtained.
Lysyl Endopeptidase, Mass Spectrometry Grade is a freeze dried product that retained sufficient activity for in-gel digestion and packed in very small quantities for convenience purposes.

[Features]

1. **High specificity and efficiency of protein digestion allow for easy database searches by peptide mass.**
2. **Improved cleavage at lysine residue and increase in the number of peptides are obtained by combination with trypsin.**
3. **Packed in very small quantities according to the amounts used so that sufficient activity for in-gel digestion may be retained.**

Comparison of In-gel Digestion Using Trypsin (Tp), Lysyl Endopeptidase (Lep) and Lep Combined with Tp (Lep +Tp)

BSA band (100ng) resolved by SDS-PAGE was in-gel digested with Tp, Lep and Lep +Tp and analyzed by MALDI-TOFMS. The figure shows the individual mass spectra. The evaluation of these peptidases is summarized in the table.

[Table: Comparison of Tp, Lep and Lep +Tp]

These results indicate there are very few missed cleavages obtained by Lep digestion. When Tp is used concomitantly with Lep, missed cleavages decrease and the number of identified peptides increase compared to when only Tp is used.

	Tp	Lep	Lep +Tp
Cleavage site	C terminal of Arg and Lys	C terminal of Lys	C terminal of Arg and Lys
Missed cleavage (Rates of missed cleavage)*	Many (8%)	**Very few (0%)**	**Few (3%)**
No. of identified peptides	17	19	**22**

* The value resulted from subtracting the coverage obtained when database searches were performed with Missed cleavage 0 from that obtained when performed with Missed cleavage 1. "Coverage" is the percentage of peptides obtained after in-gel digestion in the whole sequence.

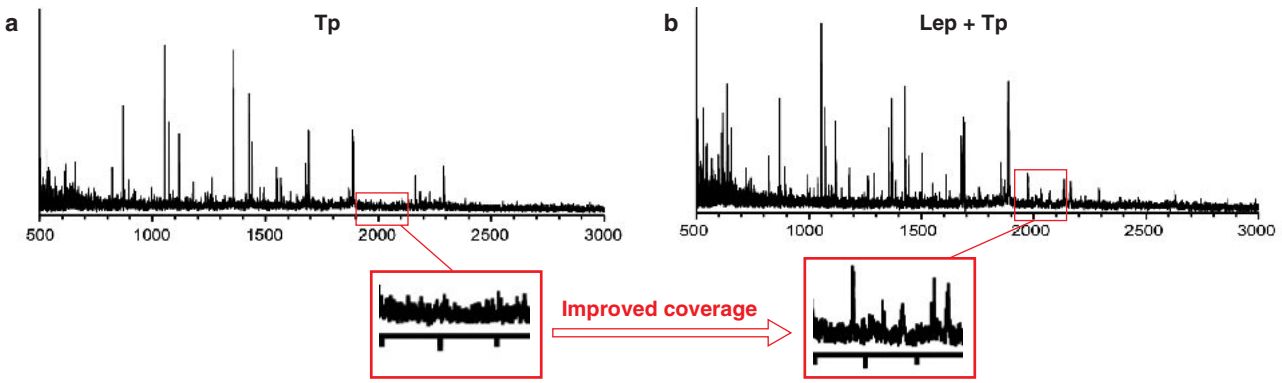


Figure: Comparison of the mass spectra of (a) the Trypsin (Tp) and (b) the Lysyl Endopeptidase (Lep) +Tp
The peaks at m/z 2000 were obtained after digestion with Lep + Tp, but not Tp alone. These results indicate improved sequence coverage.
(Data provided by Dr. Y. Wada, Osaka Medical Center and Research Institute for Maternal and Child Health)

Wako Catalog No.	Description	Grade	Package Size
125-05061	**Lysyl Endopeptidase, Mass Spectrometry Grade**	for Proteome research	5 × 20μg
202-15951	**Trypsin, from Porcine Pancreas, Mass Spectrometry Grade**	for Proteome research	5 × 20μg

Related Products

Wako Catalog No.	Description	Grade	Package Size
293-57701	Negative Gel Stain MS Kit	for Electrophoresis	20 tests
299-58901	Silver Gel Stain MS Kit	for Electrophoresis	20 tests

[References]
1. Wada, Y., and Kadoya, M.: *J. Mass Spectrom.*, **38**, 117 (2003).
2. Shevchenko, A., Wilm, MM., Vorm, O., and Mann., M.: *Anal. Chem.*, **68**, 850 (1996).

Antibodies against Vesicular Glutamate Transporters

Anti Rat VGLUT, Rabbit

L-Glutamate is an excitatory chemical transmitter that plays an essential role in neuronal plasticity, behavior, learning and memory in the central nervous system. On the other hand, VGLUTs play an essential role in glutamate signal output through vesicular storage of L-glutamate. Three kinds of VGLUTs have been identified so far. Recent studies have demonstrated that VGLUTs are also expressed in peripheral cells such as stomach, intestines, pancreas and testes. In particular, the discovery that glutamate is co-localized with glucagon in secretory granules in_cells of islets of Langerhans has been noted for new mechanism of blood glucose control. Anti Rat VGLUT, Rabbit can detect glutamatergic central nerves, peripheral nerves and nonneural cells.
Both antibodies are applicable to immunocytochemistry, immunoelectron microscopy and western blotting.

Anti Rat VGLUT1, Rabbit

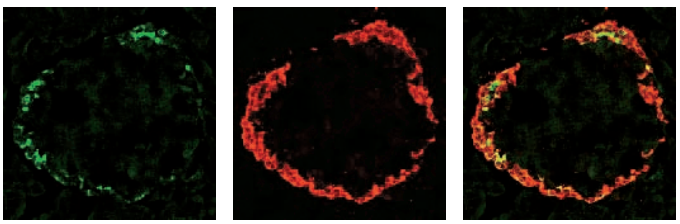
Raised against the GST fusion peptide encoding G 509 – S 560 of the cytosolic regions of VGLUT1
Specificity: Specific to rat, mouse, human and bovine VGLUT-1. No reactive to VGLUT-2
Working Conc.: Immunofluorescence 1 : 1,500

Anti Rat VGLUT2, Rabbit

Raised against the GST fusion peptide encoding G 500 – Y 582 of cytosolic regions of VGLUT2
Specificity: Specific to rat, mouse, human and bovine VGLUT-2. No reactive to VGLUT-1
Working Conc.: Immunofluorescence 1 : 1,500

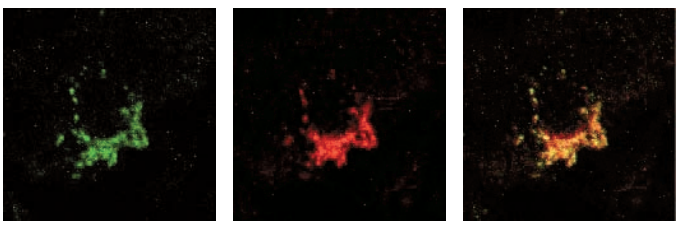
Application [1]: Immunofluorescence

VGLUT1 is co-localized with glucagon in_cells of islets of Langerhans.



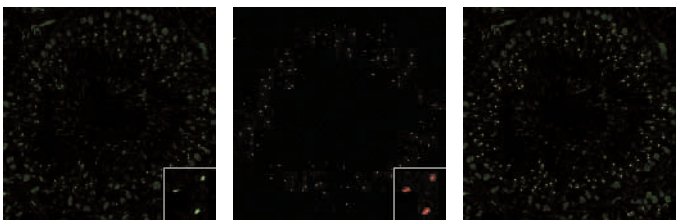
VGLUT1 Glucagon merge

VGLUT2 is co-localized with glucagon in L-cells in the mucosa of ileum.



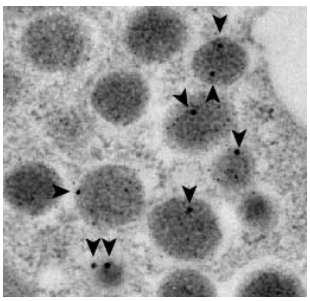
VGLUT2 Glucagon merge

VGLUT2 is localized in the acrosome.



VGLUT2 ACR-2 merge

Application [2]: Immunoelectron microscopy



Double immunoelectron microscopy in_cells of islets of Langerhans.
Glucagon (5nm) and VGLUT2 (15nm) (arrowheads) are co-localized with secretory granules.

Photo by Dr. Mitsuko Hayashi (Yale Univ.)

[References]

1) Moriyama, Y. and Hayashi, M. : *TRENDS Pharmacol. Sci. electric version*, **24**, 511 (2003).
2) Morimoto, R., Hayashi, M., Yatsushiro, S., Otsuka, M., Yamamoto, A. and Moriyama, Y. : *J. Neurochem.*, **84**, 382 (2003).
3) Hayashi, M., Morimoto, R., Yamamoto, A. and Moriyama, Y. : J. *Histochem. Cytochem.*, **51**, 1375 (2003).
4) Hayashi, M., Yamada, H., Uehara, S., Morimoto, R., Takeda, J., Yamamoto, A, and Moriyama, Y. : *J. Biol. Chem.*, **277**, 1966 (2003).
5) Hayashi, M., Otsuka, M., Morimoto, R., Muroyama, A., Uehara, S., Yamamoto, A., and Moriyama Y. : *Diabetes*, **52**, 2066 (2003).

Wako Catalog No.	Description	Grade	Package Size	Storage
010-19771	Anti Rat VGLUT-1,Rabbit	for Immunochemistry	50 μg (100 μL)	Keep at -20℃
017-19781	Anti Rat VGLUT-2, Rabbit		50 μg (100 μL)	

for DNA Methylation Research

Anti 5-Methylcytosine, Monoclonal Antibody

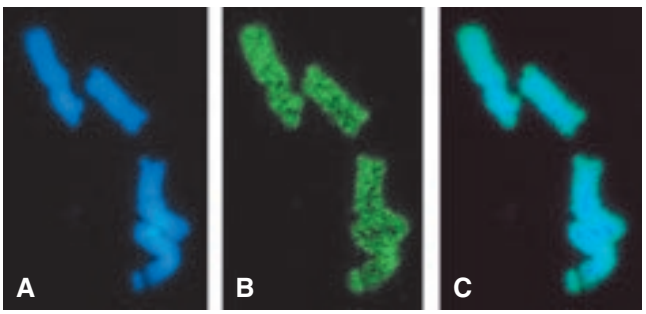
5-Methylcytosine is contained as a minor base in approximately 1% of the total base in mammals. Methylation of DNA is involved in various cellular events such as transcriptional regulation of genes and chromosome inactivation.

Storage: Keep at −20℃
Antigen: 5-Methylcytosine-BSA
Appearance: Mice ascites
Subclass: IgM
Specificity: Specific for methylcytosine. Rarely reacts with cytosine and thymidine.
Working Dilution: Westernblotting 1 : 1,000 − 1 : 10,000
Immunofluorescence 1 : 100

[References]

1) Sano, H. *et al.*: *Biochim. Biophys. Acta*, **951**, 157 (1988).
2) Steward, N. *et al.*: *J. Biol. Chem.*, **277**, 37741 (2002).

[DNA Methylation Patterns in Maize Chromosomes]



DAPI | Anti 5-Methylcytosine, Monoclonal Antibody | merge

Wako catalog No.	Description	Grade	Package size
015-19721	Anti 5-Methylcytosine, Monoclonal Antibody	for Immunochemistry	100 μL

Antibodies against Macrophage/Microglia-specific Protein Iba1

Anti Iba1 polyclonal antibodies, Rabbit (Iba1: ionized calcium binding adapter molecule 1)

Calcium ions are known to be one of the most important signal mediators in all cells including central nervous system (CNS) cells. Calcium ions exert their signaling activity through association with various calcium binding proteins, many of which are classified into a large protein family, the EF hand protein family.

Iba1 is a 17-kDa EF hand protein that is specifically expressed in macrophages/ microglia and is upregulated during the activation of these cells.

Wako has launched rabbit polyclonal antibodies were raised against a synthetic peptide corresponding to the Iba1 carboxy-terminal sequence, which was conserved among human, rat and mouse Iba1 protein sequences. These antibodies are specifically reactive to microglia/ macrophages, are appropriate for immuno-double staining of brain tissues and cell culture in combination with monoclonal antibody to GFAP, which specifically reacts to astrocyte.

Specificity :
Specific to microglia and macrophages, but not cross-reactive with neurons and astrocytes.
Reactive with human, mouse and rat Iba1.

Anti Iba1 polyclonal antibody, Rabbit, for Immunocytochemistry

Wako Cat. #019-19741 50 μg (100 μL)
−20 ℃, D/I
Working Conc.: Immunocytochemistry 1 - 2μg/mL

Anti Iba1 polyclonal antibody, Rabbit, for Western Blotting

Wako Cat. #016-20001 50 μg (100 μL)
−20 ℃, D/I
Working Conc.: Westernblot 0.5 - 1 μg/mL

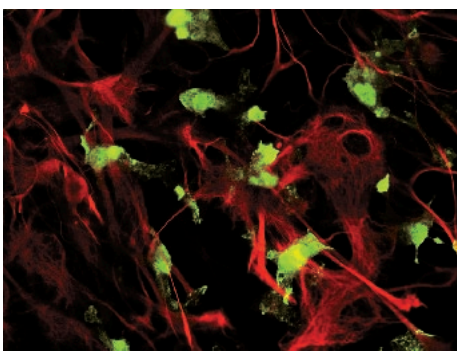


Figure 1
Immuno-double staining of rat primary mixed culture cells
Green: Iba1, which reacts to anti Iba1 antibody (Wako C. #019-19741)
Red: astrocyte, which reacts to anti GFAP, monoclonal antibody
(Data was provided by Dept. of Neurochemistry, National Institute of Nueroscience (Japan).)

A cancer detection by PET* using a tracer, 18F-FDG (*: Positron emission tomography)

A Substrate for FDG-synthesis

1,3,4,6-Tetra-O-acetyl-2-O-trifluoromethanesulfonyl-β-D-mannopyranose [Mannose Triflate], 98.0+% (HPLC)

for Sugar Synthesis

Cat. #209-16061 5 × 20mg

−20℃, Solid

Mannose Triflate is used as a substrate for synthesis of PET reagent, ^{18}F-FDG. After nuclear transmutation of ^{18}O to ^{18}F in a cyclotron, ^{18}F-FDG (2-deoxy-2-^{18}F-fluoro-D-glucose) is automatically synthesized from Mannose Triflate. Once purified, it is used for PET examination. Since the half life of ^{18}F is 2 hours, it is synthesized in each hospital.

FDG is characterized by a tendency to accumulate more in tumor cells than in normal cells. Therefore, it is effective in early detection, detection of recurrence and metastasis of various types of cancer such as lung cancer, colon cancer and breast cancer.

This product is packed in unit doses.

[Features]

1. 20 mg of Mannose Triflate in unit doses.

2. Rubber stopper and aluminum cap are used.

Enzyme for molecular biology

Deoxyribonuclease I, Bovine, recombinant, Solution

(RNase free, Protease free)

Deoxyribonuclease I, Bovine, recombinant, Solution (RNase free, Protease free) can be used for removal of genomic DNA from RNA sample in RT-PCR or degradation of DNA template after RNA synthesis. Since this product is guaranteed to be RNase free and protease free, you are safe from degradation of precious samples or contamination.

[Features]

1. Guaranteed to be RNase and Protease free

RNase activity: **RNA degradation is not confirmed by PAGE after 14-16 hours reaction of 25 ng of 32P labeled RNA with 2 units of this product.**

Protease activity: **Substrate degradation is not confirmed by spectrometry after 14-16 hours reaction of 200 ng of substrate with 50 units of this product.**

2. Inactivation at 75 ℃ for 10 minutes

Concentration : 2U/μL

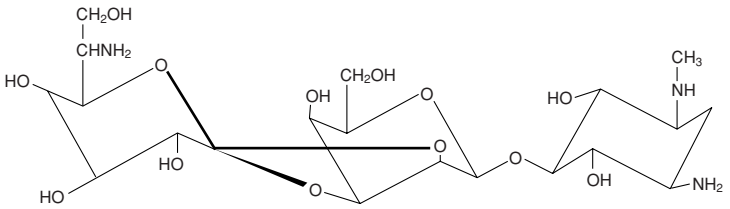
Origin : DNaseI cloned plasmid expressed in *Pichia*

Wako catalog No.	Description	Grade	Package size
548-02331 544-02333	**Deoxyribonuclease I, Bovine, recombinant, Solution** (RNase free, Protease free)	for Molecular Biology	1,000 U 10,000 U

Now Available!!!

Hygromycin B, 95 + % (TLC)

Cat. #089-06151 1 g
Cat. #085-06153 5 g
2~10℃, Solid



50 mg/mL Hygromycin B solution

Cat. #084-07681 20 mL
Cat. #080-07683 100 mL
2~10℃, Liquid

Sterile and ready-to-use 10 mmol/L PBS solution (pH 6.8)

MW: 527.52 ($C_{20}H_{37}N_3O_{13}$)
CAS No. 31282-04-9
Source: *Streptomyces hygroscopicus*

Hygromycin B is an aminocyclitol antibiotic which specifically inhibits protein synthesis in both prokaryotes, eukaryotes and animal cells. Hygromycin B is used as a cell screening antibiotic of eukaryotic cells as well as prokaryotic cells. This selection market is used especially for transformation of plant cells.

[Specification of Hygromycin B]

Solubility: Soluble in H_2O and methanol (10g/L).
pH at 25℃ (25 g/L): 9.5 ~ 12.5
Potency: min. 1,000 units/mg

[References]

1 Gritz, L. and Davies, J.: "Plasmid-encoded hygromycin B resistance: the sequence of hygromycin B phosphotransferase gene and its expression *in Escherichia coli and Saccharomyces cerevisiae", Gene*, **25**, 179-188 (1983).
2 Gonzales, R., *et al.*: "Transformation of the Dermatophyte Trichophyton *mentagrophytes* to Hygromycin B Resistance", *Infect. Immun.*, **57**, 2923-2925 (1989).
3 Mohr, G.: "Rapid detection of bacterial hygromycin B phosphotransferase in *Aspergillus niger* transformants", *Appl. Microbiol. Biotechnol.*, **30**, 371-374 (1989)

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