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EDIPOS

Edinburgh Polysaccharide and Oligosaccharide Substrates

Individual items can be ordered by emailing EDIPOS@ed.ac.uk

EDIPOS specialises in oligosaccharides produced from plant cell-wall polysaccharides such as xyloglucan, xylan and pectin. We produce

- radiolabelled oligo- and polysaccharides
- fluorescently labelled oligo- and polysaccharides

for use in rapid and sensitive enzyme assays.

We can also supply

- a purified form of Driselase suitable for cell wall analysis
- radiolabelled and 'cold' metabolites of vitamin C (ascorbate)
- feruloylated oligosaccharides and polysaccharides
- isodityrosine and related tyrosine coupling products
- hydroxyproline oligoarabinosides from the glycoprotein extensin

We develop assays, including novel high-throughput screens, for cell wall-related enzymes including glycanases, glycosidases, transglycanases and transglycosidases (transglycosylases) and esterases.

The current catalogue lists our collection of radiochemicals and four transglycanase assay kits.

Non-radioactive products will be launched during 2015.

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CATALOGUE AND PRICE LIST

➢ Radiochemical assay kits for transglycanase (endotransglycosylase) activities

The XTHs, a class of transglycanases (endotransglycosylases), possessing xyloglucan endotransglucosylase (XET) activity, have been known for some decades, and are proposed to play important roles in directing the assembly and loosening of plant cell walls, and thus in orchestrating plant growth and morphogenesis. In addition, considerable recent excitement centres on the discovery of novel transglycanase activities in diverse plants and algae. Some of the newly emerging transglycanases are hetero-transglycanases — i.e. the donor and acceptor substrates differ from each other qualitatively, thus creating interesting 'hybrid' polysaccharides such as MLG–xyloglucan (where MLG = mixed-linkage β-glucan).
The following assay kits are useful for assaying four known transglycanases.

XET (xyloglucan endotransglucosylase) radiochemical quantitative assay kit

This is the most sensitive and widely used assay for quantifying the XET activity of XTH proteins [1], readily capable of quantifying the XET activity extractable from 1–10 mg of typical tissues such as pea stems, maize roots, or cauliflower florets.

- [1] S.C. Fry, R.C. Smith, K.F. Renwick, DJ. Martin, S.K. Hodge, K.J. Matthews (1992). Xyloglucan endotransglycosylase, a new wall-loosening enzyme activity from plants. Biochemical Journal **282**: 821–828.

The kit, sufficient for 1000 assays (@ 25 µl), contains:

- 1 MBq [^{3}H]XXLGol (xyloglucan octasaccharide, acceptor substrate for XET)
- 0.25 g tamarind xyloglucan
- Detailed instructions for the assay.

Order Number: XETk Kit price: £500

MXE (mixed-linkage glucan : xyloglucan endotransglucosylase) radiochemical quantitative assay kit

A recently discovered enzyme [2]. The most sensitive assay for MXE activity of hetero-trans-β-glucanase proteins, capable of quantifying the MXE activity extractable from 1–10 mg of *Equisetum* tissues and some charophytic algae.

- [2] S.C. Fry, K.E. Mohler, B.H.W.A. Nesselrode, L. Franková (2008) Mixed-linkage β-glucan : xyloglucan endotransglucosylase, a novel wall-remodelling enzyme from *Equisetum* (horsetails) and charophytic algae. *Plant Journal* **55**: 240–252.

The kit, sufficient for 1000 assays (@ 25 µl), contains:

- 1 MBq [^{3}H]XXXGol (xyloglucan heptasaccharide, acceptor substrate for MXE)
- 0.25 g medium-viscosity MLG from barley (donor substrate for MXE).
- Detailed instructions for the assay.

Order Number: MXEk Kit price: £500

TβX (trans-β-xylanase or xylan endotransglycosylase) radiochemical quantitative assay kit

A recently discovered enzyme activity found in land plants and charophytic algae [3, 4, 5]. The most sensitive assay for TβX activity.

- [3] Franková L, Fry SC (2011) Phylogenetic variation in glycosidases and glycanases acting on plant cell wall polysaccharides, and the detection of transglycosidase and trans-β-xylanase activities. **Plant J** 67: 662–681

- [4] Johnston SL, Prakash R, Chen NJ, Kumagai MH, Turano HM, Cooney JM, Atkinson RG, Paull RE, Cheetamun R, Bacic A, Brummell DA, Schröder R (2013) An enzyme activity capable of endotransglycosylation of heteroxylan polysaccharides is present in plant primary cell walls. **Planta** 237: 173-187
- [5] Derba-Maceluch M, Awano T, Takahashi J, Lucenius J, Ratke C, Kontro I, Busse-Wicher M, Kosík O, Tanaka R, Winzéll A, Kallas Å, Leśniewska J, Berthold F, Immerzeel P, Teeri TT, Ezcurra I, Dupree P, Serimaa R, Mellerowicz EJ (2014) Suppression of a xylan transglycosylase PtxtXyn10A affects cellulose microfibril angle in secondary wall in aspen wood. **New Phytol** doi: 10. 1111/nph. 13099

The kit, sufficient for 1000 assays (@ 25 µl), contains:

- 1 MBq [^{3}H]Xyl6-ol (xylohexaitol, acceptor substrate for TβX)
- 0.25 g xylan (donor substrate for TβX).
- Detailed instructions for the assay.

Order Number: TBXk Kit price: £850

TβM (trans-β-mannanase or mannan endotransglycosylase) radiochemical quantitative assay kit

A recently discovered enzyme activity found in land plants and charophytic algae [6, 7]. The most sensitive assay for TβM activity.

- [6] Schröder R, Wegrzyn TF, Bolitho KM, Redgwell RJ (2004) Mannan transglycosylase: a novel enzyme activity in cell walls of higher plants. **Planta** 219: 590-600.
- [7] Schröder R, Wegrzyn TF, Sharma NN, Atkinson RG (2006) LeMAN4 endo-β-mannanase from ripe tomato fruit can act as a mannan transglycosylase or hydrolase. **Planta** 224: 1091–1102.

The kit, sufficient for 1000 assays (@ 25 µl), contains:

- 1 MBq [^{3}H]Man6-ol (mannohexaitol, acceptor substrate for TβM)
- 0.25 g konjac glucomannan (donor substrate for TβM).
- Detailed instructions for the assay.

Order Number: TBMk Kit price: £850

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➢ Radiolabelled substrates

Prices:
Each standard pack: £350.
Each large pack (10× standard pack, if offered): £1000.

Valuable for

- exceedingly sensitive, quantitative assays for enzymes that act in the plant cell wall / apoplast.
- studies of the metabolism and translocation of oligosaccharides *in vivo* and *in vitro*.
- use as a labelled 'internal markers' during chromatography and electrophoresis of oligosaccharides.

General notes

- Many of the oligosaccharide products are reductively tritiated at the former reducing end, and these are designated by the suffix "-ol". For example, cellobiose [β-D-glucosyl-(1→4)-D-glucose], abbreviated as Cell2, is supplied as tritiated cellobiitol [β-D-glucosyl-(1→4)-D-[^{3}H]glucitol], abbreviated as Cell2-ol.
- Some of the 'standard packs' provide relatively small quantities of ^{3}H or ^{14}C. We are happy to discuss custom preparations of higher activities of these products [please enquire].

Footnotes

* Those specific activities (SAs) marked with an asterisk are calculated for the alditol; in these cases, the preparation supplied is not necessarily free of reducing oligosaccharides. Further purification of the alditol can be undertaken [please enquire].
† Specific activity given for the benzoyl moieties.
‡ "[*cinnamoyl*-U-^{14}C]Ferul..." implies that the ferulic acid group is labelled at all carbons except the methoxy group.

Compound	Position of radiolabelling	MBq per standard pack	MBq per large pack	Approx SA MBq/ µmol	Order Number
Cellulose-related					
Cello-oligosaccharides [(1→4)-β-D-gluco-oligosaccharides], reductively tritiated					
Cell2-ol (cellobiitol)	[^{3}H]glucitol	0.5	—		HCEL2
Cell3-ol	[^{3}H]glucitol	0.1	—	780	HCEL3
Cell5-ol (cellopentaitol)	[^{3}H]glucitol	0.1	—	30*	HCEL5
Cell6-ol (cellohexaitol)	[^{3}H]glucitol	0.5	—	780	HCEL6
Pectin-related					
Rhamnogalacturonan-related					
Rhamnogalacturonan-II, mainly monomer	presumed L-[^{3}H]galactonate	0.05	—		HRGII
(1→4)-α-D-Oligogalacturonides, reductively tritiated [size ranges given are approximate]					
GalA4-ol	[^{3}H]galactonate	0.1	—	30*	HGALA4
GalA5-ol	[^{3}H]galactonate	0.1	—	780	HGALA5
GalA6-ol	[^{3}H]galactonate	0.05	—	30*	HGALA6
GalA7-ol	[^{3}H]galactonate	0.05	—	1.0	HGALA7
GalA8-ol	[^{3}H]galactonate	0.05	—	1.0	HGALA8
GalA9-ol	[^{3}H]galactonate	0.05	—	1.0	HGALA9
GalA10-ol	[^{3}H]galactonate	0.05	—	1.0	HGALA10
GalA11-ol	[^{3}H]galactonate	0.01	—	1.0	HGALA11

Compound	Position of radiolabelling	MBq per standard pack	MBq per large pack	Approx SA MBq/ µmol	Order Number
GalA12-ol	[^{3}H]galactonate	0.01	—	1.0	HGALA12
GalA13-ol	[^{3}H]galactonate	0.01	—	1.0	HGALA13
GalA14-ol	[^{3}H]galactonate	0.01	—	1.0	HGALA14
GalA6-13-ol	[^{3}H]galactonate	0.2	—	780	HGALA6X
GalA10-14-ol	[^{3}H]galactonate	0.05	—	1.0	HGALA10X
GalA14-17ol	[^{3}H]galactonate	0.01	—	1.0	HGALA14X
GalA>18-ol	[^{3}H]galactonate	0.05	—	1.0	HGALA18X
^{14}C-Labelled (1→4)-α-D-Oligogalacturonides, reducing sugars					
GalA1 (monosaccharide)	[6-^{14}C]	0.005	—		CGALA1
GalA2	[6-^{14}C]	0.005	—		CGALA2
GalA3	[6-^{14}C]	0.001	—		CGALA3
GalA4	[6-^{14}C]	0.005	—		CGALA4
GalA5	[6-^{14}C]	0.001	—		CGALA5
GalA6	[6-^{14}C]	0.001	—		CGALA6
GalA7	[6-^{14}C]	0.001	—		CGALA7
(1→5)-α-L-Arabino-oligosaccharides, reductively tritiated					
Ara7-ol	[^{3}H]arabinitol	0.1	—	780	HARA7
Ara8-ol	[^{3}H]arabinitol	0.1	1.0	780	HARA8
Ara9-ol	[^{3}H]arabinitol	0.1	—	780	HARA9
Ara10-ol	[^{3}H]arabinitol	0.05	—	1.0	HARA10
(1→4)-β-D-Galacto-oligosaccharides, reductively tritiated					
Gal5-ol (galactopentaitol)	[^{3}H]galactitol	0.25	—	390	HGAL5
Gal6-ol (galactohexaaitol)	[^{3}H]galactitol	0.25	—	390	HGAL6
Gal7-ol (galactoheptaitol)	[^{3}H]galactitol	0.25	—	390	HGAL7
Gal8-ol (galactooctaitol)	[^{3}H]galactitol	0.25	—	390	HGAL8
Gal9-ol (galactononaitol)	[^{3}H]galactitol	0.25	—	390	HGAL9
Gal10-ol (galactodecaitol)	[^{3}H]galactitol	0.25	—	390	HGAL10
Gal>10-ol (larger than galactodecaitol)	[^{3}H]galactitol	0.25	—	390	HGAL10X
Hemicellulose-related					
Hemicellulose (radiolabelling predominantly in xyloglucan) from cultured *Spinacia* (spinach) cultures	[*fucosyl*-1-^{3}H]	0.05	—		HHC
Xyloglucan-related oligosaccharides			—		
Non-fucosylated xyloglucan oligosaccharides, reductively tritiated			—		
Isoprimeveritol	[^{3}H]glucitol	0.5	—	57	HIP
XGol (trisaccharide)	[^{3}H]glucitol	0.05	—	20*	HXG3
XXGol (pentasaccharide)	[^{3}H]glucitol	0.5	—		HXXG5
XXXGol (heptasaccharide)	[^{3}H]glucitol	0.5	5.0	780	HXXXG7

Compound	Position of radiolabelling	MBq per standard pack	MBq per large pack	Approx SA MBq/ µmol	Order Number
XXLGol (octasaccharide)	[^{3}H]glucitol	0.5	5.0	57	HXXLG8
XLLGol (nonasaccharide)	[^{3}H]glucitol	0.5	5.0	57	HXLLG9
XGO-ols Glc8-based	[^{3}H]glucitol	0.1	—	30*	HXGO8
XGO-ols Glc12-based	[^{3}H]glucitol	0.02	—	30*	HXGO12
Fucosylated xyloglucan & other oligosaccharides, reductively tritiated					
2′-Fucosyl-lactitol (Fuc-Gal-Glc-ol) [substrate for α-L-fucosidases]	[^{3}H]glucitol	0.5	5.0	390	HFLAC
FGol (pentasaccharide)	[^{3}H]glucitol	0.1	—	30*	HFG5
XXFGol (nonasaccharide)	[^{3}H]glucitol	0.5	—	30*	HXXFG7
Reducing oligosaccharides of xyloglucan					
XXLG (octasaccharide) (with trace of XLXG)	[6-^{3}H]galactose	0.5	—	0.42	HXXLGG
XLLG (nonasaccharide)	[6-^{3}H]galactose	0.5	—	0.42	HXLLGG
XXXG (heptasaccharide) [please enquire]	[1-^{3}H]xylose				HXXXGX
XXFG (nonasaccharide) [please enquire]	[1-^{3}H]xylose			1.3	HXXFGX
XXFG (nonasaccharide)	[1-^{3}H]glucose (reducing end)	0.01	—		HXXFGG
XXFG (nonasaccharide) [please enquire]	[^{3}H]fucose				HXXFGF
XFG (heptasaccharide)	[^{3}H]fucose	0.01	—	4.2	HXFGF
Other hemicellulose-related oligosaccharides					
Callose (laminarin)-related: (1→3)-β-D-gluco-oligosaccharides (laminari-oligosaccharides), reductively tritiated					
Lam2-ol	[^{3}H]glucitol	0.01	—	1.4	HLAM2
Lam3-ol	[^{3}H]glucitol	0.05	—	1.4	HLAM3
Lam4-ol	[^{3}H]glucitol	0.5	—	5.0	HLAM4
Lam6-ol	[^{3}H]glucitol	0.2	—	780	HLAM6
Mannan-related: (1→4)-β-D-Manno-oligosaccharides, reductively tritiated					
Man6-ol	[^{3}H]mannitol	0.5	—	50–800	HMAN6
MLG-related. Oligosaccharides produced from barley mixed-linkage (1→3),(1→4)-β-D-glucan by **cellulase** digestion, reductively tritiated. Non-reducing end mainly Glc-(1→3)-Glc, 'reducing' end Glc-(1→4)-D-glucitol					
MLG oligo DP5-ol (cellulase-generated)	[^{3}H]glucitol	0.02	—	11	HMLG5C
MLG oligo DP6-ol (cellulase-generated)	[^{3}H]glucitol	0.05	—	11	HMLG6C
MLG oligo DP7-ol (cellulase-generated)	[^{3}H]glucitol	0.2	—	11	HMLG7C
MLG oligo DP7–8-ol (cellulase-generated)	[^{3}H]glucitol	0.2	—	1.4	HMLG7XC
MLG oligo DP8-ol (cellulase-generated)	[^{3}H]glucitol	0.1	—	11	HMLG8C
MLG oligo DP10-ol (cellulase-generated)	[^{3}H]glucitol	0.2	—	11	HMLG10C
MLG oligo DP11-ol (cellulase-generated)	[^{3}H]glucitol	0.1	—	11	HMLG11C
MLG-related. Oligosaccharides produced from barley mixed-linkage (1→3),(1→4)-β-D-glucan					

Compound	Position of radiolabelling	MBq per standard pack	MBq per large pack	Approx SA MBq/ µmol	Order Number
by **lichenase** digestion, reductively tritiated. Non-reducing end mainly Glc-(1→4)-Glc, 'reducing' end Glc-(1→3)-D-glucitol					
MLG oligo DP5-ol (lichenase-generated)	[^{3}H]glucitol	0.05	—	11	HMLG5L
MLG oligo DP6-ol (lichenase-generated)	[^{3}H]glucitol	0.1	—	11	HMLG6L
MLG oligo DP7-ol (lichenase-generated)	[^{3}H]glucitol	0.1	—	0.7	HMLG7L
MLG oligo DP7–10-ol (lichenase-generated)	[^{3}H]glucitol	0.05	—	1.1	HMLG7XL
MLG oligo DP8-ol (lichenase-generated)	[^{3}H]glucitol	0.05	—	11	HMLG8L
MLG oligo DP9-ol (lichenase-generated)	[^{3}H]glucitol	0.1	—	11	HMLG9L
MLG oligo DP10-ol (lichenase-generated)	[^{3}H]glucitol	0.05	—	11	HMLG10L
MLG oligo DP11-ol (lichenase-generated)	[^{3}H]glucitol	0.02	—	11	HMLG11L
MLG oligo DP12–13-ol (lichenase-generated)	[^{3}H]glucitol	0.05	—	11	HMLG12XL
Heptasaccharide produced from 'MLG' of the green alga *Ulva lactuca* by **lichenase** digestion, reductively tritiated. 'Reducing' end is probably sugar-(1→3)-D-glucitol					
Ulva oligosaccharide	[^{3}H]glucitol	0.05	—	53*	HULV
Xylan-related. (1→4)-β-D-Xylo-oligosaccharide, reductively tritiated					
Xyl6-ol	[^{3}H]xylitol	0.5	—	780	HXYL6
Soluble extracellular polysaccharides (SEPs) labelled in Ara + Xyl residues					
SEPs from *Rosa* (Paul's Scarlet rose) cultures	[*pentosyl*-1-^{3}H]	0.05	—		HSEPR
SEPs from *Zea* (maize) cultures	[*pentosyl*-1-^{3}H]	0.1	—		HSEPZ
SEPs from *Spinacia* (spinach) cultures	[*pentosyl*-1-^{3}H]	0.1	—		HSEPS
Starch- (amylose)-related oligosaccharides					
Malto-oligosaccharides [(1→4)-α-D-gluco-oligosaccharides], reductively tritiated					
Mlt-2-ol (maltitol)	[^{3}H]glucitol	0.5	—	30*	HMAL2
Mlt-3-ol (maltotriitol)	[^{3}H]glucitol	0.5	—	30*	HMAL3
Mlt-4-ol (maltotetraitol)	[^{3}H]glucitol	0.5	—	30*	HMAL4
Mlt-5-ol (maltopentaitol)	[^{3}H]glucitol	0.5	—	30*	HMAL5
Mlt-6-ol (maltohexaitol)	[^{3}H]glucitol	0.5	—	30*	HMAL6
Mlt-7-ol (maltoheptaitol)	[^{3}H]glucitol	0.5	—	30*	HMAL7
Chitin- and chitosan-related oligosaccharides, reductively tritiated					
(1→4)-β-D-Glucosamine and (1→4)-β-D-*N*-acetylglucosamine oligosaccharides, reductively tritiated					
GlcNAc4-ol (chitin tetrasaccharide)	*N*-acetyl-[^{3}H]-glucosaminitol	0.2	—	1.4	HCHN4
GlcNAc6-ol (chitin hexasaccharide)	*N*-acetyl-[^{3}H]-glucosaminitol	0.2	—	1.4	HCHN6
GlcN4-ol (chitosan tetrasaccharide)	[^{3}H]glucos-aminitol	0.2	—	1.4	HCHSN4

Compound	Position of radiolabelling	MBq per standard pack	MBq per large pack	Approx SA MBq/ µmol	Order Number
GlcN6-ol (chitosan hexasaccharide)	[^{3}H]glucos-aminitol	0.1	—	1.4	HCHSN6
Miscellaneous disaccharides and trisaccharides, reductively tritiated					
α-Glc-(1→2)-D-glucitol (kojibiitol)	[^{3}H]glucitol	0.1	—	780	HKOJI
α-Glc-(1→3)-D-glucitol (nigerobiitol)	[^{3}H]glucitol	0.05	—	780	HNIGE
α-Glc-(1→4)-D-glucitol (maltobiitol; maltitol)	[^{3}H]glucitol	0.1	—		HMALT
α-Glc-(1→6)-α-Glc-(1→6)-D-glucitol (isomaltotriitol)	[^{3}H]glucitol	0.1	—	780	HIMALT
β-Glc-(1→2)-D-glucitol (sophorobiitol)	[^{3}H]glucitol	0.1	—	780	HSOPH
β-Glc-(1→3)-D-glucitol (laminaribiitol)	[^{3}H]glucitol	0.05	—		HLAM3
β-Glc-(1→4)-D-glucitol (cellobiitol)	[^{3}H]glucitol	0.5	—	31*	HCEL2
β-Glc-(1→6)-D-glucitol (gentiobiitol)	[^{3}H]glucitol	0.1	—	780	HGENT
α-Gal-(1→6)-D-glucitol (melibiitol)	[^{3}H]glucitol	0.1	—	780	HMELI
α-Xyl-(1→6)-D-glucitol (isoprimeveritol)	[^{3}H]glucitol	0.5	—	70*	HISO
Miscellaneous reducing oligosaccharides ^{14}C-labelled					
α-Glc-(1→6)-α-Glc-(1→6)-α-Glc-(1→6)-Glc (isomaltotetraose)	[U-^{14}C]	0.05	—		CIMALT
XXXG [please enquire]	[U-^{14}C]				CXXXG
XXFG [please enquire]	[U-^{14}C]				CXXFG
isoprimeverose [please enquire]	[U-^{14}C]				CISO
Xylobiose [please enquire]	[U-^{14}C]				CXYL2
Oligogalacturonides (see under pectin-related oligosaccharides)	[6-^{14}C]				COGA
Miscellaneous monomeric carbohydrates & organic acids (incl. precursors & products of ascorbate / vitamin C)					
D-Apiose	[U-^{14}C]	0.01	—		CAPI
L-Arabinitol	[1-^{14}C]	0.02	—		CARL
L-Arabinose	[1-^{14}C]	0.1	—		CARA
D-Galacturonic acid (see under 'pectin-related')	[6-^{14}C]				CGALA1
3-Deoxyhexitols (produced by reductive tritiation of saccharinic acids formed by alkaline peeling of laminari-oligosaccharides)	[3-^{3}H]	0.5	—	1.4	HDHEX
Erythritol	[2,3-^{3}H]	0.5	5.0	390	HERY
L-Gulonic acid	[1-^{3}H]	0.2	—	780	HGULO
L-Mannonic acid	[1-^{3}H]	0.2	—	780	HMANO
L-Threitol	[2,3-^{3}H]	0.5	5.0	390	HTHR
L-Tartaric acid	[2,3-^{3}H]	0.1	—	407	HTART
L-Threonic acid	[2,3-^{3}H]	0.1	—	407	HTHRO
Ribitol	[1-^{3}H]	0.5	—	780	HRIB
Xylitol	[1-^{3}H]	0.5	5.0		HXYL
L-Galactonic acid (partly lactone)	[6-^{3}H]	0.5	5.0	390	HGALO
D-Glucuronic acid	[1-^{3}H]	0.5	—		HGLCA
4-*O*-Oxalyl L-threonate (with trace of 3-*O*-oxalyl L-	[*oxalyl*-^{14}C]				COXT

Compound	Position of radiolabelling	MBq per standard pack	MBq per large pack	Approx SA MBq/ µmol	Order Number
threonate) [please enquire]					
Cutin precursor. Potentially useful as substrate for study of cutin synthesis					
16-Hydroxyhexadecanoic acid	[16-^{3}H]	0.1	—	28	HHHA
Sugar phosphates & sugar nucleotides					
UDP-L-arabinopyranose	[*Ara*-1-^{3}H]	0.05	—		HUDPA
L-Arabinose 1-phosphate	[1-^{3}H]	0.05	—		HARAP
D-Mannose 1-phosphate	[U-^{14}C]	0.02	—	6.1	CMANP
Membrane-impermeant probes for hydroxyl radicals *in vivo*					
Benzoyl polyallylamine	[*benzoyl*-^{3}H]	0.1	—	320†	HBPA
BzK_5Me (Benzoyl-pentalysine, methyl ester)	[*benzoyl*-^{3}H]	0.1	—	5.3	HBPL
Benzoyl polyethyleneimine	[*benzoyl*-^{3}H]	0.05	—	320†	HBPE
Benzoyl starburst	[*benzoyl*-^{3}H]	0.05	—	320†	HBST
Cell wall-related amino acid derivatives					
L-Hydroxyproline-tetraarabinoside (Hyp-Ara_4) [please enquire]	[*Hyp*-U-^{14}C]				CHA4
L-Hydroxyproline-tetraarabinoside (Hyp-Ara_4) [please enquire]	[*Ara*-1-^{3}H]				HHA4
L,L-Isodityrosine [please enquire]	[U-^{14}C]				CIDT
L,L-Dityrosine [please enquire]	[U-^{14}C]				CDIT
Cinnamate derivatives					
trans-Cinnamic acid [please enquire]	[*ring*-^{3}H]				HCINA
trans-Cinnamic acid [please enquire]	[U-^{14}C]				CCINA
5-*O*-Feruloyl-α-L-Ara*f*-(1→3)-D-Xyl*p*-(1→4)-D-Xyl (FAXX) [please enquire]	[*pentosyl*-1-^{3}H]				HFAXX
5-*O*-Feruloyl-α-L-Ara*f*-(1→3)-D-Xyl (FAX) [please enquire]	[*pentosyl*-1-^{3}H]				HFAX
5-*O*-Feruloyl-L-Ara [please enquire]	[*Ara*-1-^{3}H]				HFA
5-*O*-Feruloyl-α-L-Ara*f*-(1→3)-D-Xyl*p*-(1→4)-D-Xyl (FAXX) [please enquire]	[*cinnamoyl*-U-^{14}C] ‡				CFAXX
5-*O*-Feruloyl-α-L-Ara*f*-(1→3)-D-Xyl (FAX) [please enquire]	[*cinnamoyl*-U-^{14}C] ‡				CFAX
5-*O*-Feruloyl-α-L-Ara [please enquire]	[*cinnamoyl*-U-^{14}C] ‡				CFA
Ferulic acid [please enquire]	[*cinnamoyl*-U-^{14}C] ‡				CFERA
p-Coumaric acid [please enquire]	[U-^{14}C]				CCOUA

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➢ **Radiolabelled cell wall preparations** (equivalent to dietary fibre)

For studies of wall degradation in—

- ruminant systems (*in-vitro* models)
- invertebrates
- omnivorous mammals
- leaf-litter microbes
- plant enzymes involved in wall lysis
- plant pathogens

Preparations may be uniformly (U) ^{14}C-labelled, implying that all carbons have approximately identical specific radioactivity; or generally (G) ^{14}C-labelled, implying that all positions are radioactive, though not necessarily to the same specific radioactivity. Both types are valuable for the study of global wall degradation and identification of products, given valuable information even when the nature of these products could not have been predicted.

Compound	Position of radiolabelling	MBq per standard pack	MBq per large pack	Approx specific activity (MBq /g)	Order Number
Spinach primary cell walls	[U-^{14}C]	0.2	—	3.2	CWSP
Broad-bean pod fibre cell walls (~7.0 MBq/g)	[G-^{14}C]	0.5	—	6.9	CWBF
Broad-bean pod parenchyma cell walls (~8.5 MBq/g)	[G-^{14}C]	0.5	—	8.4	CWBP