Molecular Dimensions

MIDAS™ MD1–59

MIDAS™: a Modern Intelligent Dynamic Alternative Screen - A revolutionary 96 condition crystallization screen based on alternative polymeric precipitants[1].

MD1-59 is presented as 96 x 10 mL conditions.

Features of MIDAS:

- Ideal for soluble protein, protein/protein complexes, protein-nucleic acid complexes and sensitive macromolecular complexes
- Narrow range of pH and salt concentrations centered on physiological values.
- Every condition contains at least one alternative polymeric precipitant.
- Designed to complement PEG and salt-based screens.
- Compatible with liquid-handling robots.

Introduction

MIDAS is a 96 condition crystallization screen based on alternative polymeric precipitants. Devised and tested (Figure 1) in the Laboratory of Dr. Clemens Grimm *et al* of Würzburg University in
Germany. MIDAS is a revolutionary crystallization screen that has moved away from the reliance on polyethylene glycols (PEGs) as the main precipitant (only 3 conditions in MIDAS contain a PEG). MIDAS systematically searches for crystallization conditions with alternative polymeric precipitants. MIDAS entails a relatively narrow range of pH and salt concentrations centred on physiological values to increase its suitability for sensitive macromolecular complexes, while every condition contains at least one alternative polymeric precipitant.

PEG Alternatives:

For decades PEGs or their monomethyl ethers (PEG MMEs), have dominated crystallization screens. Out of 8289 entries scanned in the PDB, almost half of the crystallization conditions contained a PEG component and most commercial screens available today contain PEGs. However, the success rate of PEGs might be influenced due to their widespread dominance in crystallization screens.

There are many alternatives to PEGs and have recently been described as being useful for macromolecular crystallogenesis. Alternative polymers (Figure 2) such as the Jeffamine polyetheramines, pentaerythritol propoxylate and pentareythritol, polyvinyl pyrrolidone, polypropylene glycol, polyvinyl alcohol and polyacrylate have so far only sporadically been introduced into standard crystallization screens.

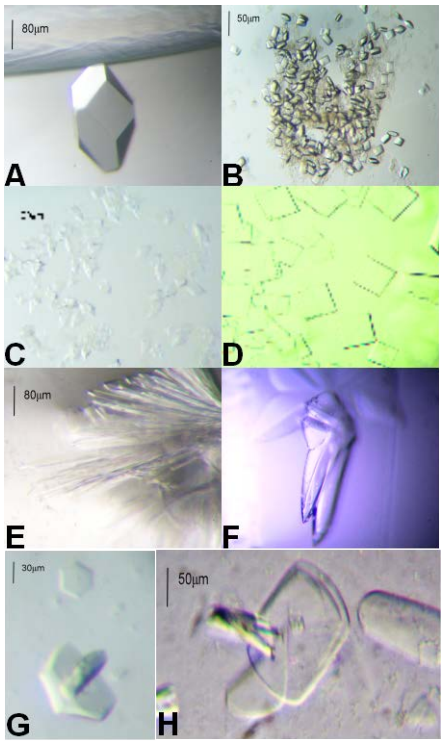


Figure 1. Examples of protein crystals grown using MIDAS. (A) Lysozyme crystals obtained in 35% Sokalan HP 56, (B) Xylanase crystals obtained in 20% Jeffamine M2070, (C) Crystals of the cytokine receptor–ligand complex obtained in 45% pentaerythritol propoxylate (5/4 PO/OH), (D) Crystals of streptavidin core obtained in 5% polyacrylate 2100, sodium salt, (E) Histone tail recognizing MBT repeats in 35% polyacrylate 2100, sodium salt), (F) Lysozyme crystals in 30% Sokalan CP 42,(G) spliceosomal assembly complex (SAC) 7 obtained in 6% polyvinyl pyrrolidone, (H) Crystals of spliceosomal assembly complex (SAC) 9 obtained in 25% Sokalan CP 42.

Formulation Notes:

MIDAS reagents are formulated using ultrapure water (>18.0 MΩ) and are sterile-filtered using 0.22 µm filters. No preservatives are added.

Final pH may vary from that specified on the datasheet. Molecular Dimensions will be happy to discuss the precise formulation of individual reagents.

Individual reagents and stock solutions for optimization are available from Molecular Dimensions.

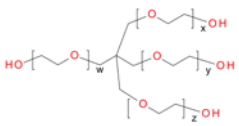
Enquiries regarding MIDAS formulation, interpretation of results or optimization strategies are welcome. Please e-mail, fax or phone your query to Molecular Dimensions.

Contact and product details can be found at www.moleculardimensions.com

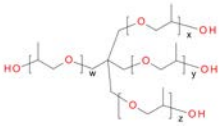
Manufacturer's safety data sheets are available to download from our website.

References :

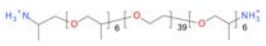
1. Grimm, C., Chari, A., Reuter, K. & Fischer, U. (2010). Acta Cryst. D66, 685-697.



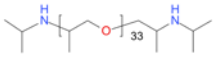
Pentaerythritol ethoxylate.



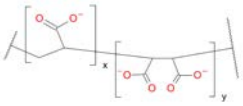
Pentaerythritol propoxylate



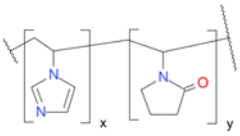
Jeffamine ED2003



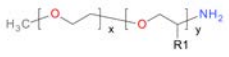
Jeffamine SD2001



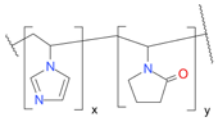
Poly(acrylic acid-co-maleic) acid



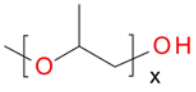
polyvinylpyrrolidone



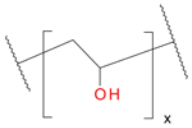
M-type Jeffamines*



Vinylpyrrolidone/vinylimidazole Copolymer

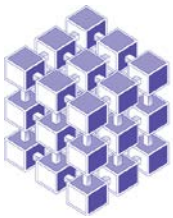


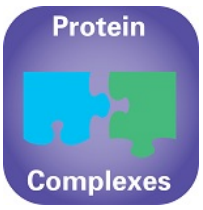
polypropylene glycol

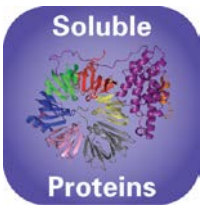


polyvinyl alcohol

Figure 2. Examples of alternative precipitants used in MIDAS™,
**R1 = —H for EO or —CH3 for PO. The PO/EO molar ratio is 29/6 for Jeffamine M2005, 10/31 for Jeffamine M2070 and 9/1 for Jeffamine M600.*

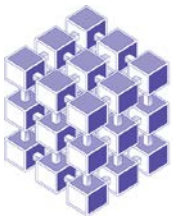


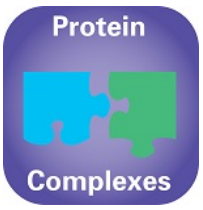


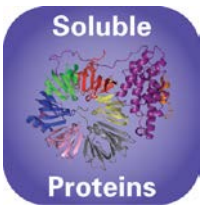


MIDAS Conditions 1-48 (Box 1) MD1–59

Tube #	Conc.	Salt	Conc.	Buffer	pH	Conc.	Precipitant
1-1			0.1 M	HEPES	6.0	50 % v/v	Polypropylene glycol 400
						5 % v/v	Dimethyl sulfoxide
1-2			0.1 M	MES	5.5	12 % w/v	Polyvinylpyrrolidone
1-3			0.1 M	HEPES	6.5	45 % w/v	Poly(acrylic acid sodium salt) 2100
1-4						14 % v/v	Poly(acrylic acid-*co*-maleic acid) solution
1-5	0.5 M	Ammonium phosphate monobasic				12.5 % w/v	Poly(acrylic acid sodium salt) 2100
1-6			0.1 M	Tris	8.5	19 % v/v	Poly(acrylic acid-*co*-maleic acid) solution
1-7						10 % v/v	Polypropylene glycol 400
1-8						5 % w/v	Poly(acrylic acid sodium salt) 2100
1-9			0.1 M	MES	6.0	25 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
1-10	0.1 M	Sodium sulfate				24 % w/v	Polyvinylpyrrolidone
1-11	0.2 M	Calcium chloride dihydrate	0.1 M	HEPES	6.5	35 % v/v	Pentaerythritol ethoxylate (15/4 EO/OH)
1-12			0.1 M	Potassium/sodium phosphate	7.0	35 % v/v	Polypropylene glycol 400
1-13	0.2 M	Sodium chloride	0.1 M	MES	5.5	20 % v/v	Jeffamine® D-2000
						10 % v/v	Jeffamine® M-2005
1-14	0.2 M	Sodium thiocyanate	0.1 M	HEPES	7.0	15 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
1-15	0.2 M	Potassium acetate	0.1 M	HEPES	7.0	5 % w/v	Polyvinyl alcohol
						10 % v/v	Jeffamine® T-403
1-16	0.2 M	Sodium chloride	0.1 M	MES	6.0	45 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
1-17			0.1 M	HEPES	7.0	8 % w/v	Polyvinyl alcohol
						10 % v/v	1-Propanol
1-18	0.1 M	Lithium sulfate	0.1 M	HEPES	7.0	30 % w/v	Polyvinylpyrrolidone
1-19			0.2 M	Imidazole	7.0	40 % v/v	Polypropylene glycol 400
1-20	0.06 M	Lithium sulfate	0.1 M	HEPES	7.5	8 % v/v	Poly(acrylic acid-*co*-maleic acid) solution
						3 % v/v	Pentaerythritol ethoxylate (3/4 EO/OH)
1-21	0.1 M	Sodium chloride	0.1 M	Tris	8.0	35 % v/v	Jeffamine® SD-2001
1-22						30 % v/v	Jeffamine® M-600
						10 % v/v	Dimethyl sulfoxide
1-23						20 % v/v	Polypropylene glycol 400
						10 % v/v	1-Propanol
1-24			0.1 M	HEPES	6.5	28 % v/v	Poly(acrylic acid-*co*-maleic acid) solution
1-25						15 % v/v	Jeffamine® ED-2003
						10 % v/v	Ethanol
1-26	0.2 M	Sodium chloride	0.1 M	MES	6.0	30 % v/v	Jeffamine® ED-2003
1-27	0.1 M	Sodium malonate dibasic monohydrate	0.1 M	MES	5.5	25 % v/v	Jeffamine® SD-2001
1-28	0.2 M	Sodium chloride	0.1 M	MES	6.0	15 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
1-29	0.2 M	Magnesium chloride hexahydrate				35 % v/v	Pentaerythritol ethoxylate (3/4 EO/OH)
1-30						40 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
						15 % v/v	Ethanol
1-31			0.1 M	Tris	8.0	50 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
1-32	0.2 M	Sodium chloride	0.1 M	Tris	8.0	12.5 % w/v	Polyvinylpyrrolidone
						10 % w/v	PEG 4000
1-33	0.1 M	Sodium chloride				25 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
						10 % v/v	Dimethyl sulfoxide
1-34	0.2 M	Ammonium sulfate	0.1 M	HEPES	7.5	35 % w/v	Poly(acrylic acid sodium salt) 2100
1-35	0.1 M	Magnesium formate dihydrate	0.1 M	Tris	8.5	30 % v/v	Pentaerythritol ethoxylate (15/4 EO/OH)
1-36	0.2 M	Potassium acetate				24 % v/v	Poly(acrylic acid-*co*-maleic acid) solution
1-37			0.1 M	Tris	8.0	60 % v/v	Polypropylene glycol 400
1-38			0.1 M	HEPES	7.5	30 % v/v	Pentaerythritol ethoxylate (15/4 EO/OH)
						6 % w/v	Polyvinylpyrrolidone
1-39						45 % v/v	Polypropylene glycol 400
						10 % v/v	Ethanol
1-40						10 % v/v	Pentaerythritol ethoxylate (3/4 EO/OH)
						10 % v/v	1-Butanol
1-41			0.1 M	HEPES	7.0	12.5 % w/v	Poly(acrylic acid sodium salt) 2100
						6 % v/v	Jeffamine® SD-2001
1-42			0.1 M	HEPES	6.5	6 % w/v	Polyvinylpyrrolidone
1-43			0.1 M	HEPES	6.5	20 % v/v	Jeffamine® ED-2003
1-44			0.1 M	Tris	8.0	20 % v/v	Glycerol ethoxylate
						10 % v/v	Tetrahydrofuran
1-45			0.2 M	Imidazole	7.0	25 % v/v	Jeffamine® D-2000
1-46	0.2 M	Potassium chloride	0.1 M	HEPES	6.5	30 % v/v	Jeffamine® SD-2001
1-47	0.1 M	Sodium chloride				30 % v/v	Polypropylene glycol 400
1-48						20 % v/v	Jeffamine® SD-2001
						15 % v/v	1-Propanol







MIDAS Conditions 1-48 (Box 2) MD1–59

Tube #	Conc.	Salt	Conc.	Buffer	pH	Conc.	Precipitant
2-1	0.2 M	Lithium sulfate	0.1 M	Tris	8.0	25 % v/v	Jeffamine® T-403
2-2	0.2 M	Potassium acetate				35 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
2-3	0.2 M	Potassium chloride	0.1 M	Glycine	9.5	20 % v/v	Pentaerythritol ethoxylate (15/4 EO/OH)
2-4	0.2 M	Sodium thiocyanate	0.1 M	HEPES	7.0	40 % v/v	Pentaerythritol propoxylate (5/4 PO/OH)
2-5	0.2 M	Potassium chloride	0.1 M	HEPES	6.5	15 % v/v	Jeffamine® T-403
						15 % v/v	Jeffamine® ED-2003
2-6	0.2 M	Potassium acetate	0.1 M	MES	6.0	15 % v/v	Pentaerythritol ethoxylate (15/4 EO/OH)
						3 % v/v	Jeffamine® T-403
2-7	0.1 M	Sodium malonate dibasic monohydrate	0.1 M	HEPES	7.0	30 % w/v	Poly(acrylic acid sodium salt) 2100
2-8						10 % v/v	Jeffamine® D-2000
						10 % v/v	Jeffamine® M-2005
						10 % v/v	Ethanol
2-9	0.1 M	Lithium sulfate	0.1 M	Tris	8.0	25 % v/v	Jeffamine® ED-2003
2-10			0.1 M	Tris	8.0	10 % v/v	Jeffamine® T-403
						10 % v/v	Jeffamine® ED-2003
2-11	0.1 M	Lithium sulfate	0.1 M	HEPES	6.5	25 % w/v	Poly(acrylic acid sodium salt) 2100
2-12	0.2 M	Magnesium chloride hexahydrate	0.1 M	HEPES	7.5	15 % w/v	Poly(acrylic acid sodium salt) 2100
2-13			0.1 M	HEPES	6.5	40 % v/v	Jeffamine® D-2000
2-14	0.5 M	Sodium chloride	0.1 M	Tris	8.0	10 % w/v	Poly(acrylic acid sodium salt) 2100
2-15			0.1 M	Potassium/sodium phosphate	7.0	14 % v/v	Jeffamine® ED-900
						11 % v/v	Jeffamine® SD-2001
2-16	0.2 M	Sodium chloride	0.1 M	BICINE	9.0	20 % w/v	Poly(acrylic acid sodium salt) 2100
2-17	0.2 M	Sodium malonate dibasic monohydrate	0.1 M	MES	5.5	20 % v/v	Jeffamine® D-2000
2-18	0.2 M	Potassium chloride	0.1 M	Tris	8.0	30 % v/v	Jeffamine® M-2070
2-19						20 % v/v	Jeffamine® M-2070
						20 % v/v	Dimethyl sulfoxide
2-20	0.2 M	Magnesium chloride hexahydrate	0.1 M	MES	5.5	40 % v/v	Pentaerythritol propoxylate (17/8 PO/OH)
2-21			0.1 M	Tris	8.0	20 % w/v	Poly(acrylic acid sodium salt) 5100
2-22			0.1 M	HEPES	7.0	28 % v/v	Polyethyleneimine
2-23	0.1 M	Ammonium formate	0.1 M	HEPES	7.0	20 % v/v	SOKALAN® CP 7
2-24	0.2 M	Sodium sulfate	0.1 M	Tris	8.0	20 % w/v	SOKALAN® HP 56
2-25	0.1 M	Potassium chloride	0.1 M	HEPES	7.0	25 % v/v	SOKALAN® CP 7
2-26	0.3 M	Ammonium formate	0.1 M	HEPES	7.0	20 % w/v	SOKALAN® CP 5
2-27						40 % v/v	Glycerol ethoxylate
2-28			0.1 M	Tris	8.5	30 % v/v	Glycerol ethoxylate
2-29						55 % v/v	Polypropylene glycol 400
2-30	0.2 M	Lithium citrate tribasic tetrahydrate				35 % v/v	Glycerol ethoxylate
2-31	0.2 M	Ammonium acetate	0.1 M	MES	6.5	30 % v/v	Glycerol ethoxylate
2-32			0.1 M	Tris	8.0	20 % w/v	SOKALAN® CP 42
						5 % v/v	Methanol
2-33			0.1 M	Tris	7.0	25 % w/v	SOKALAN® CP 42
						10 % v/v	Tetrahydrofuran
2-34	0.1 M	Lithium acetate dihydrate	0.1 M	Bis-Tris	6.0	20 % w/v	SOKALAN® CP 42
2-35			0.2 M	HEPES	6.5	10 % v/v	Jeffamine® M-2005
2-36			0.1 M	Bis-Tris	6.0	15 % w/v	SOKALAN® CP 5
2-37			0.1 M	Bis-Tris	6.0	25 % w/v	SOKALAN® CP 42
2-38						35 % v/v	Jeffamine® D-2000
2-39			0.1 M	Tris	8.5	20 % v/v	Glycerol ethoxylate
						3 % v/v	Polyethyleneimine
2-40	0.2 M	Ammonium chloride	0.1 M	HEPES	7.5	25 % v/v	Glycerol ethoxylate
2-41			0.1 M	Tris	8.5	10 % w/v	SOKALAN® CP 42
2-42			0.1 M	MES	6.0	30 % w/v	Poly(acrylic acid sodium salt) 5100
						10 % v/v	Ethanol
2-43	0.2 M	Potassium citrate tribasic monohydrate				15 % w/v	SOKALAN® CP 42
2-44			0.1 M	Tris	8.5	30 % w/v	SOKALAN® CP 42
2-45	0.2 M	Ammonium acetate	0.1 M	HEPES	7.0	25 % w/v	SOKALAN® HP 56
2-46			0.1 M	Tris	8.5	25 % w/v	SOKALAN® CP 5
2-47	0.2 M	Ammonium formate				10 % w/v	Polyvinylpyrrolidone
						20 % w/v	PEG 4000
2-48			0.1 M	Tris	8.0	15 % w/v	Polyvinylpyrrolidone
						25 % w/v	PEG 5000 MME

Abbreviations: BICINE: 2-(Bis(2-hydroxyethyl)amino)acetic acid, **Bis Tris**; Bis-(2-hydroxyethyl)imino-tris(hydroxymethyl)methane, **HEPES;** 2-(4-(2-Hydroxyethyl)-1-piperazinyl)ethanesulfonic Acid, **MES**; 2-(N-morpholino)ethanesulfonic acid, **PEG**; Polyethylene glycol, **Tris**; 2-Amino-2-(hydroxymethyl)propane-1,3-diol.

N.B. J. Polyvinylpyrolidone K15 is now called Polyvinylpyrolidine.

The conditions shown on this datasheet may differ from those shown on previous versions of the datasheets (only applicable to MIDAS batches 001- 007) due to the discontinuation of raw material supply for the following: Glascol W13, Sokalan CP12S and Sokalan HP66K. If you require further advice regarding the changes to these conditions please contact us at enquiries@moleculardimensions.com.

Sokalan® are water-soluble polymers based on acrylic acid, maleic acid, vinylpyrrolidone, vinylimmadazole and/or hydrophobic monomers.

Manufacturer's safety data sheets are available from our website or by scanning the QR code here:

Re-Ordering details:

Catalogue	Pack size	Catalogue Code
MIDAS	96 x 10 mL	MD1-59
MIDAS HT-96	96 x 1 mL	MD1-60
MIDAS Green Screen	96 x 10 mL	MD1-83
MIDAS HT-96 Green Screen	96 x 1 mL	MD1-84
MIDAS OptiMax Kit*	24 x 10 mL	MD1-62
Single Reagents		
MIDAS single reagents	100 mL	MDSR-59-tube number
MIDAS HT96 single reagents	100 mL	MDSR-60-well number

For MIDAS stock solutions please visit the Optimization section on our website.
*MIDAS OptiMax contains all the individual stock reagents for MIDAS.