Morpheus® III 10 mL and HT-96 MD1-116 and MD1-117

Morpheus III uniquely contains a range of small, drug-like compounds to aid protein stabilisation and crystallisation.

MD1-116 is presented as 96 x 10 mL conditions. MD1-117 is presented as 96 x 1 mL conditions.

Let the unique drug-like additives in Morpheus III help cure your crystallisation problems:

- Expands the amount of chemical space screened with unique drug-like additives.
- Drug-like compounds can aid protein-stabilisation and are often found in structures in the PDB.
- Hippocrates additive screen contains all 44 compounds used in Morpheus III for easy optimization.
- Designed *de novo* and optimised against a broad range of protein samples.
- No bias to particular reagents or macromolecules.
- Developed by Dr Fabrice Gorrec of the MRC-LMB, Cambridge, UK, the creator of a range of popular and novel screens including Morpheus and the LMB Crystallisation screen.

Introduction

Morpheus III is the latest member of the **Morpheus®** family of protein screens. It contains a range of drug-like compounds not present in other crystallisation screens. The additives are often found bound to protein structures submitted to the pdb and may therefore increase stability and thus crystallisability.

Morpheus III follows the general design principles of the original Morpheus screen. However, in this case a drug-like additives such as antibiotics, dipeptides and phytochemicals have been added. In addition, each condition has some cryoprotectant along with the innovative buffer systems seen with other Morpheus screens.

These drug-like compounds are likely to interact with proteins of primary interest to those in the pharmaceutical industry or researching the causes of human disease. As such they may improve the protein stability and solubility of many targets for macromolecular structure solution.

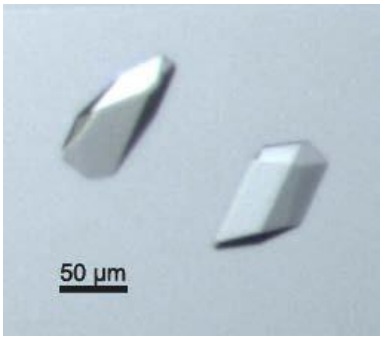

Figure 1. USB1 (2H phosphoesterase) crystals grown with Morpheus III. With thanks to Dr C Hilcenko, University of Cambridge).

Screen Design

Morpheus III is based on the 3D grid design of Morpheus (Figure 2). The drug-like ligands selected to formulate Morpheus III are shown in Table 1. From these, eight additive mixes were prepared (Table 2): Dipeptides, Vitamins, Nucleosides, Phytochemicals 1, Phytochemicals 2, Antibiotics, Cholic acid derivatives and Anaesthetic alkaloids.

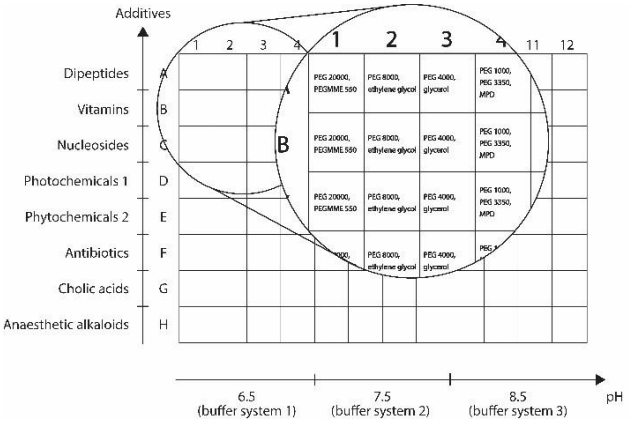

Figure 2: Morpheus III 3D grid design

Formulation Notes:

Morpheus III reagents, with the exception of the Phytochemicals 1 and Phytochemicals 2 mixes, are formulated using ultrapure water (>18.0 MΩ) and are sterile-filtered using 0.22 µm filters. No preservatives are added.

The Phytochemicals 1 (MD2-50-316 and MD2-100-316) and Phytochemicals 2 (MD2-50-317 and MD2-100-317) mixes are dissolved in 50% EtOH and 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.

Contact, product details and manufacturer's datasheets can be found at www.moleculardimensions.com.
Enquiries regarding Morpheus III formulation, interpretation of results or optimization strategies are welcome. Please e-mail, fax or phone your query to Molecular Dimensions.

References

1. Gorrec, F (2009), The MORPHEUS protein crystallization screen *J Appl Cryst* **42**, 1035-1042

2. Gorrec, F (2013), The current approach to initial crystallization screening of proteins is under-sampled *J Appl Cryst* **46**, 795-797.

3. Gorrec, F (2015), The Morpheus II protein crystallization screen, ICCBM15 proceedings (Special Issue ActaF).

RE-ORDERING INFORMATION

Code	Pack Size	Description
MD1-116	96 x 10 mL	Morpheus III
MD1-117	96 x 1 mL	Morpheus III HT-96
MD1-118	48 x 100 µL	Hippocrates™ additive screen
MD1-91	96 x 10 mL	Morpheus II
MD1-92	96 x 1 mL	Morpheus II HT-96
MD1-46	96 x 10 mL	Morpheus
MD1-47	96 x 1 mL	Morpheus HT-96
MD1-93	48 x 100 µL	The Morpheus® Additive screen

Table 1: List of Drug-like ligands in Morpheus III

Ligand Name	Mix	PDB ID	No of Structures†
Ala-Ala	Dipeptides	n/a	-
Ala-Gln	Dipeptides	n/a	1
Gly-Glu	Dipeptides	n/a	-
Gly-L-Ala	Dipeptides	n/a	-
Gly-L-Asp	Dipeptides	n/a	-
Gly-Sar	Dipeptides	n/a	-
L-Carnosine	Dipeptides	n/a	-
Leu-Ala hydrate	Dipeptides	n/a	1
Sodium-L-ascorbate	Vitamins*	ASC	33
Choline chloride	Vitamins*	CHT	37
D-Panthenol	Vitamins*	MV2	1
Pyridoxine hydrochloride	Vitamins*	UEG	3
Thiamine hydrochloride	Vitamins*	VIB	12
Cytidine	Nucleosides	CTN	23
Inosine	Nucleosides	NOS	14
Ribavirin	Nucleosides	RBV	3
Thymidine	Nucleosides	THM	45
Uridine	Nucleosides	URI	27
Menthol	Phytochemicals 1*	n/a	-
Caffeic acid	Phytochemicals 1*	DHC	9
D-Quinic acid	Phytochemicals 1*	QIC	3
Shikimic acid	Phytochemicals 1*	SKM	36
Gallic acid monohydrate	Phytochemicals 1*	GDE	9
N-Vanillylnonanamide	Phytochemicals 1*	n/a	-
Thymol	Phytochemicals 1*	IPB	1
D-Salicin	Phytochemicals 2	SA0	1
Esculin hydrate	Phytochemicals 2	n/a	-
Quinine hemisulfate salt monohydrate	Phytochemicals 2	QI9	3
Tryptamine	Phytochemicals 2	TSS	7
Arbutin	Phytochemicals 2	n/a	-
Ampicillin sodium salt	Antibiotics	AIC	8
Apramycin sulfate salt	Antibiotics	AM2	7
Bacitracin	Antibiotics	n/a	-
Dihydrostreptomycin sesquisulfate	Antibiotics	SRY	19
Gentamicin sulfate	Antibiotics	51G	3
Spectinomycin dihydrohloride pentahydrate	Antibiotics	SCM	3
CHAPS	Cholic acid derivatives	CPS	60
CHAPSO	Cholic acid derivatives	1N7	9
Sodium glycocholate hydrate	Cholic acid derivatives	GCH	4
Taurocholic acid sodium salt hydrate	Cholic acid derivatives	TCH	8
Lidocaine hydrochloride	Anesthetic alkaloids	LQZ	2
Procaine hydrochloride	Anesthetic alkaloids	n/a	-
Proparacaine hydrochloride	Anesthetic alkaloids	n/a	-
Tetracaine hydrochloride	Anesthetic alkaloids	TE4	2

†No. of Structures requested in April 2018

*Please note that the Vitamin and Phytochemicals 1 mixes may darken with age.

Table 2: Mixes of additives used in Morpheus III

Mix name	Composition	Catalogue Number (50 ml)	Catalogue Number (100 ml)
16% w/v Dipeptides	2% w/v Ala-Ala, 2% w/v Ala-Gln, 2% w/v Gly-Glu, 2% w/v Gly-L-Ala, 2% w/v Gly-L-Asp, 2% w/v Gly-Sar, 2% w/v L-Carnosine, 2% w/v Leu-Ala hydrate	MD2-50-313	MD2-100-313
15% w/v Vitamins*	3% w/v Sodium-L ascorbate, 3% w/v Choline Chloride, 3% v/v D-Panthenol, 3% w/v Pyridoxine hydrochloride, 3% w/v Thiamine hydrochloride	MD2-50-314	MD2-100-314
10% w/v Nucleosides	2% w/v Cytidine, 2% w/v Inosine, 2% w/v Ribavirin, 2% w/v Thymidine, 2% w/v Uridine	MD2-50-315	MD2-100-315
3.5% w/v Phytochemicals 1†	0.5% w/v (-)-Menthol, 0.5% w/v Caffeic acid, 0.5% w/v D-Quinic acid, 0.5% w/v Shikimic acid, 0.5% w/v Gallic acid monohydrate, 0.5% w/v N-VanillylInonanamide, 0.5% w/v Thymol	MD2-50-316	MD2-100-316
2.5% w/v Phytochemicals 2†	0.5% w/v D-Salicin, 0.5% w/v Esculin hydrate, 0.5% w/v Quinine hemisulfate salt monohydrate, 0.5% w/v Tryptamine, 0.5% w/v Arbutin	MD2-50-317	MD2-100-317
6% w/v Antibiotics	1% w/v Ampicillin sodium salt, 1% w/v Apramycin sulfate salt, 1% w/v Bacitracin, 1% w/v Dihydrostreptomycin sesquisulfate, 1% w/v Gentamicin sulfate, 1% w/v Spectinomycin dihydrochloride pentahydrate	MD2-50-318	MD2-100-318
12% w/v Cholic acid derivatives	3% w/v CHAPS, 3% w/v CHAPSO, 3% w/v Sodium glycocholate hydrate, 3% w/v Taurocholic acid sodium salt hydrate	MD2-50-319	MD2-100-319
8% w/v Anesthetic alkaloids	2% w/v Lidocaine hydrochloride monohydrate, 2% w/v Procaine hydrochloride, 2% w/v Proparacaine hydrochloride, 2% w/v tetracaine hydrochloride	MD2-50-320	MD2-100-320

†3.5% Phytochemicals 1 (MD2-50-316 and MD2-100-316) and 2.5% Phytochemicals 2 (MD2-50-317 and MD2-100-317) are dissolved in 50% EtOH.

*Please note that the Vitamin and Phytochemicals 1 mixes may darken with age.

Table 3: Buffer systems used in Morpheus III

Mix name	Conc.	pH @ 20°C	Composition	Catalogue Number (100 mL)	Catalogue Number (250 mL)
Buffer System 1	1.0M	6.5	Imidazole; MES monohydrate (acid)	MD2-100-100	MD2-250-100
Buffer System 2	1.0M	7.5	Sodium HEPES; MOPS (acid)	MD2-100-101	MD2-250-101
Buffer System 3	1.0M	8.5	Tris (base); BICINE	MD2-100-102	MD2-250-102

Table 4: Mixes of Precipitants used in Morpheus III

Mix name	Composition	Catalogue Number (100 mL)	Catalogue Number (250 mL)
60% Precipitant Mix 1	40% v/v PEG 500* MME; 20 % w/v PEG 20000	MD2-100-81	MD2-250-81
60% Precipitant Mix 2	40% v/v Ethylene glycol; 20 % w/v PEG 8000	MD2-100-82	MD2-250-82
60% Precipitant Mix 3	40% v/v Glycerol; 20% w/v PEG 4000	MD2-100-83	MD2-250-83
75% Precipitant Mix 4	25% v/v MPD; 25% PEG 1000; 25% w/v PEG 3350	MD2-100-84	MD2-250-84

Morpheus III Optimization

Although the screen is composed of various mixes, consider each condition as for any other screen, with three stock solutions:

- mix of precipitants
- mix of additives
- mix of buffers.

When you have more than one hit, you can deduce the importance of each stock from the beginning: e.g. do I see specificity related to one stock? To pH?

Every condition can be made following the same ratio of stock solutions:

1/2 [Precipitant mix] + 1/10 [additive mix] + 1/10 [Buffer system] + 3/10 dH_2O.

To vary the pH, you can change the ratio of the two buffers within the buffer stock (i.e. change ratio of two non-titrated 1M buffer stocks).
Once you know more about the chemical space within Morpheus III you can eventually investigate further, trying to reveal specificity of a single chemical.
For example, what happens when you replace the group of chemicals from a stock with only one chemical of this mix? (E.g. only one divalent cations instead of the corresponding mix of additives).

At this stage you may (or not) have a simpler condition to work with. You can also proceed to other "classic" optimization approaches such as using an additive screen, scale-up or seeding.

Tube #	Well #	Conc.		Ligand	Conc.		Buffer	pH	Conc.		Precipitant
1-1	A1	1.6	%	Dipeptides Mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
1-2	A2	1.6	%	Dipeptides Mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
1-3	A3	1.6	%	Dipeptides Mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
1-4	A4	1.6	%	Dipeptides Mix	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
1-5	A5	1.6	%	Dipeptides Mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
1-6	A6	1.6	%	Dipeptides Mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
1-7	A7	1.6	%	Dipeptides Mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
1-8	A8	1.6	%	Dipeptides Mix	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
1-9	A9	1.6	%	Dipeptides Mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
1-10	A10	1.6	%	Dipeptides Mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
1-11	A11	1.6	%	Dipeptides Mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
1-12	A12	1.6	%	Dipeptides Mix	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4
1-13	B1	1.5	%	Vitamins mix*	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
1-14	B2	1.5	%	Vitamins mix*	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
1-15	B3	1.5	%	Vitamins mix*	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
1-16	B4	1.5	%	Vitamins mix*	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
1-17	B5	1.5	%	Vitamins mix*	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
1-18	B6	1.5	%	Vitamins mix*	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
1-19	B7	1.5	%	Vitamins mix*	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
1-20	B8	1.5	%	Vitamins mix*	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
1-21	B9	1.5	%	Vitamins mix*	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
1-22	B10	1.5	%	Vitamins mix*	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
1-23	B11	1.5	%	Vitamins mix*	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
1-24	B12	1.5	%	Vitamins mix*	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4
1-25	C1	1	%	Nucleosides mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
1-26	C2	1	%	Nucleosides mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
1-27	C3	1	%	Nucleosides mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
1-28	C4	1	%	Nucleosides mix	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
1-29	C5	1	%	Nucleosides mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
1-30	C6	1	%	Nucleosides mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
1-31	C7	1	%	Nucleosides mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
1-32	C8	1	%	Nucleosides mix	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
1-33	C9	1	%	Nucleosides mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
1-34	C10	1	%	Nucleosides mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
1-35	C11	1	%	Nucleosides mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
1-36	C12	1	%	Nucleosides mix	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4
1-37	D1	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
1-38	D2	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
1-39	D3	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
1-40	D4	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
1-41	D5	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
1-42	D6	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
1-43	D7	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
1-44	D8	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
1-45	D9	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
1-46	D10	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
1-47	D11	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
1-48	D12	0.35	%	Phytochemicals 1 mix†*	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4

†The Phytochemicals 1 and Phytochemicals 2 mixes are dissolved in 50% EtOH.

*Please note that the Vitamin and Phytochemicals mixes may darken with age.

Tube #	Well #	Conc.		Ligand	Conc.		Buffer	pH	Conc.		Precipitant
2-1	E1	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
2-2	E2	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
2-3	E3	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
2-4	E4	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
2-5	E5	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
2-6	E6	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
2-7	E7	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
2-8	E8	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
2-9	E9	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
2-10	E10	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
2-11	E11	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
2-12	E12	0.25	%	Phytochemicals 2 mix†	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4
2-13	F1	0.6	%	Antibiotics mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
2-14	F2	0.6	%	Antibiotics mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
2-15	F3	0.6	%	Antibiotics mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
2-16	F4	0.6	%	Antibiotics mix	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
2-17	F5	0.6	%	Antibiotics mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
2-18	F6	0.6	%	Antibiotics mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
2-19	F7	0.6	%	Antibiotics mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
2-20	F8	0.6	%	Antibiotics mix	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
2-21	F9	0.6	%	Antibiotics mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
2-22	F10	0.6	%	Antibiotics mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
2-23	F11	0.6	%	Antibiotics mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
2-24	F12	0.6	%	Antibiotics mix	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4
2-25	G1	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
2-26	G2	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
2-27	G3	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
2-28	G4	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
2-29	G5	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
2-30	G6	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
2-31	G7	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
2-32	G8	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
2-33	G9	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
2-34	G10	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
2-35	G11	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
2-36	G12	1.2	%	Cholic acid derivatives mix	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4
2-37	H1	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 1
2-38	H2	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 2
2-39	H3	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 1	6.5	30	%	Precipitant Mix 3
2-40	H4	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 1	6.5	37.5	%	Precipitant Mix 4
2-41	H5	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 1
2-42	H6	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 2
2-43	H7	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 2	7.5	30	%	Precipitant Mix 3
2-44	H8	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 2	7.5	37.5	%	Precipitant Mix 4
2-45	H9	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 1
2-46	H10	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 2
2-47	H11	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 3	8.5	30	%	Precipitant Mix 3
2-48	H12	0.8	%	Anesthetic alkaloids mix	0.1	M	Buffer System 3	8.5	37.5	%	Precipitant Mix 4

†The Phytochemicals 1 and Phytochemicals 2 mixes are dissolved in 50% EtOH.