

# Electromembrane extraction of moderately polar basic analytes from human plasma

Generic method B2

## Intended use

Generic method B2 is recommended for monobasic analytes within the range of  $1.0 < \log P < 5.8$ . B2 is described below for extraction of small molecule pharmaceuticals from human plasma and serum samples. For other types of substances, and other type of samples or sample volumes, modification of B2 conditions may be required.

## Chemicals and solutions

- 2-Undecanone (UNDC)
- 1000 mM Formic acid
- 100 mM Formic acid

## Consumables

- Conductive vials, 200 or 600  $\mu\text{L}$
- PP2E support membrane
- Support membrane union

## Procedure

### 1. Before extraction

- Load sample solution
  - › For 200  $\mu\text{L}$  conductive sample vials: transfer 60  $\mu\text{L}$  plasma sample and 60  $\mu\text{L}$  of 1000 mM formic acid in water (sample diluent) into the sample vial
  - › For 600  $\mu\text{L}$  conductive sample vials: transfer 125  $\mu\text{L}$  plasma sample and 125  $\mu\text{L}$  of 1000 mM formic acid in water (sample diluent) into the sample vial
- Load acceptor solution
  - › For 200  $\mu\text{L}$  conductive acceptor vials: transfer 120  $\mu\text{L}$  of 100 mM formic acid (acceptor) into the acceptor vial
  - › For 600  $\mu\text{L}$  conductive acceptor vials: transfer 250  $\mu\text{L}$  of 100 mM formic acid (acceptor) into the acceptor vial
- Place a PP2E support membrane in the support membrane union
- Screw the support membrane union to the acceptor vial, with the supported membrane towards the acceptor vial
- Deposit 9  $\mu\text{L}$  2-undecanone onto the support membrane. To ensure an accurate volume, wipe the outside of the pipette tip before dispensing.
- Wait for 30 seconds, and then screw the sample vial into the support membrane union. The extraction cell is now ready for extraction.

## 2. Extraction

- Place the extraction cell in the 12-position holder, such that the sample vial is in contact with the positive electrode (anode) and the acceptor vial is in contact with the negative electrode (cathode)
- Perform the extraction at 50 V for 30 min with 1000 rpm agitation\*

## 3. After extraction

- Collect the acceptor immediately for direct injection into LC-MS/MS or a related instrumental technique. Leaving the acceptor solution in contact with the liquid membrane may result in back-extraction of analytes by passive diffusion.

\* An optimisation of the volume and rpm are usually needed depending on your sample matrix

# Recovery

Recoveries from human plasma obtained with generic method B2 are summarized below.

Compound	log P	Charge	Recovery (%)	Compound	log P	Charge	Recovery (%)
Alprenolol	2.69	+1	85	Omeprazole	2.43	+1	55
Amantidine	1.46	+1	63	Papaverine	3.08	+1	83
Amitriptyline	4.81	+1	80	Perphenazine	3.69	+1.9	51
Chlorpromazine	4.54	+1	86	Pethidine	2.46	+1	85
Chlorprothixene	5.07	+1	76	Pimozide	5.83	+1	53
Cinnarizine	5.88	+1.7	61	Prochlorperazine	4.38	+2	69
Clomipramine	4.88	+1	80	Promazine	3.93	+1	79
Clotrimazole	5.84	+1	55	Promethazine	4.29	+1	71
Cocaine	2.28	+1	76	Propranolol	2.58	+1	91
Diltiazem	2.73	+1	82	Raloxifene	5.47	+2	58
Doxepin	3.84	+1	77	Reserpine	3.53	+1	81
Droperidol	3.01	+1	87	Tamoxifen	6.35	+1	45
Fluoxetine	4.17	+1	64	Telmisartan	6.13	+1.9	65
Haloperidol	3.66	+1	82	Thioridazine	5.47	+1	65
Hydroxyzine	3.41	+1	89	Trimipramine	4.76	+1	70
Loperamide	4.77	+1	83	Venlafaxine	2.74	+1	81
Methadone	5.01	+1	75	Verapamil	5.04	+1	70
Metoprolol	1.76	+1	49				
Mianserin	3.83	+1	80				
Nortriptyline	4.43	+1	73				
Noscapine	2.58	+1	88				
Oxprenolol	2.17	+1	74				

Values for log P and charge at sample pH have been calculated using [www.chemicalize.com](http://www.chemicalize.com)

## Notes

For basic analytes with  $\log P > 1.0$ , B1 is recommended as first choice, while B2 is considered as a second alternative. B2 is more selective than B1, and may be more efficient than B1 for compounds in the polarity range  $1.0 < \log P < 2.0$ .

## Documentation

*Generic Liquid Membranes for Electromembrane Extraction of Bases with Low or Moderate Hydrophilicity*, Chen Zhou, Samira Dowlathshah, Anne Oldeide Hay, Maria Schüller, Stig Pedersen-Bjergaard, Frederik André Hansen, **Analytical Chemistry** 95 (2023) 8982-8989

*Optimization of generic conditions for electromembrane extraction of basic substances of moderate or low polarity*, Chenchen Song, Chen Zhou, Frederik André Hansen, Anne Oldeide Hay, Stig Pedersen-Bjergaard, **Journal of Separation Science** 47 (2024) 2300801

## Ordering information

Conductive vials, 200 µL	201001-1
Conductive vials, 600 µL	201002-1
Support membrane union	201001-2
PP 2E support membrane	201001-3
Transparent vial holder	201001-4

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