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# SUPPLEMENTARY MATERIAL

## Environmental chiral analysis of β-blockers: evaluation of different n-alkyl-modified SBA-15 mesoporous silicas as sorbents in solid phase extraction

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**Table S1. Comparative study of reported methods for the SPE extraction of β-blockers from waters**

Ace: Acebutolol, Al: Alprenolol, Ate: Atenolol, Bet: Betaxolol, Bis: Bisoprolol, Car: Carazolol, Cel: Celiprolol, Lab: Labetalol, Met: Metoprolol, Nad: Nadolol, Neb: Nebivolol, Ox: Oxprenolol, Pin: Pindolol, Prop: Propranolol, Sot: Sotalol, PF: preconcentration factor

| β-blockers analysed | SPE sorbent | Sample | Recovery (%) | PF | Method | Comments | Ref. |
|---|---|---|---|---|---|---|---|
| Ace, Ate, Nad, Met, Prop | Strata X-C® (200 mg) | Tap water (250 mL) | 67-125 | 83 | CG-MS | Water sample adjusted at pH: 3. Not chiral analysis. | Caban et al. (2015) |
| Ate, Prop, Met | Oasis MCX® (60 mg) | River water (1000 mL) | 60-110 | 2000 | UPLC–MS/MS | Water sample adjusted at pH: 2.5. Not chiral analysis. Internal standard calibration. | Kasprzyk-Hordern et al. (2007) |
| Ace, Al, Ate, Bis, Labe, Met, Nad, Pin, Prop, Sot, Tim | Oasis MCX® (150 mg) | Effluent wastewater (250 mL) | 91-108 | 250 | LC–MS/MS | Water sample adjusted at pH: 3. Not chiral analysis. Matrix matched calibration | Lee et al. (2007) |
| Ace, Al, Ate, Bis, Met, Nad, Pin, Prop, Sot, Tim | Oasis MCX® (60 mg) | Influent wastewater (400 mL) | 10-68 | 1000 | HPLC-MS | Water sample acidified. Not chiral analysis. Matrix matched calibration | Piram et al. (2008) |
| Ate, Prop, Met | Oasis MCX® (60 mg) | Effluent wastewater (250 mL)<br>Influent wastewater (250 mL)<br>Surface water (1000 mL) | 17-84<br>14-76<br>40-90 | 500<br>500<br>2000 | UPLC–ESI-MS/MS | Water sample adjusted at pH: 2. Not chiral analysis. Internal standard calibration. | Kasprzyk-Hordern et al. (2008) |

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|---|---|---|---|---|---|---|---|
| Ate, Met | Oasis MCX® (60 mg) | River water (150 mL)<br>Effluent wastewater (100 mL) | 71-74<br>82-87 | 750<br>500 | LC–ESI-MS/MS | Water sample adjusted at pH: 2. Not chiral analysis. Internal standard calibration. | Al-Odaini et al. (2010) |
| Ate, Nad, Met, Bis, Bet | Oasis MCX® (150 mg) | Ground water (100 mL) | 79-114 | 200 | LC-TOF-MS | Water sample adjusted at pH: 3. Not chiral analysis. | Galera et al. (2011) |
| Ace, Ate, Met, Prop, Tim, Nad, Ox, Pin, Al | Oasis MCX® (60 mg) | Effluent wastewater (200 mL) | 25-97 | 200 | LC–ESI-MS/MS | Water sample pH not specified. Not chiral analysis. Internal standard calibration. | Salem et al. (2012) |
| Ace, Ate, Met, Nad, Pin, Prop | Strata X® (200 mg) | Effluent wastewater (250 mL) | 62-96<br>28-92 | 50 | GC-FID or GC-MS | Water sample pH not adjusted (pH: 8). Not chiral analysis. Matrix matched calibration | Caban et al. (2012) |
| Ace, Ate, Nad, Met, Prop | Strata X® (200 mg) | Tap water (250 mL) | 63-113 | 50 | CG-MS | Water sample pH not specified. Not chiral analysis. | Caban et al. (2015) |
| Ate, Prop | Oasis HLB® (200 mg) | Effluent wastewater (100 mL) | 87-97 | 100 | LC–MS/MS | Water sample adjusted at pH: 7. Not chiral analysis. Matrix matched calibration | Gómez et al. (2006) |

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|---|---|---|---|---|---|---|---|
| Ox, Met, Prop, Bis, Bet | Oasis HLB® (60 mg) | River water (500 mL) | 94-103 | 500 | CG-MS | Water sample adjusted at pH: 7.5. Not chiral analysis. | Miège et al. (2006) |
| Ace, Ate, Met, Sot | Oasis HLB® (60 mg) | Effluent wastewater (250 mL)<br>Influent wastewater (100 mL)<br>Surface water (500 mL)<br>Ground water (1000 mL) | 78-101<br>64-108<br>62-105<br>76-93 | 500<br>200<br>1000<br>2000 | LC-MS/MS | Water sample pH not specified. Not chiral analysis. Internal standard calibration. | Vieno et al. (2006) |
| Ate, Met, Nad, Pin, Prop, Sot | Oasis HLB® (60 mg) | Effluent wastewater (500 mL)<br>Influent wastewater (100 mL) | 50-115<br>56-110 | 100<br>20 | HPLC-MS/MS | Water sample pH not adjusted (pH: 7). Chiral separation. Matrix matched calibration | MacLeod et al. (2007) |
| Neb, Met, Ate, Bis | Oasis HLB® (200 mg) | Surface water (50 mL)<br>Influent wastewater (50 mL) | 73-101<br>65-104 | 100 | HILIC-MS/MS | Water sample adjusted at pH: 7. Not chiral analysis. Internal standard calibration. | van Nuijs et al. (2010) |
| Met, Prop, Ate | Oasis HLB® (500 mg) | Effluent wastewater (200 mL)<br>Influent wastewater (200 mL) | 69-102<br>69-86 | 200 | UPLC–MS/MS | Water sample adjusted at pH: 2.5. Not chiral analysis | Yuan et al. (2014) |

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|---|---|---|---|---|---|---|---|
| Met, Prop, Sot | Oasis HLB® (not specified) | Wastewater (50 mL) | 21-150 | 100 | LC–MS/MS | Water sample pH not specified. Chiral analysis. Internal standard calibration | Evans et al. (2015) |
| Ate, Sot, Pin, Tim, Met, Car, Prop, Bet | MIP4SPE™ (not specified) | Effluent wastewater (25 mL)<br>Influent wastewater (25 mL) | 50-110<br>40-112 | 25 | LC–QqLIT-MS | Water sample neutral pH (not adjusted). Not chiral analysis. Internal standard calibration. | Gros et al. (2008) |
| Prop | SupelMIP™ (not specified) | River water (100 mL) | 97 | 100 | HPLC-DAD | Water sample neutral pH (not adjusted). Chiral separation. Matrix matched calibration | Morante-Zarcero and Sierra (2012a) |
| Met, Pin, Prop, Ate | SupelMIP™ (not specified) | River water (100 mL) | 97 | 100 | HPLC-DAD | Water sample neutral pH (not specified). Simultaneous chiral separation. Matrix matched calibration | Morante-Zarcero and Sierra (2012b) |
| Met, Prop, Bis, Bet, Nad, Car, Tim | C18-end capped (500 mg) | Ground water (1000 mL) | 26-125 | 250 | CG-MS | Water sample adjusted at pH: 7.5. Not chiral analysis. | Ternes et al. (1998) |
| Ate, Met, Nad, Bet, Bis, Car, Cel, Prop, Sot | Bakerbond C18® (not specified) | Effluent wastewater (100 mL)<br>Influent wastewater (200 mL)<br>River water (1000 mL) | 31-84<br>15-49<br>36-92 | 100<br>200<br>1000 | LC-MS/MS | Water sample pH not adjusted. Not chiral analysis. Matrix matched calibration | Scheurer et al. (2010) |
| Ace, Ate, Nad, Met, Prop | Strata C18-EC® (200 mg) | Tap water (250 mL) | 20-81 | 50 | CG-MS | Water sample pH not adjusted. Not chiral analysis. | Caban et al. (2015) |

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| Ate, Nad, Pin, Tim, Bis, Bet | MCM-41 | River water (100 mL) | 67-98 | 100 | Micro-LC-MS/MS | Water sample adjusted at pH: 2. Not chiral analysis. Standard addition calibration. | Dahane et al (2016) |
| Pin, Ate, Prop, Met | SBA-15-C18 (100 mg) | Tap water (150 mL)<br>River water (150 mL)<br>Ground water (150 mL) | 72 - 118<br>66-106<br>62-105 | 300 | CE-DAD | Water sample pH not adjusted. Simultaneous chiral separation. Matrix matched calibration | Silva et al. (2017) |
| Pin, Ate, Prop, Met | SBA-15-C8 (200 mg) | River water (250 mL)<br>Effluent wastewater (250 mL) | 91– 98<br>86 – 98 | 500 | CE-DAD | Water sample pH not adjusted. Simultaneous chiral separation. Matrix matched calibration | This work |

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