**Table S1. Spectrofluorometric techniques for NSAIDs determination in pharmaceuticals**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte** | **Formulation** | **Solvent** | **Emission Wavelength (nm)** | **Excitation Wavelength (nm)** | **Linearity** | **LOD** | **Ref.** |
| Naproxen | Capsule | Ultra-pure water | 352 | 284 | 0.50-20 mg/L | 0.11 mg/L | (Lian et al., 2013) |
| Celecoxib | Tablet | Methanol | 368 | 264 | 100-2000 ng/ml | 17.77 ng/mL | (Attala et al., 2020) |

**Table S2. Spectrofluorometric techniques for NSAIDs determination in biological samples**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte** | **Matrix** | **Sample Preparation** | **Sorbents/Solvents used in Sample Preparation** | **Emission Wavelength (nm)** | **Excitation Wavelength (nm)** | **Linearity** | **LOD** | **Ref.** |
| Celecoxib | Human serum | Protein precipitation with centrifugation | Ethanol | 550-440 | 360 | 0.08-0.90 µM | 57 µM | (Amjadi and Jalili, 2018) |
| Celecoxib | Human plasma | Centrifugation, evaporation, reconstitution | Acetonitrile and methanol | 368 | 264 | 100-2000 ng/mL | 17.77 ng/mL | (Attala et al., 2020) |

**Table S3. IR spectroscopic techniques for NSAIDs determination in pharmaceuticals**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Analyte(s)** | **Formulation** | **Solvent** | **Wavenumber (cm-1)** | **Linearity**  **(μg/mL)** | **LOD**  **(µg/mL)** | **Ref.** |
| Etodolac,  Bumadizone,  Tolfenamic acid, | Tablet | Chloroform | 1716.00,  2160.32,  1084.27, | 30-100,  20-90,  15-75, | 1.523,  2.773,  1.193 | (Hassib et al., 2017) |
| Ibuprofen | Tablet | Chloroform | 1807.00-1461.00 | 10-100 | 0.77 | (Khaskheliet al., 2013) |

**Table S4.** **IR spectroscopic techniques for NSAIDs determination in biological samples**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte** | **Matrix** | **Sample Preparation** | **Sorbents/Solvents used in Sample Preparation** | **Wavenumber (cm-1)** | **Linearity**  **(µg/mL)** | **LOD**  **(µg/mL)** | **Ref.** |
| Ibuprofen | Human urine | Weighing, dilution, filtration | Chloroform | 1800.00-1650.00 | 10-100 | 0.77 | (Khaskheli et al., 2013) |

**Table S5. Chromatographic techniques for NSAIDs determination in pharmaceuticals**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte(s)** | **Formulation** | **Detection** | **Mobile Phase** | **Stationary Phase** | **Flow Rate**  **(mL/min)** | **LOD** | **Ref.** |
| Dexketoprofen | Tablet | HPLC-PDA | Methanol: Water (60:40%, v/v). | Kromasil C18 column (250 × 4.6 mm × 5.0 μm) | 0.70 | 2.5 µg/mL | (Dhaneshwar and Jagtap, 2013) |
| Meloxicam | Capsule | UPLC-UV | MP-A: Potassium dihydrogen phosphate pH 6  MP-B: Methanol  (Gradient) | Acquity UPLC HSS T3 column (100 × 2.1 mm × 1.8 µm) | 0.40 | 0.50 μg/mL | (Louati et al., 2018) |
| Celecoxib | Capsule | HPLC-UV | Sodium phosphate buffer pH 5.6: Acetonitrile: Methanol (30:55:15, v/v) | Zorbax C18 column (150 × 4.6 mm × 5 µm) | 1.20 | 0.21 µg/mL | (Attimarad et al., 2020) |
| Mefenamic acid | Caplet | HPLC-UV | Methanol: Water (0.1% glacial acetic acid) (50:30, v/v) | ACE-C18 column (250 × 4.6 mm x 5 μm) | 1.00 | 0.075 µg/L | (Rezaei Kahkha et al., 2016) |
| *S*-naproxen | Tablet | Chiral HPLC-DAD | Methanol: Hexane: Isopropanol: Trifluoroacetic acid (90:9.9:0.1, v/v/v) | Kromasil Cellucoat RP chiral column (250 × 4.6 mm × 5 µm) | 1.00 | 2.00 µg/mL | (Ragab and El-Kimary, 2017) |
| *R*-etodolac,  *S*-etodolac | Tablet | HPLC-DAD | Hexane: Isopropanol: Trifluoroacetic acid (90:10:0.1, v/v/v) | Kromasil Cellucoat chiral column (250 × 4.6 mm × 5 µm) | 1.00 | 0.12 μg/mL,  0.14 μg/mL | (Hewala et al., 2014) |
| Ketorolac, Tromethamine | Eye drop | HPLC-PDA | Methanol: Ammonium dihydrogen phosphate buffer pH 3.0 (55:45, v/v) | Kromosil C18 column (150 × 4.6 mm × 5 µm) | 1.50 | 0.116 µg/mL | (Sunil et al., 2017) |
| Meloxicam | Lipid-core-nanocapsule | HPLC-PDA | Acetonitrile: Methanol: Water: Triethylamine (52:5:43:0.3 v/v/v/v) | C18-RP column (250 × 4.6 mm × 5 µm) | 1.00 | 65.9 ng/mL | (Nakama et al., 2020) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen, | Tablet | HPLC | Water: Acetonitrile: Acetic acid: Triethylamine (69.6:30:0.2:0.2, v/v) | Zorbax SB300-5-C18 column (150 × 4.6 mm, 5 μm) | 1.00 | 0.02 µg/mL,  0.01 µg/mL,  0.08 µg/mL,  0.15 µg/mL | (Al-Khateeb et al., 2021) |
| Nepafenac | Ophthalmic suspension | UHPLC-PDA | Acetonitrile: Water (50:50, v/v) | Waters Acquity BEH C18 column (100 × 2.1 mm × 1.7 µm) | 0.60 | 0.05 µg/mL | (Runje et al., 2016) |
| Diclofenac | Tablet | GC-MS | Helium | HP-5 MS column (30 m x 0.25 mm × 0.25 µm) | 1.00 | 0.05 µg/mL | (Yilmaz and Ciltas, 2015) |

**Table S6. Chromatographic techniques for NSAIDs determination in biological samples**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte(s)** | **Matrix** | **Detection** | **Sample Preparation** | **Sorbents/**  **Solvents used in Sample Preparation** | **Mobile Phase** | **Stationary Phase** | **Flow Rate**  (mL/min) | **LOD** | **Ref.** |
| Naproxen,  Diclofenac,  Mefenamic acid | Plasma sample | HPLC-UV | μSPE | Cellulose acetate nanofiber | Methanol: Water (80:20, v/v) | Welch XB C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 1.80 µg/L,  2.40 µg/L,  2.00 µg/L | (Golzari Aqda et al., 2018) |
| Naproxen,  Diclofenac,  Mefenamic Acid | Whole blood | HPLC-UV | µSPE | Electro spun Ni-Fe- layered double hydroxide - Nylon 6 composite nanofiber | MP-A: Acetonitrile  MP-B: Formic acid buffer pH 3.0  (Gradient) | C18 ODS-3 column (250 × 4.6 mm × 5.0 µm) | 1.00 | 20 ng/mL,  20 ng/mL,  15 ng/mL | (Seidi and Doroudian, 2020) |
| Diclofenac,  Ibuprofen,  Mefenamic acid | Human urine | HPLC-UV | UA-Dµ-SPE-S-UA-LLME-SFO | Zn-Al-layered double hydroxides-carbon nanotube | Acetonitrile: 0.05 M Phosphate buffer pH 3.0 (65:35, v/v) | ODS III column (250 × 4.6 mm × 5 µm) | 1.00 | 1.50 ng/mL,  1.50 ng/mL,  1.00 ng/mL | (Arghavani-Beydokhti et al., 2018) |
| Diclofenac,  Ibuprofen,  Mefenamic acid | Human plasma | HPLC-UV | UA-Dµ-SPE-S-UA-LLME-SFO | Zn-Al-layered double hydroxides-carbon nanotube | Acetonitrile: 0.05 M Phosphate buffer pH 3.0 (65:35, v/v) | ODS III column (250 × 4.6 mm × 5 µm) | 1.00 | 2.00 ng/mL,  2.00 ng/mL,  1.50 ng/mL | (Arghavani-Beydokhti et al., 2018) |
| Mefenamic acid | Human plasma and urine | HPLC-UV | SPE (mixed hemimicelles based) | Fe3O4 nano-particles (magnetic adsorbent) | Methanol: Water (0.1% glacial acetic acid) (50:30, v/v) | L1-ODS-1 column (250 × 4.6 mm × 5 µm) | 2.00 | Plasma: 0.097 ng/mL,  Urine: 0.087 ng/mL | (Beiraghi et al., 2014) |
| Acetylsalicylic acid,  Naproxen,  Diclofenac,  Ibuprofen,  Mefenamic acid | Human urine | HPLC-UV | TFME | Cotton yarn-graphene oxide-layered double hydroxide composite | MP-A: Methanol  MP-B: Water (0.05% of formic acid)  (Gradient) | Waters C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 0.15 µg/L,  0.06 µg/L,  0.10 µg/L,  0.23 µg/L,  0.18 µg/L | (Ghani and Haghdoostnejad, 2020) |
| Ketorolac,  Meloxicam,  Diclofenac,  Mefenamic acid | Human urine | HPLC-UV | TFME | Nanocrystalline cellulose templated titania sorbent | MP-A: Methanol  MP-B: Water (0.05% of acetic acid)  (Gradient) | Waters C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 2.00 µg/L,  1.80 µg/L,  0.20 µg/L,  0.50 µg/L | (Ghani, 2020) |
| *R*-ibuprofen,  *S*-ibuprofen | Human breast milk | Direct chiral LC-UV | Vortex-assisted MSPD | β-cyclodextrin and primary and secondary amine sorbents | 2-propanol: 20 mM Phosphate buffer pH 5.5 (0.2:99.8, v/v) | AGPcolumn (100 × 3.0 mm × 5 µm) | 0.50 | 0.042 µg/g,  0.045 µg/g | (León-González and Rosales-Conrado, 2017) |
| Ketorolac,  Meloxicam,  Diclofenac,  Mefenamic acid | Urine | HPLC-UV | μSPE | Graphene oxide- meso-tetrakis (4- hydroxyphenyl) porphyrin | MP-A: Acetonitrile  MP-B: Formate buffer pH 3  (Gradient) | C18 SB column (250 × 4.6 mm × 5 µm) | 1.00 | 2.0 ng/mL,  2.0 ng/mL,  0.5 ng/mL,  1.0 ng/mL | (Manouchehri et al., 2019) |
| Diclofenac,  Ibuprofen,  Mefenamic acid | Human plasma | HPLC-UV | TAALLM | 1,2-dichloroethane | 0.05 M Phosphate buffer pH 3.0: Acetonitrile (67:33, v/v) | ODS III column (250 × 4.6 mm × 5 µm) | 1.00 | 0.2 ng/mL,  0.3 ng/mL,  0.1 ng/mL | (Bazregar et al., 2016) |
| Ketoprofen,  Naproxen,  Diclofenac | Human urine and serum, River water | HPLC-UV | MSPE | Magnetic porous carbon | Methanol: 0.1% Acetic acid (63:37, v/v) | Zorbax SB-C18 column (150 × 4.6 mm × 5 µm) | 1.00 | 0.2 µg/L,  0.2 µg/L,  0.4 µg/L | (Han et al., 2019) |
| Naproxen,  Diclofenac,  Mefenamic acid | Urine | HPLC– UV | μSPE | Cellulose acetate nanofiber | Methanol: Water (pH 3) (80:20, v/v) | Welch SB C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 1.00 µg/L,  1.50 µg/L,  1.10 µg/L | (Golzari Aqda et al., 2018) |
| Acetaminophen,  Naproxen,  Celecoxib,  Ibuprofen, Mefenamic acid | Human  plasma | HPLC– UV | Electrically-assisted- SPME | Polyvinylalcohol/casein/tannic acid/polyaniline/titanium dioxide nanoparticles electrospun nanofibers | MP-A: Methanol  MP-B: 10 mM of Formic acid buffer solution (pH 7)  (Gradient) | Knauer ODS-H C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 27.3 ng/mL,  25.0 ng/mL,  16.1 ng/mL,  11.5 ng/mL,  8.0 ng/mL | (Nejabati and Ebrahimzadeh, 2023) |
| Naproxen,  Diclofenac,  Mefenamic acid | Human urine and  plasma | HPLC– UV | μSPE | Cellulose acetate nanofiber | Methanol: Water (pH 3) (80:20, v/v) | Welch SB C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 1.80 µg/L,  2.40 µg/L,  2.00 µg/L | (Golzari Aqda et al., 2018) |
| Diclofenac,  Acetaminophen | Cow milk,  Human plasma and  Urine | HPLC– UV | Magnetic dispersive-SPME | Magnetic graphene  oxide modified with 3-aminopropyltriethoxysilane | Deionized water: Methanol (20:80, v/v) | PrincetonSPHER-100 C18 column (250  × 4.6 mm) | 0.70 | 0.3 µg/L,  0.1 µg/L | (Dehghani Soltani et al., 2023) |
| Naproxen,  Ibuprofen,  Diclofenac,  Mefenamic acid | Human  urine | HPLC-UV | Sorptive thin film extraction (Fabric  phase sorptive extraction) | Polyester fabric-based nano copper-polyhedral oligomeric silsesquioxanes sorbent | MP-A: Methanol  MP-B: Phosphate buffer  solution (pH 2.5) (Gradient) | Ultisil XB-C18 column (250 × 4.6 mm × 5 μm) | - | 0.3 ng/mL,  0.5 ng/mL,  1.0 ng/mL,  0.5 ng/mL | (Moradi et al., 2023) |
| Ketoprofen,  Flurbiprofen,  Naproxen | Swine muscle | HPLC-UV | SPME | UiO-66- modified cotton polydopamine | Acetonitrile: 20 mM Potassium dihydrogen phosphate (48:52, v/v) | C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 0.01 ng/mL,  0.01 ng/mL,  0.03 ng/mL | (W. Li et al., 2018) |
| Ketoprofen,  Flurbiprofen,  Diclofenac sodium | Human plasma | HPLC-UV | In-tip  SPME | Amino bearing metal-organic  frameworks-coated cotton fibers (MIL-101-NH2@cotton.) | Acetonitrile: 20 mM Potassium dihydrogen phosphate (38:42, v/v) | C18 column (250 × 4.6 mm × 5 μm) | 0.80 | 0.03 ng/mL,  0.03 ng/mL,  0.15 ng/mL | (Ji et al., 2023) |
| Ketoprofen,  Diclofenac | Human urine | HPLC-UV | DES-LLME | Methanol | Methanol: 0.1% Aqueous formic acid (75:25, v/v) | Luna C18 column (150 × 4.6 mm × 5 μm) | 1.00 | 15 ng/mL,  44 ng/mL | (Shishov et al., 2018) |
| Ketoprofen,  Flurbiprofen,  Diclofenac sodium | Human plasma | HPLC-UV | SPME | Choline chloride and itaconic acid (DES)  monolith- modified tube | Methanol: Water (0.2% acetic acid) (60:20, v/v) | Wondasil-C18 column (250 × 4.6 mm × 5 µm) | 0.80 | 0.05 ng/mL,  0.05 ng/mL,  0.50 ng/mL | (Wang et al., 2018) |
| Tolmetin,  Ketoprofen,  Naproxen,  Flurbiprofen,  Diclofenac,  Indomethacin,  Ibuprofen,  Mefenamic acid,  Tolfenamic acid | Human urine | HPLC-UV | Mixed-mode SPE | G4-QHMs MAX sorbent | MP-A: 20 mM Potassium dihydrogen phosphate (pH 2.7)  MP-B: Methanol  (Gradient) | Zorbax SB-C18 column (250 × 4.6 mm × 5 μm) | 1.00 | 0.009 μg/mL,  0.009 μg/mL,  0.004 μg/mL,  0.005 μg/mL,  0.005 μg/mL,  0.005 μg/mL,  0.009 μg/mL,  0.005 μg/mL,  0.005 μg/mL | (Huang et al., 2018) |
| Naproxen,  Ketoprofen,  Diclofenac,  Mefenamic acid | Human urine | HPLC-UV | SPMTE | MCM-41 as a sorbent and acetonitrile as desorption solvent | Acetonitrile: 25 mM Phosphate buffer (pH 4.2) (50:50, v/v) | Zorbax SB-C18 column (100 × 4.6 mm × 5.0 µm) | 1.00 | 8.0 µg/L,  5.7 µg/L,  6.8 µg/L,  10.6 µg/L | (Kamaruzaman et al., 2013) |
| Diclofenac,  Mefenamic acid | Human urine | HPLC-UV | SPE with the supramolecular solvent formation | C18 sorbent (10 mm height × 15 mm internal diameter) with tetrahydrofuran | 50 mM/L Ammonium acetate buffer (pH 5.2): Acetonitrile (50:50, v/v) | ODS-3 column (50 × 4.6 mm × 5 μm) | 1.00 | 3.00 µg/L,  7.00 µg/L | (Rezaei et al., 2013) |
| Mefenamic acid | Human urine | HPLC-UV | Pipette tip SPME | Zinc sulfide-modified carbon nanotube | Methanol: Water (0.1% glacial acetic acid) (50:30, v/v) | ACE-C18 column (250 × 4.6 mm × 5 μm) | 1.00 | 0.075 µg/L | (Rezaei Kahkha et al., 2016) |
| Acetylsalicylic acid,  Ketoprofen,  Naproxen,  Diclofenac sodium,  Ibuprofen | Human urine | UHPLC-UV | MEPS | C18 cartridge | MP-A: 0.1% Aqueous trifluoroacetic acid  MP-B: Acetonitrile  (Gradient) | Poroshell 120 EC-C18 column (100 × 3.0 mm × 2.7 µm) | 0.80 - 1.00 | 12.8 ng/mL,  14.3 ng/mL,  1.07 ng/mL,  3.38 ng/mL,  3.36 ng/mL | (Magiera et al., 2013) |
| Diclofenac,  Indomethacin,  Ibuprofen,  Mefenamic acid | Human urine | HPLC-UV | HF-SPME | Nanocubic cobalt oxide coated graphene oxide | Methanol: Water (0.2% acetic acid) (70:30, v/v) | Symmetry® reversed phase C18 column (250 × 4.6 mm × 5 μm) | 1.0 | 0.28 μg/L,  0.31 μg/L,  0.25 μg/L,  0.59 μg/L | (Darvishnejad et al., 2021) |
| Naproxen,  Nabumetone | Human urine | HPLC-FD | Vortex-assisted SEME - SFOD | 1-undecanol | MP-A: Methanol  MP-B: Water  (Gradient) | Nucleosil-C18 column (250 × 4.6 mm × 5 µm) | 0.90 – 2.00 | 0.90 ng/L,  2.10 ng/L | (Asadi et al., 2015) |
| Cimicoxib | Canine plasma | HPLC-FL | LLE | Acetylene and diethyl ether | Acetonitrile: 10 mM Ammonium acetate buffer (pH 4.5) (35:65, v/v) | Kinetex C18 column (100 × 4.6 mm × 2.6 µm) | 1.00 | 8.00 ng/mL | (Giorgi et al., 2013) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human urine and  plasma | HPLC-DAD | DLLME with back extraction | Acetone and n-dodecane and tri-octyl phosphine oxide | MP-A: Methanol  MP-B: Format buffer (pH 2)  (Gradient) | Agilent Eclipse-XDB C18 column (150 × 4.6 mm × 5 µm) | 1.00 | 1.0 µg/L,  1.0 µg/L,  6.0 µg/L,  6.0 µg/L | (Ghambarian et al., 2020) |
| Ketoprofen,  Naproxen,  Fenbufen,  Diclofenac,  Ibuprofen | Human urine | HPLC-DAD | MSPE | Fe3O4@ magnetic [ionic liquid](https://www.sciencedirect.com/topics/chemistry/ionic-liquid) hypercrosslinked polymer composite | MP-A: 0.5% acetic acid in water  MP-B: Acetonitrile  (Gradient) | ZORBAX ODS-C18 column (250 × 4.6 mm × 5 μm) | 1.00 | 0.33 ng/mL,  0.33 ng/mL,  0.33 ng/mL,  0.15 ng/mL,  1.50 ng/mL | (Han et al., 2023) |
| Ketoprofen,  Etodolac,  Flurbiprofen,  Ibuprofen | Human milk | HPLC-DAD | Switchable-hydrophilicity solvent - LLME | N, N-dimethyl cyclohexylamine | Acetonitrile: 1.0% Trifluoracetic acid (pH 1.4) (40:60, v/v) | GromSil 80 Octyl-4 FE column (250 × 4.6 mm × 3 μm) | 0.80 | 0.06 µg/mL,  0.14 µg/mL,  0.04 µg/mL,  0.14 µg/mL | (Hassan and Alshana, 2019) |
| Ketoprofen,  Etodolac,  Flurbiprofen,  Ibuprofen | Human saliva | HPLC-DAD | Switchable-hydrophilicity solvent - LLME | N, N-dimethyl cyclohexylamine | Acetonitrile: 1.0% Trifluoracetic acid (pH 1.4) (40:60, v/v) | GromSil 80 Octyl-4 FE column (250 × 4.6 mm × 3 μm) | 0.80 | 0.04 µg/mL,  0.13 µg/mL,  0.12 µg/mL,  0.18 µg/mL | (Hassan and Alshana, 2019) |
| Ketoprofen,  Etodolac,  Flurbiprofen,  Ibuprofen | Human urine | HPLC-DAD | Switchable-hydrophilicity solvent - LLME | N, N-dimethyl cyclohexylamine | Acetonitrile: 1.0% Trifluoracetic acid (pH 1.4) (40:60, v/v) | GromSil 80 Octyl-4 FE column (250 × 4.6 mm × 3 μm) | 0.80 | 0.07 µg/mL,  0.12 µg/mL,  0.12 µg/mL,  0.18 µg/mL | (Hassan and Alshana, 2019) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human urine and saliva | HPLC-DAD | µLPME | Dihexyl ether | MP-A: 0.1% Formic acid (pH 2.6)  MP-B: Methanol  (Gradient) | STAR RP-18e column (75 × 4.0 mm × 3 μm) | 0.50 | 0.09 µg/mL,  0.10 µg/mL,  0.07 µg/mL,  0.08 µg/mL,  0.30 µg/mL | (Ramos-Payan et al., 2016) |
| Ibuprofen | Human plasma | HPLC-DAD | MSPE | Magnetic carbon nanodot/graphene oxide hybrid material (Fe3O4@C-nanodot@GO) | Acetonitrile: 50 mM Phosphate buffer (pH 3.0) (67:33, v/v) | HiChroma C18 column (150 × 4.6 mm × 5 µm) | - | 8.00 ng/mL | (Yuvali et al., 2020) |
| R-etodolac,  S-etodolac | Human plasma | Enantioselective HPLC-DAD | SPE | C18 cartridge | Hexane: Isopropanol: Trifluoroacetic acid (90:10:0.1 v/v/v) | Kromasil Cellucoat chiral column (250 × 4.6 mm × 5 µm) | 1.00 | 0.06 μg/mL,  0.06 μg/mL | (Hewala et al., 2014) |
| Ketoprofen,  Felbinac,  Diclofenac,  Ibuprofen | Human urine and water sample | LC-DAD | MDSPE | HDTMAZSM5/Fe2O3 | 0.01 M Phosphate buffer pH 4.2: Acetonitrile (50:50, v/v) | Kinetex® EVO C18 column (150 × 4.6 mm × 5 µm) | 1.00 | 1.00 µg/L,  0.50 µg/L,  2.00 µg/L,  3.00 µg/L | (Baile et al., 2019) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human urine and water sample | LC-DAD | MIP-SPE | MIP cartridge | MP-A: Water (0.1% acetic acid)  MP-B: Acetonitrile  (Gradient) | Kromasil C18 column (250 × 2.0 mm × 5 μm) | 0.80 | 0.4 µg/L,  0.3 µg/L,  0.4 µg/L,  0.4 µg/L | (Martinez-Sena et al., 2016) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human urine | LC-PDA | Sequential injection -based -RDSE | EmporeC18 moieties | MP-A: Methanol and 0.1% Formic acid in water (20/80, v/v)  MP-B: Methanol and 0.1% Formic acid in water (95/5, v/v)  (Gradient) | Monolithic Onyx C18 column (100 × 4.6 mm × 5 µm) | 1.00 | 0.0355 mg/L,  0.0253 mg/L,  0.0217 mg/L,  0.0440 mg/L | (Manzo et al., 2014) |
| Acetylsalicylic acid,  Piroxicam,  Naproxen,  Diclofenac,  Indomethacin,  Mefenamic acid | Hair | HPLC-PDA | HF-SPME | Fe3O4/SiO2/TiO2 nanocomposites | MP-A: Methanol  MP-B: 0.1% Formic acid pH 3.7  MP-C: Acetonitrile  (Gradient) | Agilent Zorbax Eclipse XDB-C18 column (150 × 4.6 mm × 3 µm) | 1.00 | 0.1052 μg/mL,  0.0822 μg/mL,  0.0671 μg/mL,  0.0212 μg/mL,  0.0134 μg/mL,  0.0668 μg/mL | (Es’haghi and Esmaeili-Shahri, 2014) |
| Indomethacin,  Ibuprofen,  Fenbufen,  Ketoprofen,  Flurbiprofen,  Carprofen,  Indoprofen | Human plasma | HPLC-PDA | SPE | Strata-X cartridge | Acetonitrile: 10 mM Phosphate buffer pH 2.5 (50:50, v/v) | Kinetex Evo C18 column (150 × 4.6 mm × 5 μm) | 0.80 | 0.003 μg/mL | (Milanetti et al., 2019) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen, | Human urine | HPLC-PDA | Electromembrane extraction | Supporting liquid membrane: 1-nonanol modified with Aliqua-336. | MP-A: 0.1% Formic acid  MP-B: Acetonitrile  (Gradient) | Purosphere STAR RP-18e column (100 × 4.6 mm, 3 μm) | 0.80 | 0.50 ng/mL,  0.02 ng/mL,  1.00 ng/mL,  0.60 ng/mL | (Aranda-Merino et al., 2021) |
| Furprofen,  Indoprofen,  Ketoprofen,  Fenbufen,  Flurbiprofen,  Ibuprofen | Human saliva | HPLC-PDA | Fabric phase sorptive extraction | Sol-gel polytetrahydrofuran sorbent | 30 mM Phosphate buffer pH 2.5: Acetonitrile (50:50, v/v) | Symmetry C18 column (75 × 4.6 mm × 3.5 µm) | 1.20 | 0.03 μg/mL | (Tartaglia et al., 2020) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human urine | HPLC-PDA | HF-LPME | Dihexyl ether | Methanol: Water: Formic acid (59.4:39.4:1.2, v/v/v) | Kinetex C18 column (150 × 3 mm × 2.6 µm) | 0.40 | 2.20 µg/L,  1.60 µg/L,  3.70 µg/L,  4.30 µg/L | (Worawit et al., 2018) |
| Furprofen, Indoprofen, Ketoprofen, Fenbufen, Flurbiprofen, Indomethacin, Ibuprofen | Human plasma and urine | HPLC-PDA | MEPS | C18 sorbent | MP-A: 30 mM Phosphate buffer (pH 2.5)  MP-B: Acetonitrile  (Gradient) | Gemini C18 column (250 × 4.6 mm × 5 µm) | 1.00 | 0.03 µg/mL | (Locatelli et al., 2014) |
| Ketorolac | Human plasma | RP-HPLC-PDA | Protein precipitation method | Trichloroacetic acid | Acetonitrile: 5 mM Ammonium acetate pH 3.5 (60:40% v/v) | Thermo C18 (250 × 4.6 mm × 5 µm) | 1.00 | 4.00 ng/ml | (Muralidharan et al., 2013) |
| Furprofen,  Indoprofen,  Ketoprofen,  Fenbufen,  Flurbiprofen,  Indomethacin,  Ibuprofen | Human dialyzed samples | UHPLC-PDA | MEPS | C18 sorbent | 10 mM Phosphate buffer (pH 2.5): Acetonitrile  (40:60, v/v) | Fortis Speed Core C18 column (150 × 4.6 mm × 2.6 µm) | 0.80 | 0.008 µg/mL,  0.009 µg/mL,  0.009 µg/mL,  0.009 µg/mL,  0.009 µg/mL,  0.010 µg/mL,  0.010 µg/mL | (D’Archivio et al., 2016) |
| Furprofen,  Naproxen,  Fenbufen,  Flurbiprofen,  Diclofenac | Human plasma and urine | UHPLC-PDA | DMSPE | Graphene /Fe3O4 | Acetonitrile: 10 mM Potassium dihydrogen phosphate (pH 2) (50:50, v/v) | Luna Omega column (100 × 2.1 mm × 1.7 µm) | 0.55 | 0.00061 µg/mL,  0.0012 µg/mL,  0.00061 µg/mL,  0.00091 µg/mL,  0.00091µg/mL | (Ferrone et al., 2018) |
| R- and S-Ibuprofen | Human plasma | HPLC-MS/MS | LLE-SPE | LLE: Ethyl acetate  SPE: Strata-X-Drug N Polymer cartridge | Methanol: Water (0.1% acetic acid) (90:10, v/v) | Lux Cellulose chiral column (250 × 4.6 mm × 5µm) | 0.60 | 0.02 mg/L | (Nakov et al., 2015) |
| Ketoprofen,  Diclofenac | Beef liver | HPLC-MS/MS | Effervescence-assisted -DLLME | Menthol and formic acid (DES) | Methanol: 0.05% Aqueous solution of formic acid (75:25 v/v) | Luna C18 column (300 × 2.0 mm × 5 μm) | 0.50 mL/min | 0.10 µg/kg,  0.30 µg/kg | (Shishov et al., 2020) |
| Flurbiprofen | Human plasma | HPLC–MS/MS | LLE | Methyl t-butyl ether | 10 mM Ammonium formate buffer (pH 3.5): Methanol (15:85, v/v) | Luna C18 column (50 × 2 mm × 5 µm) | 0.25 | - | (Lee et al., 2014) |
| Celecoxib | Rat plasma | LC-MS/MS | Protein precipitation | Formic acid in methanol | MP-A: 10 mM Ammonium formate in 5% acetonitrile  MP-B: 10 mM Ammonium formate in 95% acetonitrile  (Gradient) | Atlantis T3 column (100 × 2.1 mm × 3 µm) | 0.20 | - | (Oh et al., 2015) |
| Ampiroxicam,  Tenoxicam,  Piroxicam,  Meloxicam,  Lornoxicam | Human plasma | LC-MS/MS | SPE | Oasis MAX cartridge | Acetonitrile: 10 mM Formic ammonium buffer (pH 3.0) (50:50, v/v) | Unison UK-C18 column (100 × 2 mm × 3 µm) | 0.20 | 0.01 ng/mL,  0.02 ng/mL,  0.09 ng/mL,  0.014 ng/mL,  0.24 ng/mL | (Shirako et al., 2013) |
| Diclofenac,  Flunixin,  Ketoprofen,  Mefenamic acid,  Meloxicam,  Naproxen,  Phenylbutazone,  Tolfenamic acid | Whole blood | LC-MS/MS | QuEChERS | Acidified acetonitrile | MP-A: 2 mM Ammonium acetate and 0.1% Formic acid in ultrapure water  MP-B: 2 mM Ammonium acetate in Methanol  (Gradient) | Infinity Lab Poroshell C18 (100 × 2.1 mm × 2.7 μm) | 0.40 | - | (Rial-Berriel et al., 2020) |
| Pelubiprofen | Human plasma | LC-MS/MS | LLE | Methyl tertbutyl ether | MP-A: 0.1% Formic acid in water  MP-B: 100% Acetonitrile  (Gradient) | C18 ACR (150 × 4.6 mm × 5 µm) | 0.35 | 15.00 ng/mL | (Ryu et al., 2015) |
| Acetaminophen,  Naproxen,  Diclofenac  Mefenamic acid | Autopsy blood samples | LC-MS/MS | SPE | Clean Screen SPE cartridges | MP-A: Methanol  MP-B: 10.0 mM Ammonium formate (pH 3.0)  (Gradient) | Raptor Biphenyl column (50.0 x 3.0 mm x 2.7 µm) | 0.30 | 0.70 ng/mL,  1.00 ng/mL,  1.00 ng/mL,  0.60 ng/mL | (Al-Asmari, 2020) |
| Naproxen,  Ibuprofen,  Diclofenac | Fish plasma | LC–MS/MS | LLE | Ice-cold acetone | MP-A: 5 mM Ammonium acetate in Milli-Q water  MP-B: Methanol and Acetonitrile (50:50, v/v)  (Gradient) | Agilent Poroshell SB- C18 column (50 × 2.1 mm × 2.7 µm) | 0.30 | 0.69 pg/μL,  0.63 pg/μL,  0.48 pg/μL | (Chen et al., 2015) |
| Salicylic acid,  Acetylsalicylic acid,  Acetaminophen,  Diclofenac,  Tolfenamic acid,  Antipyrine,  Flunixi meglumine,  Aminophenazone,  Meloxicam,  Metamizole sodium | Swine tissue | UPLC-MS/MS | SPE | Oasis HLB cartridge | MP-A: 0.1 % Formic acid in water  MP-B: 0.1 % Formic acid in acetonitrile  (Gradient) | AcquityTM BEH Shield RP18 column (50 × 2.1 mm × 1.7 μm) | 0.30 | 1.5 µg/kg,  0.2 µg/kg,  0.2 µg/kg,  1.0 µg/kg,  1.5 µg/kg  1.0 µg/kg,  0.5 µg/kg,  1.0 µg/kg,  0.2 µg/kg,  0.2 µg/kg | (Sun et al., 2023b) |
| Flunixin | Rabbit tissues | UPLC–MS/MS | SPE | Acidic acetonitrile and Oasis HLB cartridge | MP-A: Acetonitrile  MP-B: 5 mM Ammonium acetate (0.1% formic acid)  (Gradient) | Acquity BEH C18 column (50 × 2.1 mm ×1.7 µm) | 0.20 | 0.30–0.80 µg/kg | (Zhu et al., 2013) |
| Diclofenac,  Ethenzamide,  Ibuprofen,  Indomethacin,  Mefenamic acid | Bird tissues (liver, kidney) | UHPLC–MS/MS | Ultrasonic Extraction-LLE- silica gel chromatography-GPC-SPE | Ice-cold acidic acetonitrile | MP-A: 0.1% Acetic acid in Milli-Q water  MP-B: 0.1% Acetic acid in Methanol and Acetonitrile (50:50, v/v)  (Gradient) | Asentis Express C18 column (100 × 2.1 mm × 2.7 µm) | 0.25 | 0.92 ng/g,  0.51 ng/g,  2.00 ng/g,  1.10 ng/g,  0.39 ng/g | (Tanoue et al., 2014) |
| Diclofenac,  Ethenzamide,  Ibuprofen,  Indomethacin,  Mefenamic acid | Fish tissues (plasma, liver, brain) | UHPLC–MS/MS | Ultrasonic Extraction-LLE- silica gel chromatography-GPC-SPE | Acidic ice-cold acetonitrile | MP-A: 0.1% Acetic acid in Milli-Q water  MP-B: 0.1% Acetic acid in Methanol and Acetonitrile (50:50, v/v)  (Gradient) | Asentis Express C18 column (100 × 2.1 mm × 2.7 µm) | 0.25 | 0.048-0.320 ng/g,  0.025-0.086 ng/g,  0.280-1.500 ng/g,  0.029-0.190 ng/g,  0.023-0.210 ng/g | (Tanoue et al., 2014) |
| Acetaminophen,  Diclofenac,  Ibuprofen,  Naproxen  Piroxicam,  Propyphenazone | Invertebrates | UPLC-MS/MS | Extraction: sonication  Clean-up: SPE | Methanol | MP-A: Methanol  MP-B: Water (pH 9) (adjusted using ammonia)  (Gradient) | Acquity BEH C18 column (50 × 2.1 mm × 1.7 µm) | 0.40 | 1.90 ng/g,  0.51 ng/g,  0.64 ng/g,  0.21 ng/g,  2.80 ng/g,  0.16 ng/g | (Huerta et al., 2015) |
| Antipyrine,  Baclofen,  Diclofenac potassium,  Fenbufen,  Flunixin meglumine,  Indomethacin,  Tolfenamic acid,  Nabumetone,  Naproxen,  Oxaprozin | Pork | UPLC–MS/MS | Solvent extraction or  QuEChERS | Acetonitrile: Water mixture (80/20, v/v) and ethylenediamine tetraacetic acid | MP-A: 0.1 % Formic acid  MP-B: Methanol  (Gradient) | Agilent Eclipse XDB-C18 column (150 × 2.1 mm × 3.5 µm) | 0.30 | 3.0 µg/kg,  1.5 µg/kg,  0.9 µg/kg,  0.5 µg/kg,  3.0 µg/kg,  1.3 µg/kg,  3.0 µg/kg,  0.3 µg/kg,  3.0 µg/kg,  0.4 µg/kg | (Yin et al., 2016) |
| Vitacoxib | Equine plasma | UPLC–MS/MS | Protein precipitation | Methyl tertbutyl ether | MP-A: Acetonitrile  MP-B: 0.1% Formic acid  (Gradient) | Kinetex C18 column (50 × 2.1 mm × 2.6 μm) | 0.40 | - | (Wang et al., 2017) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human urine | UHPLC-MS-MS | MIP-SPE | MIP cartridge | MP-A: 0.1% Formic acid  MP-B: Methanol  (Gradient) | Kromasil C18 column (250 × 2.0 mm × 5 μm) | 0.40 | 0.0007 µg/L,  0.0003 µg/L,  0.0007 µg/L,  0.0008 µg/L | (Martinez-Sena et al., 2016) |
| Ketoprofen,  Naproxen,  Meloxicam,  Flunixin,  Carprofen,  Diclofenac,  Ibuprofen,  Tolfenamic acid,  Vedaprofen | Bovine meat | UHPLC-MS/MS | LLE-SPE | LLE: 0.2 M Acetate buffer (pH 5.2) and Methanol  SPE: Mesoporous silica SBA-15-C18 | MP-A: Acetonitrile  MP-B: 0.1% Formic acid and 4 mM ammonium acetate  (Gradient) | ACE Excel C18 column (100 × 2.1 mm × 2 µm) | 0.30 | 0.48 µg/Kg,  1.18 µg/Kg,  0.73 µg/Kg,  0.13 µg/Kg,  0.30 µg/Kg,  0.25 µg/Kg,  18.25 µg/Kg,  0.20 µg/Kg,  0.63 µg/Kg | (Casado et al., 2016) |
| Parecoxib sodium,  Valdecoxib | Rat plasma | UPLC-MS/MS | Protein precipitation-LLE | Ethyl acetate and diethyl ether | MP-A: Methanol  MP-B: 2 mM Ammonium acetate  (Gradient) | Kinetex C18 column (50 × 2.1 mm × 2.6 μm) | 0.20 | - | (Liu et al., 2016) |
| Naproxen,  Sulindac,  Paracetamol,  Indomethacin,  Ketoprofen | Fish samples | LC-HRMS | Microwave-assisted extraction-hollow fiber-liquid/solid phase microextraction | 1-Octanol, toluene, and Polypropylene hollow fiber | MP-A: 0.1% Formic acid in water  MP-B: 0.1% Formic acid in methanol  (Gradient) | Agilent C18 capillary column (150 × 2.1 mm × 2.7 μm,) | 0.20 | 0.01 µg/kg,  0.02 µg/kg,  0.05 µg/kg,  0.50 µg/kg,  0.20 µg/kg | (Zhang et al., 2017) |
| Acemetacin,  Benzydamine,  Bromfenac,  Carprofen,  Diclofenac,  Eltenac,  Etoricoxib,  Firocoxib,  Flufenamic acid,  Flunixin,  Indomethacin,  Ketoprofen,  Meclofenamic acid,  Meloxicam | Horse urine | LC-HRMS | Automated on-line SPE | Oasis HLB cartridge | MP-A: 5 mM Ammonium formate (pH 3.0)  MP-B: Methanol  (Gradient) | Kinetex C18 column (75 × 3 mm × 2.6 μm) | 3.00 – 1.50 | 10.0 ng/mL,  2.5 ng/mL,  25.0 ng/mL,  4.0 ng/mL,  5.0 ng/mL,  5.0 ng/mL,  0.4 ng/mL,  12.5 ng/mL,  0.5 ng/mL,  0.1 ng/mL,  4.0 ng/mL,  4.0 ng/mL,  5.0 ng/mL,  10.0 ng/mL | (Kwok et al., 2017) |
| Indomethacin,  Oxaprozin,  Ketoprofen,  Alminoprofen,  Zaltoprofen,  Tiaprofenic acid  Pranoprofen,  Etodolac,  Ibuprofen,  Diclofenac,  Fenoprofen,  Loxoprofen,  Naproxen | Human plasma | HILIC-MS/MS | Centrifugation | 10-mM ammonium acetate and acetonitrile | MP-A: 10 mM Ammonium acetate solution (pH 6.8)  MP-B: Acetonitrile  (Gradient) | Unison UK-Amino column (50 × 3 mm × 3µm) | 0.40 | 0.125 µg/mL,  0.025 µg/mL,  0.125 µg/mL,  0.025 µg/mL,  0.125 µg/mL,  0.025 µg/mL,  0.025 µg/mL,  0.025 µg/mL,  0.025 µg/mL,  0.025 µg/mL,  0.025 µg/mL,  0.250 µg/mL,  0.025 µg/mL | (Nemoto et al., 2014) |
| Ibuprofen,  Carprofen,  Ketoprofen,  Mefenamic acid,  Meclofenamic acid sodium,  Diclofenac sodium,  Tolfenamic acid,  Flunixin,  Niflumic acid | Pig serum | Anion-exchange-LC-ESI-MS | Online eluent switching anion exchange extraction | Formic acid and acetonitrile | MP A: Acetonitrile and water (80:20, v/v)  MP B: 7 mM Ammonia in acetonitrile and water (80:20, v/v)  (% of MP-A and MP-B, 100:0, v/v) | Agilent PL-SAX (50 × 2.1 mm × 5 μm) | 0.2-0.5 | 2.5 ng/mL,  1.3 ng/mL,  1.5 ng/mL,  0.6 ng/mL,  0.6 ng/mL,  0.5 ng/mL,  0.6 ng/mL,  0.2 ng/mL,  0.5 ng/mL | (Chang et al., 2015) |
| Piroxicam | Beagle dog plasma | SFC-MS/MS | Evaporation-free LLE | Ethyl acetate | MP-A: Supercritical carbon dioxide  MP-B: Methanol containing 10.0 mM ammonium acetate, 0.4 % formic acid, and 2.0 % water  (Gradient) | Acquity BEH 2-EP column (100 × 3 mm × 1.7 μm) | 1.5 | - | (X. Li et al., 2018) |
| Naproxen | Beagle dog plasma | SFC-MS/MS | Evaporation free-LLE | Formic acid and ethyl acetate | MP A: Carbon dioxide  MP B: Methanol  (Gradient) | Acquity BEH column (100 × 3 mm × 1.7 μm) | 1.50 | - | (Yang et al., 2021) |
| Ibuprofen,  Diclofenac | Human urine | GC-FID | Ultrasound-enhanced – air-assisted LLME | n-octanol | Helium | BP-20 SGE fused-silica capillary column (30 m × 0.32 mm × 0.25 μm) | 4.00 | 0.1-1.0 µg/L,  1.0-8.0 µg/L | (Barfi et al., 2015) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human plasma | HPLD- DAD | DLLME-BE | Methanol & Acetone | Methanol 40% :  Formic/format buffer 60% (pH -2 ) | Agilent Eclipse-XDB-C18 analytical column (150 mm × 4.6 mm, 5 µm) | 1.00 | 0.5 µg/L,  0.5 µg/L,  1.0 µg/L,  1.0 µg/L | (Ghambarian et al., 2020) |
| Ketoprofen,  Naproxen,  Diclofenac,  Ibuprofen | Human plasma | GC-MS | DLLME-BE | Acetone and n-dodecane and trioctylphosphine oxide | Helium | HP-5 fused silica capillary column (30 m × 0.32 mm × 0.25 mm) | 1.00 | 0.3 µg/L,  0.3 µg/L,  0.5 µg/L,  0.5 µg/L | (Ghambarian et al., 2020) |
| Ibuprofen | Equine urine | GC-MS | SPE  LLE | SPE: WCX cartridge and SCX cartridge  LLE: diethyl ether and sodium bicarbonate | Helium | HP-1MS column (17 m × 200 μm × 0.11 μm) | 1.80 | 0.58 µg/mL | (Waraksa et al., 2018) |
| Diclofenac | Whole blood | GC-QqQ-MS/MS (MRM) | LLE | Ethyl acetate | Helium | SH-RXI-5MS column (30 m × 0.25 mm, 0.25 µm) | 1.5 | 0.05 ng/mL | (Szpot et al., 2021) |

**Table S7.** **Potentiometric techniques for determination of NSAIDs in pharmaceutical samples**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte** | **Formulation** | **Solvents** | **Electrode** | **pH** | **Concentration Range** | **LOD** | **Ref.** |
| Diclofenac | Tablet | 20% Hydro-alcoholic solution | Ion-selective electrode (Graphite) | 2-7 | 3.1 × 10-4 - 1.1 × 10-2 mol/L | 1.9 × 10-4 mol/L | (Oliveira et al., 2014) |

**Table S8. Voltammetric techniques for NSAIDs determination in pharmaceuticals**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte(s)** | **Formulation** | **Solvents** | **Method** | **Electrode** | **Concentration Range** | **LOD** | **Ref.** |
| Mefenamic acid,  Indomethacin | Tablet | Britton-Robison buffer solution (pH 6) | DPV | Boron-doped diamond electrode | 0.50-20.00 μM | 0.13 μM,  0.098 μM | (Petković et al., 2020) |
| Diclofenac | Tablet | Britton-Robison buffer solution (pH 8) | DPV | Carbon paste-multiwalled carbon nanotubes  electrode | 2.49–10 μM/L | 0.74 μM/L | (Aguilar-Lira et al., 2017) |
| Nepafenac | Ophthalmic suspension | Britton-Robison buffer solution (pH 6) | Adsorptive stripping square wave voltammetry | Graphene nanoplatelets and carbon nanofibers modified glassy carbon electrode | 0.064-3.814 ng/mL | 16.0 ng/mL | (Nigović et al., 2018) |
| Diclofenac | Tablet | 0.1 M LiClO4: Acetonitrile | Linear sweep voltammetry | Platinum disc electrode | 5-35 µg/mL | 1.6 µg/mL | (Yilmaz and Ciltas, 2015) |

**Table S9. Voltammetric techniques for NSAIDs determination in biological samples**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte(s)** | **Matrix** | **Sample Preparation** | **Sorbents/Solvents used in Sample Preparation** | **Solvents** | **Method** | **Electrode** | **Concentration Range** | **LOD** | **Ref.** |
| Ibuprofen | Human blood | No pretreatment | - | Phosphate buffer (pH 8) | DPV | Palladium-Montmorillonite modified carbon paste electrode | 1.00 x 10-6 -1.00 x 10-8 mol/L | 2.85 x 10-9 mol/L | (Loudiki et al., 2016) |
| Naproxen | Human plasma | Dilution, vortex, centrifugation, and then neutralize | 70% Perchloric acid | Phosphate buffer (pH 6) | DPV | Nanomaterial-based carbon paste electrodes | 4.35-65.5 µM | 6.255 µM | (Hendawy et al., 2019) |
| Phenylbutazone,  Flunixin | Equine plasma | MISPE | MIP cartridge | Acetate buffer (pH 4.7) with KCl | DPV | Miniaturized disposable graphite-based screen-printed electrode | 0.025–10 µg/ml | 0.005 µg/ml | (Meucci et al., 2013) |
| Ibuprofen,  Paracetamol | Human blood | Dilution | Phosphate buffer solution | Phosphate buffer (pH 6) | CV and DPV | Clay-modified carbon paste electrode | 1.0 × 10-6 - 1.0 × 10-3 mol/L | 3.23 × 10-8 mol/L and 1.04 × 10-8 mol/L | (El Ouafy et al., 2022) |

**Table S10. Electrophoresis techniques for NSAIDs determination in pharmaceuticals**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte(s)** | **Formulation(s)** | **Method** | **Solvents** | **Voltage** | **Linearity** | **LOD** | **Ref.** |
| Piroxicam | Tablet | CZE | 10% Methanol in borate buffer (pH 9) | 25 kV | 0.23-28.79 μg/mL | 0.07 μg/mL | (Dal et al., 2014) |
| Diclofenac sodium,  Ibuprofen,  Ketoprofen,  Chlorzoxazone,  Lidocaine HCl,  Methocarbamol | Tablet, capsule, injection | MEKC | 15% Methanol in borate buffer (pH 9) and 100 mM sodium dodecyl sulphate | 15 kV | 0.30-4.80 mg/mL  0.02-0.80 mg/mL  0.20-2.20 mg/mL  0.06-1.80 mg/mL  0.30-4.40 mg/mL  1.10-10.10 mg/mL | 0.10 mg/mL,  8.20 x 10-3 mg/mL,  0.05 mg/mL,  0.02 mg/mL,  0.10 mg/mL,  0.32 mg/mL | (El-Kommos et al., 2013) |

**Table S11. Electrophoresis techniques for NSAIDs determination in biological samples**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte(s)** | **Matrix** | **Sample Preparation** | **Sorbents/Solvents used in Sample Preparation** | **Method** | **Solvents** | **Voltage** | **Linearity** | **LOD** | **Ref.** |
| Naproxen | Human urine | Centrifugation | - | CE with chemiluminescence | Borate buffer (pH 10.0) | 16 kV | 10-2000 μg/L | 2.7 μg/L | (Zhang et al., 2018) |
| Ibuprofen,  Suprofen,  Indomethacin,  Diclofenac,  Mefenamic acid,  Flufenamic acid | Human urine | Centrifugation, filtration, dilution | Acetonitrile and methanol | Non-aqueous capillary electrophoresis | Ammonium acetate buffer (pH 8.5) | 30 kV | 20 ng/mL  50 ng/mL  10 ng/mL  10 ng/mL  10 ng/mL  10 ng/mL | - | (Bonvin et al., 2014) |