

Index

a

acetylation 141, 157
 acylating reagents 161
 agitation 78, 79, 150, 151, 163, 164,
 167–168, 197, 266
 air displacement pipettes 68–69
 alcohol 65, 107, 108, 125, 149, 155, 156,
 168, 203, 281, 284, 390
 alkylation reactions 160
 analyte protectants (APs) 27, 64, 222,
 248, 252, 348, 353, 358
 aromatic acid chlorides 154–155
 aspiration speed 62–63
 automated liner exchange (ALEX)
 226–230
 automated solid-phase extraction 131
 automatic tool changer (ATC) 42

b

barcodes 38–40, 219
 bay region 315
 benzo(a)pyrene 313, 314, 318–319
 Birmingham Wire Gauge 58

c

carousel autosamplers 26
 Cartesian robots 28–32
 cellulose acetate (CA) 125
 centrifugation 38, 49, 97, 99, 101–104,
 125, 148–150, 348, 357, 383,
 385–386, 395
 charcoal
 application 301

consumables 301
 scope and principle 301–302
 solvents and chemicals 301
 system configuration 302
 workflow 303
 chemical analysis 1–3, 8, 20, 231
 chemical filtration 129, 133, 139, 348
 Chemical Weapons Convention
 (CWC)
 analysis parameter 385, 386
 application 382–383
 consumables 383–384
 recovery 388
 results 389
 sample measurements 388–389
 scope and principle 383
 solvents and chemicals 383
 system configuration 384–385
 workflow 385–387
 chloroform 99, 103, 151, 158
 clean-up procedures 124–148
 centrifugation 148–150
 filtration 124–129
 gel permeation chromatography
 143–148
 solid phase extraction 129–143
 collaborative robots 33–34
 cycloidal mixing 169–170

d

dansylchloride 155
 decapping 50–52

- derivatization 153–163
 - acetylation 157
 - aromatic acid chlorides 154–155
 - dansylchloride 155
 - fluorinating reagents 158–159
 - FMOC derivatization 155
 - GC and GC-MS 156–159
 - in-port derivatization 159–163
 - LC and LC-MS 154–155
 - methoxyamination 158
 - methylation 157–158
 - ninhydrin reaction 155
 - silylation 156–157, 260–262
 - SPME on-fiber 262–266
 - detection force 77
 - dichloromethane (DCM) 11, 91, 276, 342, 383
 - dilution pipetting mode 71
 - dilutions 248
 - for calibration curves 251–256
 - geometric 248–251
 - working standards preparation 256–259
 - dilutor/dispenser operation 82–84
 - dispensing speed 27, 55–57, 63
 - dispersive liquid/liquid micro-extraction (DLLME) 66, 84, 92, 100–104, 203, 384
 - drop force 77
 - drops and droplets 55–57
 - dynamic headspace analysis 84, 168, 192, 201–210, 279
 - dynamic headspace analysis with in-tube extraction (ITEX DHS) 124, 169, 203–207, 278, 281
 - Dynamic Headspace Vacuum Transfer in Trap (DHS-VTT) 206, 207
- e**
- economical aspects 15–16
 - EPA Method 8270E 304
 - EQuan™ 20
 - ethanol 103, 193–195, 284–288, 342, 344
 - European standards (EN) 2, 13, 21, 62, 130, 322, 347
 - evaporation 22, 66, 90–91, 94, 103, 104, 106, 124, 129, 132–135, 137–139, 146, 150–153, 163, 194, 216, 225–226, 233, 260, 262, 313–314, 332–333, 341, 348, 368, 369, 459
 - extraction 90–123
 - dispersive liquid/liquid
 - micro-extraction 100–104
 - liquid 91–92
 - liquid-liquid extractions 97–100
 - pressurized fluid extraction 92–97
 - sorptive extraction methods 104–123
- f**
- fatty acid methyl ester (FAMES) 21
 - analytical parameter 326
 - application 321
 - consumables 324
 - derivatization method 323
 - health risk 324
 - limitations 323
 - method description 322–323
 - sample measurements 328
 - scope and principle 321–322
 - solvents and chemicals 323–324
 - system configuration 325–326
 - workflow 326–327
 - filtration 124
 - filter material 125–126
 - filter vials 127–129
 - syringe 126–127
 - flow cell sampling 84–85
 - fluorinating reagents 158–159
 - forward pipetting mode 69
- g**
- gas chromatography (GC)
 - automated liner exchange 226–230
 - hot needle injection 222–224
 - liquid band injection 224–226
 - liquid injection 222–230
 - sandwich injection 222
 - gastight syringes 61
 - GC volatiles analysis 191
 - dynamic headspace analysis 201–210

- needle trap micro-extraction
 - 208–210
 - purge & trap 202–204
 - using sorbent tubes 207
 - with in-tube extraction 204–207
 - multiple headspace quantification
 - 197–201
 - static headspace 192–194
 - analyte sensitivity 195
 - injection technique 195–197
 - overcoming matrix effects 194
 - tube adsorption 210–222
 - gel permeation chromatography (GPC)
 - 91, 143–148, 231
 - GPC-GC online coupling 146–147
 - micro-GPC-GC online coupling
 - 147–148
 - standard methods 145
 - workflow and instrument configuration
 - 145–146
 - geometric dilution 248–251
 - geosmin
 - analytic parameters 296–297
 - application 295
 - consumables 296
 - quantitative calibration 297–299
 - recovery and precision 299
 - regulations 300
 - sample measurements 300
 - scope and principle 295
 - solvents and chemicals 295
 - system configuration 296
 - workflow 297
 - glass fiber (GF) 125
 - glycidol 329–339
 - glyphosate
 - analysis parameter 365–366
 - applications 362
 - consumables 364
 - sample measurements 367–368
 - scope and principle 362–363
 - sensitivity 366–367
 - solvents and chemicals 364
 - system configuration 364–365
 - workflow 365–366
 - green analytical chemistry (GAC) 4,
 - 10–12, 19, 20, 33, 100, 147, 374, 459
 - gripper transport 48–50, 89, 92
- h**
- halal food
 - analytical parameters 286–287
 - application 284
 - consumables 285
 - results 288
 - scope and principle 284–285
 - solvents and chemicals 285
 - system configuration 285–286
 - workflow 286, 287
 - height in rack 77
 - height on tool 77
 - hot needle injection 222–224
 - human performance 2–4
- i**
- incubation overlapping 36, 163–164
 - injection-port 38, 119, 159, 233–237,
 - 275, 297, 371, 393
 - instrumental workflows 9–10
 - data quality 11
 - green analytical chemistry 11–12
 - productivity 12–13
 - Turkey operation 11
- j**
- just enough clean-up concept 124
- l**
- laboratory logistics 7–16
 - LC injection 233–234
 - dynamic load and wash 234–235
 - pipette tool 235–237
 - LC-GC on-line injection 230–233
 - liquid band injection 224–226
 - liquid-liquid extractions (LLE) 11, 24,
 - 27, 66, 82, 84, 92–94, 97–100, 122,
 - 130, 134, 142, 148, 155, 163, 167,
 - 170, 294, 304, 306–311, 312–314,
 - 322, 340, 362, 364, 383–389
 - low retention tips 81–82

m

- Maestro® 365
- magnetic transport 46–48, 163, 251, 273, 323, 393
- metal plunger 60, 301
- methoximation reaction (MeOx) 158
266–271
- methylation 21, 157–158, 160, 321–324, 328
- micro-extraction in packed sorbent (MEPS) 141–142
- micro-SPE (μ SPE) 50–51, 84, 124, 137, 142–143, 148, 163, 216, 229, 348–351, 353–362, 383–389
- micropipet 68, 73, 78
- mineral oil hydrocarbons (MOH)
 - analysis parameter 343–344
 - application 339
 - consumables 342–343
 - quantitative calibration 346
 - sample measurements 346–347
 - scope and principle 340–342
 - solvents and chemicals 342
 - system configuration 343
 - workflow 344–346
- mini-SPE 137, 349
- miniaturization 2, 4, 10–12, 28, 90, 92, 94, 96, 130, 134, 137, 142, 146, 150
- mixed cellulose ester (MCE) 125
- mixing
 - agitation 167–168
 - cycloidal 169–170
 - spinning 169
 - syringes 169
 - vortexing 166–167
- 3-Monochloropropane-1,2-diol (3-MCPD)
 - 328, 329
 - analysis parameter 334–336
 - analytical method 332–333
 - consumables 333
 - recovery and precision 337–338
 - sample measurements 336
 - scope and principle 329–332
 - system configuration 334
 - workflow 335, 336

- multiple axis robots 32–33
- multiple headspace analysis (MHE) 163, 194, 197–201, 286, 325

n

- needle transport 50, 138
- needle trap device (NTD) 208–209
- needle-trap micro-extraction (NTME) 208–210
- ninhydrin reaction 155
- nitrocellulose (NC) 125

o

- on-line SPE 134–137
- online-SPE water analysis
 - analysis parameter 373–375
 - application 368–369
 - consumables 370
 - sample preparation 369
 - scope and principle 369
 - solvents and chemicals 369–370
 - system configuration 370–371
 - workflow 371–373

p

- peltier devices 165
- pesticides analysis
 - application 347–348
 - consumables 353
 - sample measurements 358–361
 - sample preparation cycles 350–352
 - scope and principle 348–350
 - setup 354–357
 - solvents and chemicals 352–353
 - system configuration 354
 - workflow 357–358
- phthalates
 - analysis parameter 396–398
 - application 393–395
 - consumables 395
 - quantitative calibration 398
 - sample measurements 399, 400
 - scope and principle 395
 - solvents and chemicals 395

system configuration 396, 397
 workflow 398
 pick up force 76
 pipette
 disposable pipette extraction
 78–79
 filter tips 78
 protein de-salting 79–81
 pipettes
 air displacement pipettes 68–69
 aspiration 71, 73
 dispensing 73–74
 functional tips 78–81
 liquid classes 75
 liquid level detection 74–75
 materials 81–82
 modes 69–72
 positive displacement pipettes 69
 tips 75–77
 polyamide (PA) 125
 polyaromatic hydrocarbons (PAHs)
 analysis parameter 317–319
 application 315
 consumables 316
 regulations 318–319
 sample measurements 318, 320, 321
 scope and principle 315–316
 solvents and chemicals 316
 system configuration 316–317
 workflow 317, 320
 polyethersulfone (PES) 125, 128
 polymer tip plungers 61
 polypropylene (PP) 81, 125,
 353
 polytetrafluoroethylene (PTFE) 51, 61,
 125–126, 128, 249, 301, 353, 370,
 376, 396, 397, 399
 polyvinylidene difluoride (PVDF) 126,
 128
 pressurized fluid extraction (PFE)
 92–97
 priming 24, 59–61, 63–65, 82, 290
 purge and trap technique (P&T)
 202–204, 206, 289–291, 294

q

quantitative headspace analyses 197
 Queen of the Fruits 276

r

radio-frequency identification (RFID)
 chips 39–40, 87, 219
 regenerated cellulose (RC) 126
 relative centrifugal force (RCF) 149
 residual solvents
 analytical parameter 378, 380
 application 375
 consumables 376
 sample measurements 380–382
 scope and principle 376
 solvents and chemicals 376–378
 system configuration 378, 379
 workflow 379
 reverse pipetting 69–70

s

sample preparation process 1, 12, 32,
 129, 367–368
 sandwich injection 27, 160, 162, 222
 scavenging mode 129, 133, 139
 selective compliance articulated robot
 arm (SCARA) 28, 29
 semivolatiles organic compounds
 analytical parameter 306–311
 application 304
 consumables 305–306
 quantitative calibration 312–313
 recovery 314
 regulations 314
 sample measurements 313–314
 scope and principle 304
 solvents and chemicals 304–305
 system configuration 306
 workflow 312
 shale aldehydes
 analytical parameter 392
 application 390–391
 consumables 392
 results 393, 394
 scope and principle 391

- shale aldehydes (*contd.*)
 - solvents and chemicals 391
 - system configuration 392
 - workflow 393
 - silylation 118–119, 141, 156–159, 163, 260–262, 266–271
 - smart syringe concept 45
 - solid materials handling 85–88
 - automated powder dispensing 86–88
 - extraction 90–123
 - powder dispensing 86–88
 - weighing 88–89
 - workflow 86
 - solid phase extraction (SPE) 129, 137, 138, 141
 - general clean-up procedure 133
 - micro-SPE clean-up 137–140
 - on-line 134–137
 - sample preparation process 129
 - scavenging mode 129
 - syringe micro-SPE 140–143
 - sorptive extraction methods 104
 - spinning 169
 - stainless steel 60, 94, 146, 220, 342
 - standard operating procedure (SOP) 11, 13–15, 46, 460
 - standardization 2, 4, 10, 59, 459
 - static headspace analysis 192–194
 - analyte sensitivity 195
 - injection technique 195–197
 - overcoming matrix effects 194
 - Stir Bar Sorptive Extraction (SBSE) 108, 119, 121–123, 195, 201, 217
 - strip force 77
 - Stubs Iron Wire Gauge 58
 - sulfur compounds 276–283
 - syringe rinsing 22, 64
 - syringe washing 64–65, 235, 249
 - syringes 56–65
 - large volume 57
 - needles 58–59
 - needles point styles 59–60
 - operational parameters 62–64
 - plunger types 60–61
 - precision and accuracy 57–58
 - termination 61–62
- t**
- taste and odour compounds trace analysis
 - analytical parameters 273
 - application 271–272
 - consumables 272–273
 - quantitative calibration 275
 - recovery and precision 275
 - sample measurements 275–276
 - scope and principle 272
 - solvents and chemicals 272
 - system configuration 273
 - workflow 273–275
 - temperature control 163–166
 - cooling 163–166
 - heating 163–164
 - Tenax 201–202, 204–207, 209, 213, 216, 220
 - tetrahydrofuran (THF) 395
 - thermal desorption unit (TDU) 40, 122, 207–208, 217
 - thin-film micro-extraction (TFME) 123
 - traditional sample extraction 97
 - transesterification 21–22, 332
 - transferring standard methods 20
 - transport vial 46
- u**
- United States Environmental Protection Agency (US EPA) 13, 40, 91, 97, 202, 204, 289
- v**
- vacuum-assisted sorbent extraction (VASE) 220
 - vial bottom sensing 66–67
 - volatile organic compounds (VOCs) 375
 - in drinking water
 - analytic parameters 292, 293
 - application 289
 - consumables 290
 - quantitative calibration 294
 - regulations 294

- scope and principle 289–290
- solvents and chemicals 290
- system configuration 290, 291
- workflow 293
- volatile sulfur compounds (VSCs) 207, 276, 278, 279, 281
- volumetric dosing 88
- vortex mixer 99, 166–167, 169, 251, 255, 268, 301, 306, 323, 325, 334, 371, 397

W

- weighing 88–89
- workflow concepts
 - instrumental concepts
 - Cartesian robots 28–32
 - collaborative robots 33–34
 - multiple axis robots 32–33
 - selective compliance articulated robots 28
 - tray autosamplers 26–28
 - workstations 25–26

- object transport 46
 - grippers 48–50
 - magnetic 46, 48
 - needle 50
- sample preparation 19–20
 - online/offline configuration 25
 - transferring standard methods 20–21
- sample preparation process 35
 - batch processing 36–37
 - identification 38–40
 - incubation overlapping 36, 37
 - parallel processing 38
 - prep-ahead mode 35–36
 - sequential sample preparation 35
- tool change 41
 - automatic 42–44
 - identification 44–46
 - manual 41–42
- vial decapping 50–52
- workstation 25–26, 88, 335

