Applications Chart

Analyte Class	Matrix	Analytes per Application	GracePure™ Product	Pretreatment	Precondition	Load	Wash	Elute
Amphetamines	Urine	Amphetamine and Methamphetamine	C18-Aq, 500mg	Spike urine with 1µg/mL target analytes. Dilute with equal volume of 2% ammonium hydroxide in DI water.	5mL methanol followed by 5mL DI water.	Apply 10mL sample.	2mL DI water, followed by 1mL IPA:DI water (25:75). Vacuum 2 minutes. Next wash 1mL hexane, vacuum 2 minutes. Final wash with 1mL IPA.	3 x 1mL IPA containing 2% ammonium hydroxide.
Anticonvulsants	Serum	Phenobarbital, Primidone, Carbamazepine, 5,5-Diphenylhydantoin, MPPH (5-Methylphenyl-5-phenylhydantoin)	C18-Low, 500mg	Add 100µL of 0.1M KH_2PO_4 buffer, pH 3.5 to 500µL of serum in a test tube. Add 200µg/mL MPPH, 5-methylphenyl-5-phenyl-hydantoin as internal standard. Vortex 1 minute.	5mL methanol followed by 5mL DI water.	Add the prepared sample.	9mL of DI water, vacuum 2 minutes.	500µL of methanol.
Benzodiazepines	Serum	Norchlordiazepoxide, Demoxepam, Chlordiaz-epoxide, Nitrazepam, Nordiazepam (Metabolite of diazepam), Diazepam	C18-Low, 500mg	Use 500µL serum. Add 500µL internal standard solution: 50µg/mL benzodiazipine. Vortex 1 minute.	5mL methanol followed by 5mL DI water.	Add the serum sample.	6mL DI water, vacuum 2 minutes.	1mL of methanol.
BHA	Soy Oil	BHA (3-*tert*-Butyl-4-hydroxyanisole)	Amino, 200mg	Add 10mg BHA into 1mL soy oil and dilute to 10mL with *n*-Pentane.	3mL pentane.	Add 1mL sample.	1.5mL *n*-pentane.	2mL ethanol.
Caffeine	Coffee	Caffeine	C18-Aq, 500mg	None, will work equally well for any beverage containing caffeine.	5mL methanol followed by 5mL DI water.	Add 1mL prepared sample.	6mL DI water, vacuum 10 minutes.	3mL of chloroform.
Carbohydrates	Molasses	Fructose, Glucose, Sucrose	C18-Low, 500mg	Dilute 20g molasses to 250mL with DI water.	5mL methanol followed by 5mL DI water.	Add 2mL prepared sample.	No wash, apply vacuum for 5 minutes.	Collect eluate. Filter through a 0.45µm syringe filter.
Carbohydrates	Wine	Ethanol, Glucose, Sucrose	C18-Max, 100mg	None.	2mL methanol followed by 2mL DI water.	Add 2mL of wine with the vacuum turned off.	No wash, allow wine to remain in contact with cartridge for 2 minutes.	Turn on vacuum and collect eluant. The organic acids and anthocyanins will retain while the carbohydrates pass through.
Chlorinated Pesticides	Water	α-BHC, Lindane, β-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, p,p'-DDE, Dieldrin, o,p'-DDD, Endrin, o,p'-DDT, p,p'-DDD, p,p'-DDT	C18-Fast, 500mg	Due to the large sample volume, attach large volume reservoir to SPE device.	5mL methanol followed by 5mL DI water.	Add 100mL of water sample.	No wash, apply vacuum for 5 minutes.	2mL of ethyl acetate.
Chlorotetracycline	Ointment	Chlorotetracycline	Diol, 500mg	Add 2mL of hexane to 50mg of ointment. Vortex 1 minute.	3mL of hexane.	Add 500µL prepared sample.	2mL of hexane, continue vacuum for 3 minutes.	2mL of a methanol:0.1N HCl solution (50:50).
Chlorphenoxy Acid Herbicides	Water	2,4-D; 2,4,5-T; Silvex	C18-Fast, 500mg	Acidify 100mL water sample to pH 2.2.	5mL methanol followed by 5mL DI water.	Add acidified sample.	Wash with 6mL of DI water.	3mL of chloroform.
Desalting	Protein Solution	Cytochrom C, Ribonuclease-A	C18-Aq, 500mg	None.	3mL methanol followed by 0.025% ammonium hydroxide.	Apply 1mL protein salt solution.	No wash.	500µL 0.4% TFA followed by 500µL acetonitrile containing 0.4% TFA. Apply vacuum until dry.
Lactic Acid	Water	Lactic Acid	Anion-X, 500mg	None.	2mL 1M NaCl followed by 10mL DI water.	1mL, 1mL/min. (pH 7).	DI water, 2mL.	0.1M HCl, 500µL.
Lidocaine, Metabolites	Serum	GX (Glycinexylidide), MEGX (Monoethylgly-cinexylidide), Lidocaine, Mepivacaine (internal standard),	C18-Low, 500mg	Use 500µL serum. Add 500µL internal standard solution: 50µg/mL Mepivacaine HCl in 0.1M NaH_2PO_4. Vortex 1 minute.	5mL methanol followed by 5mL DI water.	Add sample.	8mL DI water:methanol (75:25), vacuum 2 minutes.	500µL methanol.
Nitroaromatics and Naphthols	Water	2,4-DNT, 2-NT, 4-NT, 3-NT, 1- Naphthol, 2-Naphthol	C18-Fast, 500mg	Spike 1000mL tap water with 0.75µg/mL of analytes.	5mL methanol followed by 5mL DI water.	Add 1000mL sample at flow rate of 5mL/min.	No wash.	Elute with 3 x 1mL methanol:water (50:50). Air dry after each elution.
Off Flavors	Wine	4-Ethyl Phenol, 4-Ethyl Gualacol	C18-Low, 500mg	None.	5mL methanol followed by 5mL DI water.	Apply 10mL wine sample.	5mL water.	1mL isopropyl alcohol.
Paraben Preservatives	Cosmetics	Methyl Paraben, Propyl Paraben	C18-Low, 500mg	Weigh one gram of cosmetic (hand cream, toothpaste, liquid soap) into a test tube. Add 10mL methanol and vortex one minute. Centrifuge resulting mixture to remove insoluble materials. Remove a 100µL aliquot to a 2mL volumetric flask and dilute to volume with methanol.	5mL methanol followed by 5mL DI water.	Add 2mL prepared sample.	3mL DI water, vacuum 2 minutes.	1mL methanol.
Perchlorate	Biological Matrix	Perchlorate	Anion-X, 500mg	None.	3mL 0.5M NaCl followed by 3mL DI water.	Apply 1mL sample.	No wash.	3 x 0.75mL of 0.1M NaCl.
Phenylpropanolamine	Urine	Phenylpropanolamine	C18-Low, 100mg	1mL urine sample is placed in a small test tube. Add 250mL of carbonate buffer ($NaHCO_3$/Na_2CO_3, 5:1 w/w) Vortex 1 minute.	2mL methanol followed by 2mL DI water.	Add the buffered urine.	2mL DI water, vacuum 2 minutes.	6mL of chloroform:isopropanol (90:10) through the cartridge. Repeat with an additional 0.2mL.
Phthalate Esters	Drinking Water	Dimethyl Phthalate, Diethyl Phthalate, Diallyl Phthalate, Dibutyl Phthalate, Diamyl Phthalate	C18-Low, 500mg	None.	5mL methanol followed by 5mL DI water.	Add 200mL water sample.	3mL DI water.	Pass two 500µL aliquots of ethyl acetate.
Polyaromatic Hydrocarbons	River Water	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Dibenz[ah]anthracene, Benzo[ghi]perylene, Indeno[1,2,3-cd]pyrene	C18-Aq, 500mg	None.	5mL methanol followed by 5mL DI water.	Apply 200mL water containing PAH's.	2mL DI water followed by 2mL IPA:Water (20:80).	2 x 2mL methanol.
Polyaromatic Hydrocarbons	Tap Water	Acenaphthalene, Fluorene, Phenanthrene, Anthracene, Fluoranthrene, Pyrene, Benz[a]anthracene, Benzo[b]fluoranthrene, Benzo[k]fluoranthrene, Benzo[a]pyrene, Dibenz[a,h]anthracene, Indeno[1,2,3-cd]pyrene, Benzo[ghi]perylene	C18-Low, 500mg	None.	6mL 2-propanol:DI water (15:85).	Add 100mL water sample.	2mL 2-propanol:DI water (15:85).	1mL methylene chloride.
Preservatives	Beverages	Propionic Acid, Butyric Acid, Valeric Acid, Caproic Acid, Heptanoic Acid, Caprylic Acid	Anion-X, 500mg	Adjust beverage pH to 10 using KOH.	10mL DI water.	Apply 8mL beverage sample.	20mL DI water.	1mL 1.0N HCl followed by 1mL methanol.
Quinidine	Urine	Quinidine	Diol, 500mg	Add 1mL HCl and 1mL urine sample to a 5mL volumetric flask. Heat to 65°C in a water bath for 10 minutes. Cool and add 1mL ammonium hydroxide. Dilute to volume with distilled water.	3mL methanol followed by 3mL DI water adjusted to pH 9.	Add 500µL prepared sample.	1mL of distilled water, continue vacuum for 2 minutes to remove residual wash solution.	Pass two aliquots of 500µL methanol.
Salicylic Acid	Urine	Salicylic Acid, Acetylsalicylic Acid	C18-Max, 100mg	Spike 2mL synthetic urine with 100ppm salicylic acid and 100ppm acetylsalicylic acid.	3mL methanol followed by 3mL DI water.	Add 2mL spike urine.	2mL 50mM phosphate buffer monobasic, pH 2.	2mL methanol:water (50:50).
Sedatives/Hypnotics	Serum	Barbital, Methyprylon, Amobarbital, Phenacetin, Secobarbital, Meprobamate, Glutethimide, Caf-feine, Phenobarbital, Methaqualone, Oxazepam, 4-Methyl Primidone, Diazepam, Nodiazepam	C18-Low, 500mg	Use 500µL serum. Add 200µL internal standard solution: 10µg/mL 4-methyl primidone in 0.1M KH_2PO_4, pH 4. Vortex 1 minute.	5mL methanol followed by 5mL DI water.	Add prepared serum sample.	6mL DI water, vacuum 2 minutes.	500µL acetone.
Steroids	Hydrocortisone Cream	Hydrocortisone	Silica, 500mg	Weigh one gram of cream into a 20mL vial. Add 10mL hexane: ethyl acetate (50:50). Vortex 3 minutes. Decant supernatant into a 50mL volumetric flask. Repeat extraction and combine super-natants. Dilute to volume with hexane:ethyl acetate (50:50).	2mL, hexane:acetone (80:20).	Add 1mL prepared sample.	2mL of hexane:acetone (80:20) vacuum 2 minutes.	Pass two aliquots of 500µL methanol.
THC	Urine	Δ9-Tetrahydrocannabinol	C18-Low, 500mg	Place 10mL urine sample in a centrifuge tube. Add 0.9mL of 10N NaOH. Cap tube and place in boiling water bath for 15 minutes. Cool to room temperature. Adjust pH to 2. Vortex 1 minute.	5mL methanol followed by 5mL DI water.	Add prepared urine sample.	Wash first: 10mL of 0.1M HCl . Wash second 25mL of 50µM phosphoric acid containing 10% acetonitrile. Vacuum 2 minutes.	3mL of acetone through the cartridge. Collect eluate and add 1.5mL of methylene chloride, centrifuge 5 minutes. Remove up-per phase and add 1.5mL of hexane. Centrifuge for 5 minutes. Remove upper phase once again and dry the treated sample. Redissolve in 200µL of chloroform for subsequent GC analysis.
THC, Metabolites	Urine	Δ9-Tetrahydrocannabinol Methyl Ester, 9-Carboxy-11-nor-Δ9-THC Methyl Ester (Metabolite of #1)	C18-Low, 500mg	Add 1mL methanolic KOH (10% w/v) to 10mL of urine in a test tube. Cap and heat tube to 100°C for 15–20 minutes. Cool to room temperature and adjust pH to 3.	5mL methanol followed by 5mL DI water.	Add prepared urine sample.	5mL DI water followed by 5mL of acetonitrile:water (40:60). Vacuum 2 minutes.	2mL of methanol.
Theophylline	Serum	β-Hydroxyethyl Theophylline (internal standard), Theophylline	C18-Low, 100mg	Add 2mL of 0.1M KH_2PO_4 (pH 4) buffer to 1mL serum. Vortex for one minute.	2mL methanol followed by 2mL DI water.	Add buffered serum.	2mL DI water, vacuum 2 minutes.	1mL of methanol.
Topical Anesthetics	Serum	Benzocaine, Procaine, Mepivacaine	C18-Low, 500mg	Use 500µL serum. Add 500µL internal standard solution: 50µg/mL Mepivacaine HCl in 0.1M NaH_2PO_4. Vortex 1 minute.	5mL methanol followed by 5mL DI water.	Add sample.	8mL DI water:methanol (75:25), vacuum 2 minutes.	Pass 500µL of methanol and dry. Redissolve in 200µL of chloroform for subsequent analysis by gas chromatography.

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