

Excedrin

caffeine
pKa $\approx$ 14

aspirin
(acetylsalicylic acid)
pKa $\approx$ 3.5

acetaminophen
(paracetamol)
pKa $\approx$ 9.5

binders
(starches, cellulose, glycogen)

Acid-Base Extraction

caffeine
pKa $\approx$ 14

aspirin
(acetylsalicylic acid)
pKa $\approx$ 3.5

acetaminophen
(paracetamol)
pKa $\approx$ 9.5

binders
(starches, cellulose, glycogen)

ethyl acetate

Acid-Base Extraction

binders
(starches, cellulose, glycogen)

trace organics

vacuum

caffeine
aspirin
acetaminophen

additional organic solvent wash
(ethyl acetate)

Acid-Base Extraction

1M K_2HPO_4
pH $\approx$ 6.5

aspirin
(acetylsalicylic acid)
pKa $\approx$ 3.5

sodium acetylsalicylate

caffeine
aspirin sodium salt
acetaminophen

Acid-Base Extraction

6M HCl
pH $<$ 0.1

aspirin sodium salt

aspirin (solid)

salts

vacuum

Acid-Base Extraction

1M KOH
pH $\approx$ 13.5

caffeine
acetaminophen sodium salt

acetaminophen (paracetamol)
pKa $\approx$ 9.5

sodium paracetamate

caffeine

sodium paracetamate

Acid-Base Extraction

6M HCl
pH $<$ 0.1

acetaminophen sodium salt

acetaminophen (solid)

salts

vacuum

Acid-Base Extraction

Na_2SO_4
(anhydrous)

salts
 $Na_2SO_4 \cdot H_2O$

vacuum

Evaporate Solvent

pure caffeine crystals

Acid-Base Extraction

Ethyl Acetate

aspirin

vacuum

aspirin (wet)

brine
(sat. NaCl / H_2O)

aspirin (dry)

salt water

Acid-Base Extraction

Na_2SO_4
(anhydrous)

salts
 $Na_2SO_4 \cdot H_2O$

vacuum

Evaporate Solvent

pure aspirin crystals