OVERVIEW OF CHROMATOGRAPHY

Type	Features	Uses
Paper	• Inexpensive • Slow • Qualitative analysis only • Stationary phase: stationary liquid (polar water) on cellulose fibres • Mobile phase: pure solvent or solvent mixture • R_f measured (reproducible under identical conditions) • Only suitable for small sample size (suffers from streaking effects)	• Identification of colours in inks or food • Identification of amino acids • Separation of plant pigments
TLC	• Inexpensive • Faster than paper and more sensitive • Qualitative analysis only • Stationary phase: solid (e.g. silica gel) coated onto a support • Mobile phase: pure solvent or solvent mixture • R_f measured (reproducible under identical conditions) • Small sample size (does not suffer from streaking effects)	• Separation of plant pigments • Identifying certain biological substances • Identification of amino acids
GC	• Most expensive (>$50000) • Fastest technique and most sensitive • Used for gases or easily vaporised discrete molecular substances (i.e. must be gas to be swept into column) • Sample must not be temperature sensitive • Both qualitative and quantitative analysis • Stationary phase: in GSC a solid, in GLC a liquid of low volatility such as a long chain hydrocarbon or oil adsorbed to a solid support • Mobile phase: a carrier gas (He, Ne or other inert gas) which plays a little role apart from sweeping the components along (no real attractive forces established between gas and components) • R_t value measured (identification) and area under peaks measured (for quantitative purposes) – once calibrated against standards (reproducible under identical conditions) • Small sample size to produce clear peaks in chromatogram (0.1µL to 50µL)and sample must have a molar mass less than or equal to 300g/mol	• Analysis of air-borne pollutants • Analysis of oil spills • Analysis of alcohol content • Analysis of essential oils in perfume preparation

Type	Features	Uses
HPLC	• Less expensive than GC (<$10000) • Slower than GC and less sensitive • Used for organic compounds that decompose if vaporised or compounds with molar masses greater than 300g/mol • Small sample sizes which must be liquid or solution (10µL) • Both qualitative and quantitative analysis • Stationary phase: commonly solid (very finely divided to increase surface area) but can be a liquid coated onto a solid • Mobile phase: pure solvent or solvent mixture pumped through under high pressure – identity of mobile phase is significant unlike GC • R_t measured and also area under peaks (quantitative once calibrated against standards) (reproducible under identical conditions)	• Analysis of pharmaceuticals and drugs • Analysis of toxic compounds in shell fish • Protein analysis • Analysis of pollutants in water