

Table 3:CHEMICAL COMPOSITION ANALYZERS

Methods	Chromatography			Spectrophotometers					Photometry			Spectrometry
	Liquid	Gas-Liquid	Gas-Solid	Radiation		Absorption			Refractometry	Visible Light Methods		Mass
										Turbidimeters	Opacity Monitors	
Working Principle	Separation occurs in the column based on varying affinities of components to bind to column packing. A detector measures some physical property that relates to concentration			*Heat, luminescence, fluorescence	*Ultraviolet	*Infrared			*Measures the refractive index using Shell's law	*Measures turbidity or sample clarity	*Measures attenuation of light (absorption or scattering of light)	*Detects molecular weight of composition in mixture
Comments	Widely used to separate and measure volatile compounds			*Often used in biological or pharmaceutical industries	*Gas/liquid	*Gas/liquid *Nondispersive			*For optically transparent materials only	*Fluids with suspended solid particles	*Sample must transmit light	*Mass to charge ratio *Must liquify sample
Examples	*Chemical or biochemical processes *Separate proteins			*Fluorescence spectrophotometers to detect specific proteins in cells	*Presence of aromatics in organic compounds	*Quantifying organic peroxides in lubricants using FTIR analysis			*Monitoring juice concentrate in orange juice	*Detect pollutants in water (quality check)	*Measure smoke density in chimney stacks	*Detecting iron content in cereal
Advantages	*Precise			*High sensitivity *Very specific	*Reliable *Large data bank for reference				*Relatively simple set-up *Simple calculations	*Ideal for small concentration of solids in fluids	*Better than turbidimeters, accounts for scattering and absorption of light	*Accurate
Disadvantages	*Offline *Lag time *Expensive			*Too specific	*Applicable to certain EM range, gas/liquid compounds *Durability/mobility				*Prone to fouling	*Fouling *Stability		*Expensive *Off-line