



## APPLICATION NOTE – GENERAL APPLICATIONS OF POLARIMETERS

### What is Polarimetry?

**Polarimetry** is an analytical method of measuring the concentration of inorganic and organic compounds in a liquid solution using an instrument that determines the optical activity of those compounds. A compound is considered to be optically active if linearly polarized light is rotated when passed through it. The amount of optical rotation is determined by the molecular structure and concentration of chiral molecules in the substance. Each optically active substance has its own specific angle of rotation, which can be used to identify specific compounds and their concentrations in a solution. The polarimetry measurement does not affect the sample.

The polarimetry measurement is influenced by:

- sample composition
- concentration
- length of the observation tube
- temperature
- color of light (wavelength)

Polarimetry is used in many industries.

### Food industries

Polarimetry is used in food industries for quality control of original, intermediate, and final products, the determination of concentrations, and purity control.

- **Sugar industries:** sugar (sucrose, levulose, glucose, etc.), sugar syrups, starch, sugar-free sweeteners like isomalt, etc.
- **Dairy:** lactose, sucrose, lactoglobuline, lactic acid, esters, etc.
- **Vine industries:** analysis of sugar on the vine, tartaric acid, esters, etc.
- **Fruit:** analysis of sugar in fruit syrups (levulose), acids and esters (malic acid, etc.), essential oils, etc.

### Pharmaceutical industries

Polarimetry is used in pharmaceutical industries for purity control and determination of concentration of substances according to the requirements of the European and American Pharmacopeia by measurement of both specific and optical rotation.

- **Alkaloids:** cocaine, codeine, nicotine, morphine sulphate, etc.
- **Amino acids:** asparagine, glutamic acid, etc.
- **Organic compounds:** ascorbic acid, menthol, camphor, etc. □ **Others:** steroids, antibiotics, serums, vitamins, etc.

### Medicine

- Research of sugar and albumin in urine
- Hormone research
- Enzymology and toxicology research

### Cosmetic Industries

- Control of purity and identification of optically active essential oils and essences like lemon oil, orange oil, lavender oil, spearmint oil, etc.

## **Chemical Industries**

Purity control and measurement of concentration, identification, and characterization of compounds, such as:

- Organic fluids
- Biopolymers
- Synthetic polymers
- Organic polymers

## **Research applications**

- Analysis of optically active compound structure analysis
- Determination of configuration changes of solved macromolecules
- Monitoring changes in concentration of an optically active component in a reaction mixture, as in enzymatic scission
- Distinction of optical isomers
- Investigating kinetic reactions by measuring optical rotation as a function of time
- Analyzing molecular structure by determining optical rotation dispersion

## **Reichert Polarimeters**

Reichert has been a leader in the development and manufacture of optical instruments for over 150 years. This expertise has resulted in the most accurate polarimeters on the market. Reichert instruments are unique in that they provide a linear response and maintain accuracy over the entire reading range. Most other instruments are accurate only at small angular rotations. Choose Reichert polarimeters for:

- Ultimate accuracy throughout the reading range
- Robust, low-maintenance construction
- Modular design to combine with refractometers and density meters