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Editorial Note

# Gist of chromatography and its Applications

**Hitoshi Nohta** *

*Department of Pharmaceutical Sciences, Fukuoka University, Fukuoka, Japan*

Chromatography, a technique of separating the components or solutes of a mixture based on the relative amounts of each solute distributed between a stream of moving liquid called the mobile phase and an adjacent stationary phase, or a process by which a chemical mixture B. a liquid or gas decomposes into components as a result of the different distribution of dissolved substances when it flows around or over a stationary solid or liquid phase. The mobile phase can be liquid or gaseous, while the stationary phase is solid or liquid.

Chromatography was originally used by artists, colour theorists, and craftsmen who hoped to perfect industrial dyes for textiles. Over time, it has also spawned a unique branch of chemistry and, with it, the techniques used today to understand and purify mixtures. In modern laboratories, the appearance of colour no longer plays a role, but the same principles apply. By dissolving a mixture of interest in a mobile phase and transporting it through a stationary phase, the components of the mixture can separate from each other due to their different transport rates.

Chromatographic processes separate ionic, inorganic, or organic species, and molecular species, whose size ranges from the lightest and smallest, helium and hydrogen, to particles like individual cells. However, no single configuration will accomplish this. Little prior knowledge of the components of a mixture is required. At best, chromatography separates several hundred components of unknown identity and concentration, leaving the components unchanged. With some detectors, quantities in the parts per billion range can be detected. Dissolved substances can vary from polar to nonpolar, i.e. H. soluble in water to soluble in hydrocarbons.

The principles of chromatography appear in other laboratory techniques as well. Gel electrophoresis classifies nucleic acids and proteins according to their size and pushes them through the gel by an electric field. This technique is, in fact, a type of chromatography. Similarly, distillation classifies the components of a mixture according to their boiling and condensation points, the apparatus itself being a kind of stationary phase. Separations are quick and range from analysis times of a few minutes to several hours. The pre-chromatographic world would have taken several hours for the separation of multicomponent mixtures to be miraculous. Now several hours are considered excessive and a lot of emphasis is placed on increasing speed.

Initially, chromatographic techniques were used to separate substances according to their color, as was the case with herbal pigments. With the passage of time, its field of application has expanded considerably. Chromatography is now considered an extremely sensitive and efficient separation process. Column chromatography is one of the useful methods of separation and determination. Column chromatography is a protein purification method specifically designed based on one of the characteristic features of proteins. These methods are also used to check the purity of a protein. The HPLC technique, which has many superior properties, including in particular its higher sensitivity, rapid turnover rate, and its use as a quantitative method, can purify amino acids, proteins, nucleic acids, hydrocarbons, carbohydrates, drugs, antibiotics and steroids.

**Correspondence to:** Hitoshi Nohta, Department of Pharmaceutical Sciences, Fukuoka University, Fukuoka, Japan, Tel: 001-317-988-3336 26; E-mail: nohta@fukuoka-u.ac.jp

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