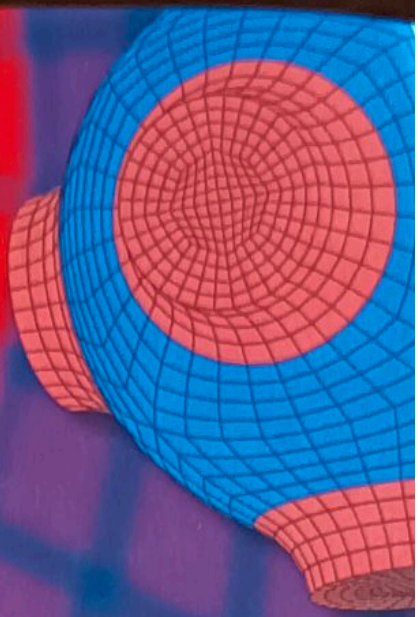
Advanced Structured Materials



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Bioactive Natural Products for Pharmaceutical Applications

Springer

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Chapter 8
Capillary Electrophoresis: A New Evolutionary Platform of Plant Secondary Metabolites

Dilipkumar Pal and Souvik Mukherjee

Abstract Capillary electrophoresis (c.e) is a modern S_{pt} technique other than any other chromatographic technique for the detection of plant secondary metabolites (Psm). There are two types of c.e such as capillary zone electrophoresis (c.z.e) and micellar electro kinetic (M.e.k.c.c). All kinds of secondary metabolites (S_m) (flavonoids, cardiac glycosides, aglycones, steroids, diterpene, saponin, etc.) are not possible to isolate with the help of HPLC and Gas chromatography. But such type of metabolites may possibly be isolated with the help of c.e smoothly and easily. However, in c.e charged molecules are transferred to the opposite charged molecules in the presence of the electrical field. Very low solvent, low price silica columns, and small amount of samples are needed to run the c.e. There are various characteristics such as voltage (V_{tg}), temperature, electrolyte concentration, B_F pH, micelle concentration, and organic modifiers may influence the S_{pt} of different S_m. In this book chapter we will describe the different parameters of c.e like methodology, detector sample analysis, and combination of other hypnated technique for the detection of metabolites.

Keywords Capillary zone electrophoresis · Micellar electro kinetic capillary chromatography · Phenolics · Alkaloids · Terpenoids

Abbreviation

A_{NT}	Acetonitrile
Alkd	Alkaloid
A_{ACT}	Ammonium acetate
BRT	Borate
B_F	Buffer
BFS	Buffer solution
C.e	Capillary electrophoresis
C.w	Capillary wall

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C.z.e	Capillary zone electrophoresis
C.n	Coumarin
Esp	Electrolyte solution parameter
ESOP	Electro-osmotic pressure
E.c	Eukaryotic cell
Fvd	Flavonoid
F.s.c.c	Fused silica capillary column
I.p	Instrumental parameters
M.m	Metabolism
M_td	Method
M.e.k.c.c	Micellar electro kinetic
M.C.L	Micelle
NI	Negative ion
Ps	Plant species
PI	Positive Ion
P.c	Prokaryotic cell
Qn	Quinone
S_{pt}	Separation
Tps	Terpenoids
Vt_g	Voltage

8.1 Introduction

Metabolism (M.m) is a magical strategy for the formation of various ce function. It is also observed that M.m is created either the beginning of euka cell (e.c) and prokaryotic cell (p.c) (Harstad et al. 2016). If M.m does not occ the functions related to natural cellular works of a normal cell would be lost. E is required for conducting the formation of the cell. This energy is derived food, cellular function is switched on when energy is derived from food (Har 2017). There are two types of M.m such as catabolism (compound breakin anabolism (compound making). The metabolite products (m.ps) of e.c are p carbohydrate, lipid, and nucleic acid which are also known as a primary met (Zhang et al. 2017). Besides, m.ps of p.c (plant, bacteria, fungus, etc.) are al glycoside, terpenoids, saponin, etc. However, there are different M_td (spectroscopic technique and chromatographic technique) in regards know what types of P are created in e.c (Junger et al. 2019). By the application of e electrical field, if a sample contained positive (PI) and negative ion (NI), these PIS are transferred into the negative end and NIS are positive end th phenomenon is called as electrophoresis (Fig. 8.1). There are various M_td in in this technique (Fig. 8.2). So, Capillary electrophoresis (c.e) is a new hyp separation (S_{pt}) technique (Fig. 8.3). It was first invented by Herten in