Comprehensive analysis of medium for effective cell culture

Qualitative and quantitative analyses of medium components are very important for quality improvement and quality assurance since medium components have an great effect on efficiency of cell culture.

Profiling of medium components

Simultaneous analysis
- Identification and semi-quantitative analysis of main components (amino acids, sugars, lipids, minerals, etc)

Individual component analysis
- Analysis of trace components and attention components (metabolites, surfactants, growth factors, etc)

High-precision quantitative analysis
- For quality control and quality assurance
- Evaluation of component change in medium during cell culture.

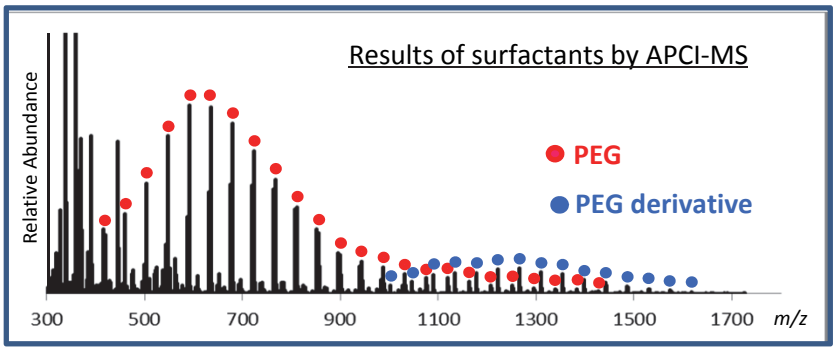
We provide some data according to the reference of the pharmaceutical application in Japan.

Case of medium for regenerative medicine

Amino acid	concetration µmol/mL
Aspartic acid	0.14
Threonine	0.37
Asparagine	0.14
Glutamine	2.6
Leucine	0.39
Lysine	0.42
Arginine	0.59
Proline	0.21
Others	**µg/mL**
2-mercaptoethanol	4.24
Li	6.6

Simultaneous analysis is capable to evaluate plural amino acids. We prepare quantitative and high sensitive analysis for trace components.

It was confirmed that two types of surfactants, PEG and PEG derivative, are contained in the sample.



Providable Menu (Qualitative and Quantitative analysis)

Components	Methods	Limit of quantitation	Example of providable menu
Amino acids, amino acid derivatives (metabolites)	LC/MS/MS, Amino acid analysis	1～10 nmol/mL	Ala, Arg, Asp, Glu, Gly, His, Ile, Leu, Lys etc Aminoadipic acid, etc
Sugars, Sugar derivatives	LC/MS/MS, HPLC	0.5 µg/mL	Glucose, Fructose, etc
Lipids	LC/MS/MS, GC, TLC	2 µg/mL	Free fatty acids, Sterols
Nucleic acids	LC/MS/MS, qPCR, DNA chip	1 µg/mL	Nucleotides, RNA, miRNA, Residual DNA
Vitamins	LC/MS/MS, HPLC, ELISA	1 ng/mL～1 µg/mL	Vitamin B1,B2,B3,B6,B12,A,D,E.K,Folic acid, Biotin
Minerals (metals, salts)	ICP-AES, ICP-MS, XRF	0.05～1 ng/mL	Metals: Zn, Cu, Se, etc Salts: Na, K, Ca, etc
Minerals (cation, anion, acid, amine)	IC	1～10 µg/mL	Anion : Cl^-, Br^-, NO_2^-, SO_4^{2-} Cation : Li^+, Na^+, K^+, Mg^{2+} , etc Organic acid : Succinic acid, Pyruvic acid Amine: Lower amine
Surfactants	LC/MS/MS, LC/MS, NMR, GC	0.005～0.1 µg/mL	Polysorbates, Pluronics, etc
Growth factors, etc	ELISA, LC/MS/MS	1 µg/mL	Insulin, Transferrin, etc
Proteins	ELISA, LC/MS/MS	1 n g/mL～1 µg/mL	Cytokine, Albumin, Host cell protein, etc
Antibiotics	LC/MS/MS	0.1 µg/mL	Penicillin, Streptomycin, etc
Additives	HPLC, NMR	0.1 µg/mL～200 µg/mL	2-mercaptoethanol, Simeticone, etc