

## Technical revolution of D-amino acid profiling

Amino acids are essential and ubiquitous compounds for living organisms on Earth. Proteinogenic amino acids (except for glycine) have chiral carbon, and those enantiomers (L-form and D-form) exist (Fig. 1).

L-forms predominantly exist in nature, therefore researches of amino acids have been focused mainly on L-forms. But recently, the demand of D-amino acid profiling has been drastically increasing because significance of D-amino acids contribution to several kinds of biological events is suggested.

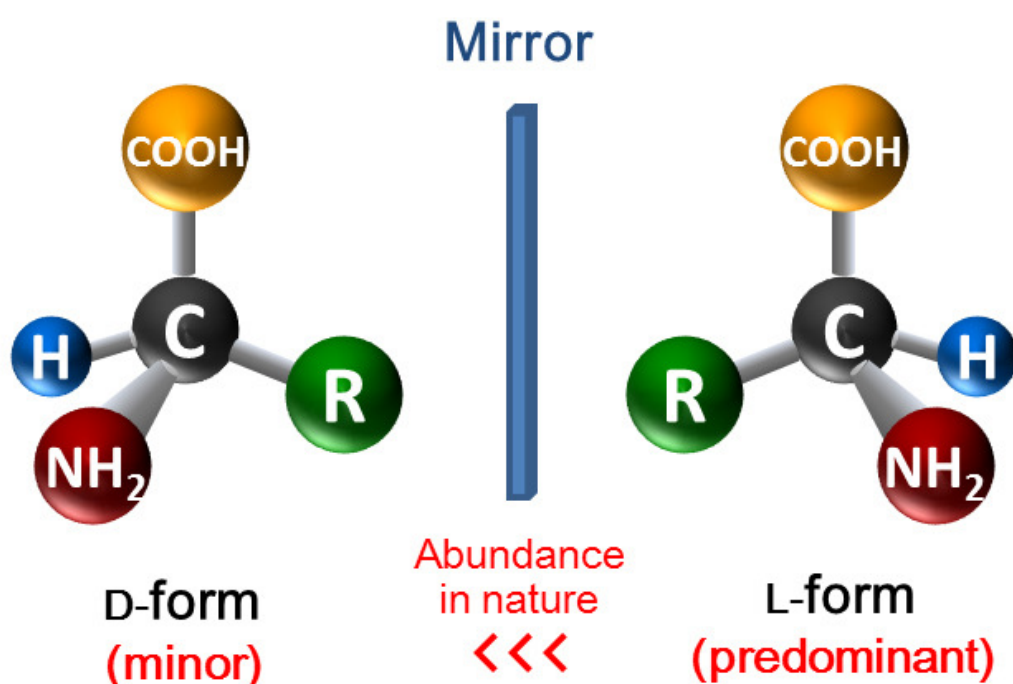


Fig. 1. Enantiomers of amino acid.

Enantioseparation of amino acids is one of the main themes in the field of chiral analysis, and many researchers have tried developments of simultaneous analytical method for a long time. However, due to problems such as long analysis time, insufficient enantioseparability, appearance of interference peaks, most of conventional techniques have not been able to satisfy researchers who participate in D-amino acid related. Therefore, highly sensitive, robust, high-throughput, and user-friendly method for D-amino acid profiling must be developed soon.

By combining a commercially available chiral column and LC-TOFMS (Liquid chromatography–time of flight mass spectrometry), we developed the novel tactic to meet the all specifications that are definitely required for the cutting edge studies of D-amino acids.

The novel method includes the following world best performance.

1. The shortest analytical time (within 10 minutes) employing a simple LC condition (isocratic mode).
2. The highest enantioselectivity without derivatization for 18 proteinogenic amino acid enantiomers (except for proline).
3. The largest coverage for analytical targets (totally more than one hundred targets including non-proteinogenic amino acids and amines).

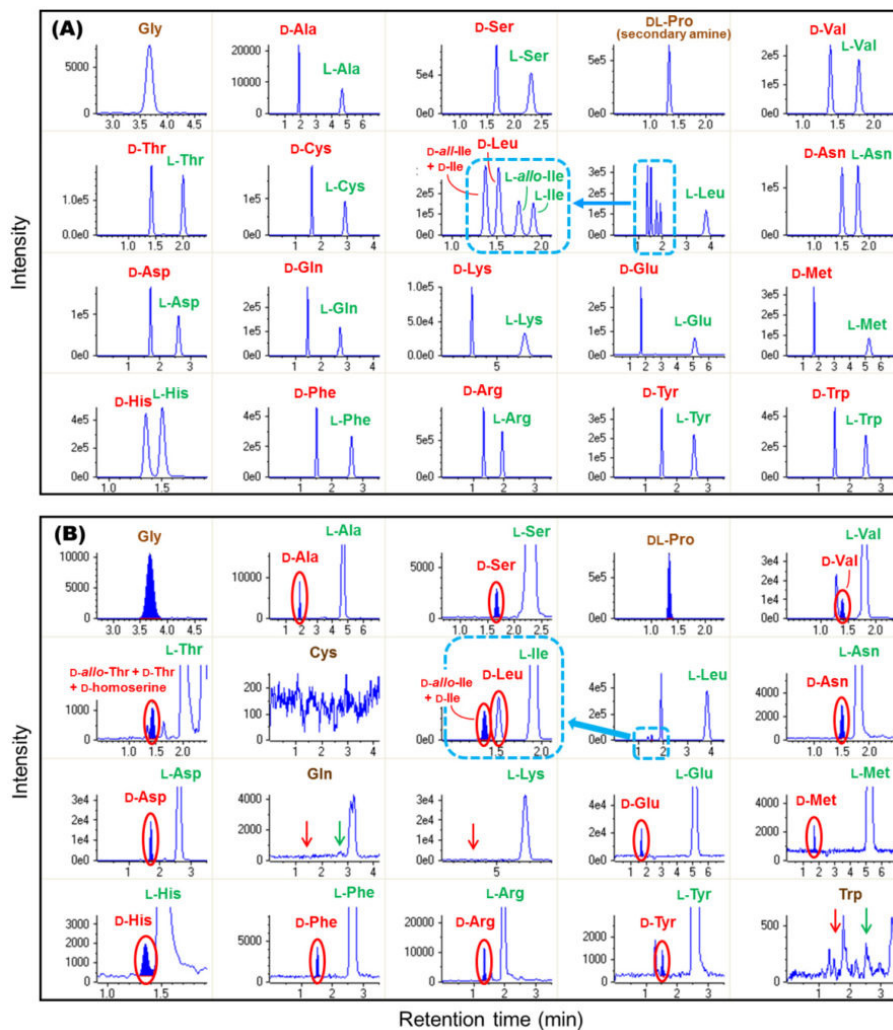


Fig. 2. LC-MS chromatograms of (A) Mixed standard solution proteinogenic amino acid enantiomers and (B) Black vinegar.

We have succeeded in not only enantioselectivity using a mixed standard solution of proteinogenic amino acids, but also determinations of D-amino acids in several foods (black vinegar, kimchi, yogurt etc.) (Fig. 2).

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## **Publication**

[Novel high-throughput and widely-targeted liquid chromatography-time of flight mass spectrometry method for d-amino acids in foods.](#)

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