

相対モル感度を用いた single-reference HPLC 法が定量値に影響を及ぼす 要因の検討と機能性表示食品中のルテイン定量への応用

(2020年6月30日受付)

(2020年7月21日受理)

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Investigation of factors affecting on quantitative value by single-reference HPLC method with the relative molar sensitivity (RMS) and application to determination of lutein in Foods with Function Claims

(Received June 30, 2020)

(Accepted July 21, 2020)

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Abstract

Chromatographic techniques, such as high-performance liquid chromatography (HPLC), are typically adopted as quantitative methods for the separation and identification of functional substances classed as Food with Function Claims (FFC). Although the quantitative values determined by chromatographic approaches are ensured by using high purity reference materials, for most functional substances, such references are not commercially available.

In this study, we applied an alternative quantitative technique using the relative molar sensitivity (RMS), namely single-reference HPLC, to quantitatively analyze the content of lutein in FFC. In this method, RMS of the analyte to a single reference compound was used to determine the analyte content in FFC using HPLC/ photodiode array detector (PDA). Notably, the approach did not require the use of any reference materials. Since there were no researches on factors affecting on quantitative value by single-reference HPLC method, the concentration ranges of the analyte and single reference, which yielded reliable RMS values, were comprehensively evaluated to obtain accurate quantitative values by single-reference HPLC. Consequently, when the signal to noise ratio of the peaks corresponding to the single reference and analyte was above 50, the differences in the quantitative values were within approximately 1.5%. Based on the obtained results, RMS of lutein to a single reference compound, specifically sudan I, which is a stable commercially available analytical standard, was established at 8.18. It was found that there was no significant difference between the lutein content of FFC determined utilizing the single-reference HPLC method and the absolute calibration curve approach. The calibration curve was generated using lutein with adjusted purity measured by ¹H-qNMR. The outcomes of the study demonstrate that lutein in FFC can be indirectly quantified employing inexpensive and high-purity sudan I as a single reference.

Keywords : ルテイン、機能性表示食品、¹H- 定量 NMR、相対モル感度

lutein, Foods with Function Claims, ¹H-qNMR, relative molar sensitivity

I 緒言

機能性表示食品とは、事業者の責任において特定の保健の目的が期待できる旨の表示を行うものとして、消費

者庁長官に届け出られたものである¹⁾。機能性表示食品において、機能性関与成分および安全性の担保が必要な成分の含量は、製品の安全性・有効性などの品質に関わる重要な項目であるため、届出の際にはこれらの成分に