

# LC-MS/MS によるカンナビジオール（CBD）製品中の $\Delta^9$ -テトラヒドロカンナビノール（THC）および $\Delta^9$ -テトラヒドロカンナビノール酸（THCA）分析法開発の基礎的検討

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## Study for the determination of $\Delta^9$ -tetrahydrocannabinol (THC) and $\Delta^9$ -tetrahydrocannabinolic acid (THCA) in cannabidiol (CBD) products by LC-MS/MS assay

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### Abstract

Recently, health food products containing cannabidiol (CBD) are becoming increasingly available in Japanese food markets. In this situation, the Ministry of Health, Labour and Welfare in Japan revised the Cannabis Control Act in December 2024. This law sets the residual limits of tetrahydrocannabinol (THC) levels in various CBD products. Specifically, the residual limits based on  $\Delta^9$ -THC and  $\Delta^9$ -tetrahydrocannabinolic acid (THCA) concentrations were 10 ppm for oil and powder, 1 ppm for various solid samples and 0.1 ppm for liquid samples. In addition, the ministry presents the proposal method for the determination of  $\Delta^9$ -THC and  $\Delta^9$ -THCA based on LC-MS/MS and/or LC-Q/TOF/MS assays. Thus, we investigated that LC-MS/MS assay would be useful, accurate, sensitive and screening evaluation of residual limits of THC levels in common products such as oil, cookies, gummy, chocolate, and beer samples. Our LC-MS/MS assay of  $\Delta^9$ -THC and  $\Delta^9$ -THCA was developed with reversed-phase short column (running time: 5 min) and ESI-positive/negative mode (LOD/LOQ: 0.05 pg/0.25 pg). Recovery tests with absolute/internal calibrations were accuracy of 50.5% – 115.3%/94.9 – 106.3%, and precision of 0.4 – 8.8%/0.4 – 1.9%, respectively. In conclusion, our good results were obtained for almost all products, however the recovery rates of water-soluble product were not enough to evaluate these levels using absolute calibrations. On the other hand, we suggest that accurate methods with internal calibration would be useful for the evaluation of residual limits of THC levels in various products.

**Keywords :** カンナビジオール、デルタ 9- テトラヒドロカンナビノール、デルタ 9- テトラヒドロカンナビノール酸、液体クロマトグラフィータンデム質量分析法、残留限度値  
CBD,  $\Delta^9$ -THC,  $\Delta^9$ -THCA, LC-MS/MS, residual limits

## I 緒言

近年、日本国内においてカンナビジオール（CBD）に関連する様々な製品が流通しており、その種類や品目は

増加していく傾向にある。一方で、CBD 関連製品から微量に残留する可能性がある違法成分デルタ 9- テトラヒドロカンナビノール（ $\Delta^9$ -THC）も懸念されている。そのような中、令和 6 年 12 月 12 日「大麻取締法及び麻薬及び