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Method Development for the Determination of Gamma-Aminobutyric Acid in Rice Products by Lc-Ms-Ms

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Abstract : Gamma-aminobutyric acid (GABA) is a non-protein amino acid that is a functional constituent of certain rice varieties. When consumed, it decreases blood pressure and reduces the risk of hypertension-related diseases. This has led to more research dedicated towards the development of functional food products (e.g. germinated brown rice) with enhanced GABA content, and the development of these functional food products has led to increased demand for instrument-based methods that can efficiently and effectively determine GABA content. Current analytical methods require analyte derivatisation, and have significant disadvantages such as being labour intensive and time-consuming, and being subject to analyte loss due to the increased complexity of the sample preparation process. To address this, an LC-MS-MS method for the determination of GABA in rice products has been developed and validated. This developed method involves a relatively simple sample preparation process before analysis using HILIC LC-MS-MS. This method eliminates the need for derivatisation, thereby significantly reducing the labour and time associated with such an analysis. Using LC-MS-MS also allows for better differentiation of GABA from any potential co-eluting compounds in the sample matrix. Results obtained from the developed method demonstrated high linearity, accuracy, and precision for the determination of GABA (1ng/L to 8ng/L) in a variety of brown rice products. The method can significantly simplify sample preparation steps, improve the accuracy of quantitation, and increase the throughput of analyses, thereby providing a quick but effective alternative to established instrumental analysis methods for GABA in rice.

Keywords : functional food, gamma-aminobutyric acid, germinated brown rice, method development
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