Analysis of benzobicyclon and its metabolite in brown rice and rice straw after field application using liquid chromatography-tandem mass spectrometry

So Jeong IM¹, A. M. ABD EL-ATY¹,², Young-Jun LEE¹, Md. Musfiqur RAHMAN¹, Sung-Woo KIM¹, Jeong-Heui CHOI¹, Jae-Han SHIM¹

¹Biotechnology Research Institute, Chonnam National University, 77 Yongbong-ro, Buk-gu, Gwangju 500-757, Republic of Korea, (e-mail: jhshim@jnu.ac.kr)
²Department of Pharmacology, Faculty of Veterinary Medicine, Cairo University, 12211-Giza, Egypt

Abstract

This study was carried out to develop an extraction as well as an analytical method for detecting benzobicyclon and its amino-substituted metabolite (1315P-570) in brown rice and rice straw using liquid chromatography-tandem mass spectrometry (LC-MS/MS) in positive ion mode with multiple reactions monitoring (MRM). The parent as well as the metabolite in rice and rice straw were extracted and analyzed under the same conditions. A correlation coefficient (R²) of > 0.994 was obtained for matrix-matched calibration curves constructed in various concentration ranges. Recoveries at two fortification levels were satisfactory and ranged between 75.4–118.9% with relative standard deviations (RSDs) < 13%. Under storage conditions (−20°C), the analyte and its metabolite were stable for up to 92 days. The limits of quantitation (LOQs) were lower than the maximum residue limit (MRL) (0.1 mg/kg) set by the Korea Food and Drug Administration for brown rice. Field trials with recommended or double the recommended dose revealed that the herbicide could safely be applied to rice and rice straw, as no residues were detected in the harvested samples. The sensitivity of the developed method was sufficient to ensure reliable determination of benzobicyclon and its metabolite in rice grain and rice straw.

Key words: residue, herbicide, metabolite, unpolished rice, rice straw, analysis

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