

Rapid reversed-phase chromatographic method for determination of eight vitamin E isomers and gamma-oryzanols in rice bran and rice bran oil

Abstract

Rice bran and rice bran oil contain high amounts of lipid soluble phytochemicals such as tocopherols, tocotrienols and γ -oryzanols with potential health benefits. A reversed-phase high-performance liquid chromatographic method for the quantitation of these phytochemicals was developed. These phytochemicals were extracted using rapid one-step methanol extraction and separated on a Kinetex pentafluorophenyl phase column for quantitation using fluorescence and ultraviolet detectors. Separation was carried out within 20 min at a flow rate of 1.0 mL/min using a gradient elution of mobile phase consisting of methanol and water at column temperature of 30 °C. A good separation of all eight tocol isomers was achieved while the γ -oryzanols were separated near to baseline. Extraction yields of tocopherols, tocotrienols and γ -oryzanols from saponification medium with different pH conditions were studied. Total γ -oryzanols extracted from alkaline medium were significantly lower than those from the neutral and acidic mediums ($p < 0.05$), while total tocols extracted from these mediums were not significantly different. The method gave a good calibration linear response ($R^2 > 0.9994$), low detection limit (3–34 ng/mL) and high precision (RSD < 7.5 %) with satisfactory recovery (R% = 81–116 %). The advantages of this method over available reverse-phase methods are the better resolution of β and γ tocol isomers with the γ -oryzanols, usage of non-halogenated mobile phase and shorter analysis time, and it is compatible with the standard laboratorial chromatographic equipment.

Keyword: Tocopherols; Tocotrienols; Oryzanols; RP-HPLC; Determination; Rice