To establish optimal ultra-high-pressure (UHP)-assisted extraction conditions for procyanidins from lychee pericarp, a response surface analysis method with four factors and three levels was adopted. The optimum conditions were as follows: 295 MPa pressure, 13 min pressure holding time, 16.0 mL/g liquid-to-solid ratio, and 70% ethanol concentration. Compared with conventional ethanol extraction and ultrasonic-assisted extraction methods, the yields of the total procyanidins, flavonoids, and phenolics extracted using the UHP process were significantly increased; consequently, the oxygen radical absorbance capacity and cellular antioxidant activity of UHP-assisted lychee pericarp extracts were substantially enhanced. LC-MS/MS and high-performance liquid chromatography quantification results for individual phenolic compounds revealed that the yield of procyanidin compounds, including epicatechin, procyanidin A2, and procyanidin B2, from lychee pericarp could be significantly improved by the UHP-assisted extraction process. This UHP-assisted extraction process is thus a practical method for the extraction of procyanidins from lychee pericarp.

The ORAC and CAA antioxidant activities of lychee pericarp procyanidins were improved by ultra-high-pressure (UHP)-assisted processing.