Cabbage (*Brassica oleracea* var. *capitata*) is one of the major cruciferous vegetables and it is characterized by its high concentration of glucosinolate as well as carotenoids, tocopherol, vitamin C and fibers. The objective of this study was to determine the influence of common cooking (i.e., boiling, microwave, steaming and frying) on the phytochemical contents (lutein, β-carotene, γ-tocopherol, and α-tocopherol) and total antioxidant capacity determined by DPPH and ABTS assay in cabbage. The total polyphenol and flavonoid contents of cabbage extract were 344.75 μg gallic acid equivalent/g dry weight and 5.95 μg quercetin equivalent/g dry weight, respectively. We detected four glucosinolate peaks in cabbage representing glucoraphanin, sinigrin, glucobrassicin, and 4-methoxyglucobrassicin based on their retention time in HPLC and their molecular ion and fragmentation patterns obtained by LC-MS analysis. In fresh cabbage, sinigrin (4.54 µmol/g) was the major glucosinolate, followed by glucobrassicin (3.63 µmol/g), 4-methoxyglucobrassicin (2.30 µmol/g), and glucoraphanin (2.05 µmol/g). Various cooking methods affected the concentrations of nutrients and health-promoting compounds in cabbage. The concentrations of four glucosinolates in cabbage significantly decreased after different cooking methods, and the rate of decrease was higher with increased cooking time. Cooking cabbage significantly increased the apparent concentrations of lutein, β-carotene, α-tocopherol, and γ-tocopherol. Our results clearly show that health-promoting compounds in cabbage are significantly affected by different cooking methods, and that all cooking treatments reduced glucosinolate concentrations. However, carotenoid and tocopherol concentrations were increased by various cooking methods, and a longer cooking time increased their extractability.