

## Abstract

Cowpea, an African leafy vegetable (*Vigna unguiculata*), contains a high level of vitamin C. The leaves harvested at 4–9 weeks are highly prone to vitamin C losses during handling and processing. Therefore, the purpose of this research was to study the effect of thermal treatment on the stability of ascorbic acid oxidase (AAO), total vitamin C content (l-ascorbic acid, l-AA), and dehydroascorbic acid (DHAA) and l-AA/DHAA ratio in cowpea leaves harvested at different maturities (4, 6, and 8 weeks old). The results showed that AAO activity, total vitamin C content, and l-AA/DHAA ratio in cowpea leaves increased with increasing maturity (up to 8 weeks). Eight-week-old leaves were the best source of total vitamin C and showed a high ratio of l-AA/DHAA (4:1). Thermal inactivation of AAO followed first-order reaction kinetics. Heating at temperatures above 90 °C for short times resulted in a complete AAO inactivation, resulting in a protective effect of l-AA toward enzyme-catalyzed oxidation. Total vitamin C in young leaves (harvested at 4 and 6 weeks) was predominantly in the form of DHAA, and therefore temperature treatment at 30–90 °C for 10 min decreased the total vitamin C content, whereas total vitamin C in 8-week-old cowpea leaves was more than 80% in the form of l-AA, so that a high retention of the total vitamin C can be obtained even after heating and/or reheating (30–90 °C for 10 min) before consumption. The results indicated that the stability of total vitamin C in situ was strongly dependent on the plant maturity stage and the processing conditions applied.