The *n*-hexane extracts of young, mature and senescent leaves of *Vigna unguiculata* (L.) Walp., commonly known as cowpea, were analysed by thin-layer chromatography (TLC), gas chromatography with flame ionization detector (GC-FID) and gas chromatography-mass spectroscopy (GC-MS), and revealed 12, 14 and 12 free fatty acids representing approximately 3.2, 4.5 and 2.5 mg per 100 g of leaf tissue in young, mature and senescent leaves, respectively. After extraction of surface-wax free fatty acids, the chloroform : methanol : water extracts of three types of leaf were analysed by TLC, GC-FID and GC-MS, and 15 fatty acids were detected, accounting for approximately 15.5, 24.0 and 9.4 mg in young, mature and senescent leaves, respectively. Palmitoleic, heptadecanoic and docosanoic acids were the predominant free fatty acids in young, mature and senescent leaves, representing approximately 1.4, 1.3 and 0.8 mg per 100 g leaf tissue, respectively; whereas myristic, tridecanoic and pentadecanoic acids were the least abundant free fatty acids in young, mature and senescent leaves, accounting for approximately 1.5, 20.6 and 25.2 µg per 100 g leaf tissue, respectively. Palmitoleic acid was the predominant fatty acid without surface-wax free fatty acids in young, mature and senescent leaves, accounting for approximately 8, 16.9 and 4.8 mg, respectively. Nonadecanoic acid was the least abundant fatty acid in young and senescent leaves without surface-wax free fatty acids representing approximately 64 and 43 µg per 100 g leaf tissue, respectively; whereas lauric acid was the least abundant fatty acid in mature leaves (40 µg per 100 g leaf tissue).