

ABSTRACT

Pumpkin peel and flesh are key inter and intra specie distinguishing features but there is dearth of knowledge about the peel and flesh characteristics and how these relate to postharvest stability of the different varieties. Pumpkin flesh and seeds greatly contribute to human diet but also promote health through antioxidant effects hence often dried and powdered to increase their usability. However, no study has provided optimum drying temperature time combination for optimal nutritional quality and bioactivity of pumpkin flesh and seeds. This study aimed at understanding fruit characteristics and how they associate with postharvest stability of the major pumpkin varieties grown in Uganda, optimising nutritional quality and bioactivity of flours from flesh and seeds and assessing the suitability of the flours for value addition.

Mature fruits of *C. maxima duchesne* subsp *maxima*, *C. pepo* L var. *fastigata* and *C. moschata decne* were monitored for 8 months under ambient conditions. *C. moschata decne* deteriorated fastest. Factor analysis revealed the major changes affecting postharvest stability in the first 3 months to be reduction in sucrose, esterification of pectin, starch, hemicellulose and cellulose, with factor loadings of -0.97, -0.88, -0.87, -0.82 and -0.79 respectively. Moisture loss from the flesh (0.95) and peel (0.94), and change in size of intercellular spaces (0.93) were major changes from 4 to 7 months, while polygalacturonase activity (0.64) superseded from 7 to 8 months.

The pumpkins had a total antioxidant activity (TAA) ranging from 41.00 to 44.60% (flesh) and 50.10 to 51.80% (seeds). *C. moschata decne* had the highest and *C. maxima duchesne* subsp *maxima* the least. *C. pepo* L var. *fastigata*, with TAA second to *C. moschata decne* and more shelf stable was selected for optimisation of drying conditions. The optimised conditions of 57°C; 6.9hr (for the flesh) produced flours with 35.99±0.04g/100g DMB resistant starch and 35.72±0.97% TAA while 60°C; 3.15hr (for the seeds) produced flours with 65.43±0.82% protein digestibility, 5.41±0.28mg/g DMB trypsin inhibitor activity and 44.63±0.41% TAA. Starch from flesh had amylose content ranging from 34.60 to 42.76% with *C. maxima duchesne* subsp *maxima* having the highest and *C. pepo* L var. *fastigata* the least. Flours from the flesh of *C. pepo* L var. *fastigata* had peak viscosity (cP) of 1712.00±9.00 making it ideal for viscous products. Starch from seeds had amylose content of 56.41 to 60.95% and the flours had peak viscosity of 70.66 to 83.00cP making them ideal for products where reduced calorie intake is preferred.