Impact of local cooking on β-carotene bioaccessibility from orange-fleshed sweet potato derived products made in Uganda

**Materials and methods**

Chapatis, mandazis and porridge were prepared in Uganda according to local recipes, with 30% OFSP flour, water and/oil. Extraction and HPLC analysis of carotenoids from micelles and from OFSP food products were carried out according previous work. Carotenoid bioaccessibility from OFSP food products was assessed using an in vitro digestion in order to simulate gastric and small intestinal phases of digestion. Sample were incubated at 37°C with pepsin (pH : 4) for 30 minutes with bile extract and pancreatin (pH : 6) for a further 30 minutes. Micelles were collected in the aqueous fraction after centrifugation and filtration.

**Results and discussion**

- Chapati and mandazi presented similar all-trans-β-carotene contents (31.5 and 32.9 mg/kg respectively) whereas that of porridge was only 8.7 mg/kg. Boiled OFSP had the highest content of all-trans-β-carotene (95 mg/kg) (Table 1).
- After in vitro digestion, the bioaccessibility, i.e, the percentage of micellarization of all-trans-β-carotene was greater in products cooked with oil: chapati (73%), mandazi (49%), as compared with the boiled ones: porridge (16%) and pureed root (10%).
- The presence of fat during the preparation of chapati (7.4%) and mandazi (3.3%) clearly improves the bioaccessibility of β-carotene in OFSP. The more efficient incorporation in micelles of the 13-cis-β-carotene as compared with the all-trans form was observed in all the products.
- Taking account bioaccessibility and applying a 50% conversion to retinol would indicate that a 100g portion of the OFSP purée could provide 46% of the daily vitamin A requirement (RDA) for child under 6 years. In comparison 100g of porridge would only provide 6% of the daily vitamin A requirement (RDA) for child under 6 years. Interestingly, two mandazis and one chapati could bring 75 and 100% of the RDA respectively.
- Results reported in figure 3 showed that classical estimate of RAE were overestimated for boiled OFSP and porridge but were underestimated for chapati.

**Conclusion**

These last results highlighted that β-carotene bioaccessibility is critical in the process of establishing the vitamin A activity of a particular food product. Indeed, this study suggested that the consumption of products made from a composite flour incorporating OFSP flour in Uganda could favourably contribute to decrease of vitamin A deficiency.