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Influences of pre-treatments on quality attributes of yam chips

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SUMMARY : The process conditions were optimized for the preparation of hot air dried yam chips. The effects of blanching time (0, 1, 3 and 5 min) and blanching temperature (80 and 90 °C) as well as the drying temperature (70, 80 and 90 °C) on the drying kinetics as well as various quality attributes of yam chips *viz.* colour, texture and brown pigment accumulation and organoleptic evaluation were also investigated. It was found that drying took place entirely in the falling rate period. Longer blanching time and lower drying temperature resulted in better colour retention and led to chips of lower browning index. Blanching also reduced the hardness and fracturabilty of the product. The final product showed optimum texture attributes for the blanching treatment of 90°C for 3 minutes followed by the drying process at 80°C for 480 minutes.

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Yams (*Amorphophallus* spp.) is an important tropical tuber food crop rich in starch (Akanbi *et al.,*1996; Omonigho and Ikenebomeh, 2000). They have the highest rate of dry matter production per day and are major calorie contributors. Yam have also been used as health food and herbal medicinal ingredients in traditional Chinese medicine (Liu *et al.,* 1995). Yam extracts showed significant anti oxidative activity and modified serum lipid levels in humans. Yams are used to help treat diabetes mellitus (Hikino *et al.,* 1986 and Liu *et al.,* 1995) and promote the health of women after menopause (Araghiniknam *et al.,* 1996 and Mirkin, 1994). Several biological activities, such as anti-cancer (Ravikumar *et al.,* 1979 and Sung *et al.,* 1995), anti-thrombotic (Peng *et al.,* 1996 and Hsu *et al.,* 2003), anti-viral (Aquino *et al.,* 1991), hemolytic (Hsu *et al.,* 2003 and Santos *et al.,* 1997), hypercholesterolemic (Malinow, 1985 and Sauvaire *et al.,* 1991) and hypoglycemic (Kato *et al.,* 1995) have been documented.

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Because yams are regarded as health foods and not staple, it is feasible to develop a stable form of yam products to fulfill the health food market. To overcome the perishability of fresh yam tubers, due to their high moisture content and the seasonal nature of their production yams can be processed into dried products so that it could be available round the year for consumption and conveniently used in manufacturing formulated foods or capsules and other value added products for consumption(Ajibola *et al.,*1988 and Iyota *et al.,* 2001).

Yam chips can be a popular snacks and its production can generate a competitive industry like other snack products (Garayo and Moreira, 2002). Many works have been performed to study hot air drying of yam pieces of various shapes (Krokida *et al.,* 1998; McMinn and Magee, 1996 and Wang and Brennan, 1995). Drying as one of the most common preservation methods could, therefore, be a feasible alternative for production of low-fat or fat-free yam chips with desirable colour and textural characteristics. Conventional air-drying is energy intensive and consequently cost intensive because it is a simultaneous heat and mass transfer process accompanied by phase change (Barbanti *et al.,*1994). Hot air drying is an economical mechanical system of drying in which drying of food is done by ventilating hot air through wet food sample to accomplish removal of moisture from it. In heated air drying systems hot air is ventilated through a mass of agricultural product by forced convection method. The heat of drying air provides necessary energy for