

Conservation of Onion and Tomato in Niger. Assessment of Post-harvest Losses and Drying Methods.

Diploma Thesis at the Department of Agricultural Engineering

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Abstract

Reduction of post-harvest losses of perishables is of major importance when striving for improved food security in developing countries (KADER, 2005, GOLETTI, 2003). The concern of this work was an assessment of the current situation regarding post-harvest losses of onion and tomato in Niger. With about 300000 t of yearly production, onion is the leading vegetable produced in Niger. The major part is exported to neighbouring and other West African countries, thus contributing an important share of the gross national product (GNP). With about 130000 t produced, tomato is equally important for domestic markets. Furthermore both vegetables are also consumed when traditionally sun dried, mainly as a pulverised seasoning or colouring.

The main study area was the urban agglomeration of Niamey. During the stay between the 4th of September and the 15th of December 2006 several markets in the city were visited to ascertain the origin of offered produce as well as to assess and document handling practises and losses on retail level. The latter was further broadened by conducting surveys of both, retailers and consumers. After clarifying typical marketing chains, visits of mainly onion production sites in Tabelot (Air Mountains) and tomato producing farmers around Niamey were made and documented.

Food losses could not be measured in quantity, but documenting material underlines its severity. However, large quantities of poor quality produce are still sold and consumed. Causes of losses are manifold, and include inappropriate harvesting and transport containers, bad road conditions, want of care while handling the produce, lacking proper storage facilities and means of

advisory service, and shortcomings of controlling hygienic safety throughout the marketing chain.

Traditional sun drying of onion and tomato is common in Niger. As this generally results in qualitative shortcomings of the produce (AXTELL, 2002, ADAM, 1998) qualitative analyses of sun and solar dried onion and tomato were conducted. Therefore a trial was carried out under field conditions in Niamey to compare traditionally dried produce by two different farmers, with onion and tomato dried with a natural convection dryer (Coquillage Dryer) and a forced convection dryer (Icaro Dryer), which were available on-site. At last samples of dry onion and tomato purchased on markets were analysed. Final samples were tested for residual moisture content, contamination with sand (acid non-soluble ash), and microbiological for total bacteria counts, faecal coliforms, moulds and yeasts, and anaerobic living sulphite reducing bacteria. Also the performance of the solar dryers was documented and assessed by recording data of temperature and air humidity.

Traditional drying took longer than solar drying and final produce had higher moisture contents, higher contamination levels with sand, but microbial contamination levels did not show a clear tendency. However, dry produce currently available, according to the results obtained, is very likely to be a health risk. Both solar dryers failed to produce dry onion and tomato of superior hygienic quality to traditional drying. Contamination with dirt was reduced to almost zero when using solar dryers but microbial deterioration was not prevented. The investment necessary for implementing the tested devices is not justified with such long drying times and limited capacity.

Surveys with consumers were conducted to assess their quality awareness of fresh and dry onion and tomato. Furthermore a comparative consumer survey was done to reveal potential of improved dry tomato and onion. Payment is made according to produce quality and the majority of consumers would prefer solar dried tomato. The survey could not reveal whether consumers would really pay higher prices for solar dried produce, provided that those have a better quality. The need for improved drying methods and devices became obvious, however, the challenge is to create produce of superior quality that is accepted and adopted by the consumers at the same time.