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

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Background

The West African country Niger, one of the hottest places in the world where 4/5 is covered by desert..

Approx. 300000 t of onion and 100000 t of tomato are produced in Niger per year, mainly with irrigation during the dry season. The major production regions are the Department of Tahoua and the Oases of the Aïr Mountains in the Department of Agadez.

Post-harvest loss is a “measurable quantitative and qualitative loss of a given product at any moment along the post-harvest chain” (De Lucia and Assennato, 1994) and includes the “change in the availability, edibility, wholesomeness or quality of the food that prevents it from being consumed” (FAO and UNEP, 1981). Post-harvest loss does not equal food loss necessarily (Grolleaud, unknown). According to literature estimates, about 50% of produced fruits and vegetables are lost after been harvested (FAO, 1989).

Materials and Methods

Interviews with consumers and retailers of fresh and dry onion and tomato.

Documentation of the commer-cialisation path and observations on markets in Niamey.

Preparation for traditional sun drying

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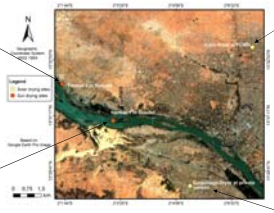
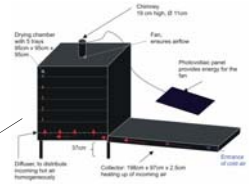
Drying Trials under field conditions in Niamey



Map of Niamey



Forced convection Dryer / Icaro Dryer

Natural convection Dryer / Coquillage Dryer

Microbiological analysis of selected samples from the drying trial and samples bought on different markets (total counts [g cfu^{-1}] of areobic mesophile bacteria, faecal coliform bacteria, yeasts and moulds, anareobic sulphite reducing bacteria), and determination of acid non-soluble ash and moisture content/water activity.

Selected Results

Harvested onion are uploaded in Tabelot

Selection of onion on the market in Niamey, part of it is dried

Fresh tomato arriving in Niamey

Tomato sold in Niamey

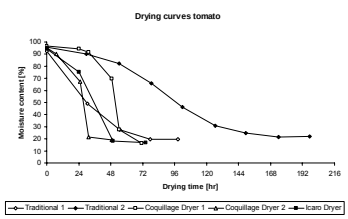
Minor quality produce is offered

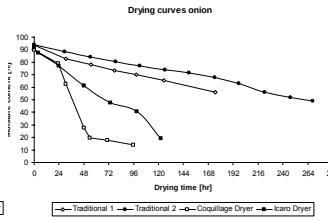
Dry onion

Dry tomato

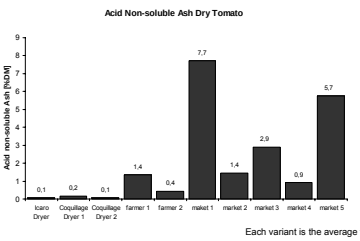
The commercialisation of onion and tomato leads to severe quality losses Yet, minor quality is still sold or dried for preservation.

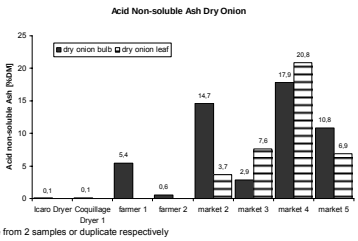
Dry onion and tomato are commonly used in the local cuisine.





None of the final moisture contents ensure a successful conservation.





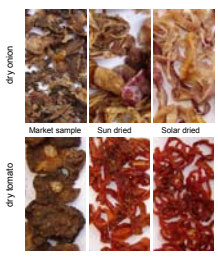
Each variant is the average from 2 samples or duplicate respectively

The use of the solar dryers reduced the contamination with dirt enormously.

Microbiological analysis confirmed the potential health risk when consuming traditionally dried onion and tomato. Particularly amounts of moulds and yeasts and faecal coliforms exceeded given limiting values. Only the dry onion made with the forced convection Dryer complied with all standards.

Conclusions

Sun drying of onion and tomato



Quantitative and qualitative losses were confirmed and their reasons are manifold, for example inappropriate harvesting practises, packaging, transportation, sorting, storage, etc. Produce of minor quality is often dried for preservation to prevent their discard.

Tested Solar Dryers could effectively reduce contamination with sand/dirt, but not exclude microbial deterioration.

Traditional sun drying as well as the used solar dryers produce dry onion and tomato with potential health risk. Thus, **the need to improve handling practices and drying technologies is necessary and urgent**. The conditions in Niger to improve the drying of perishables are favourable (climate, concentrated production, tradition to use dry vegetables etc.). However, certain obstacles need to be overcome, such as socio-economic constraints, little infrastructure, or limited innovation willingness, etc. Consumers in Niamey prefer hygienically produced and safe dry onion and tomato. Literature showed that consumers react very price sensitive (Koriko and Torrelli, 2005) and thus, low cost improvements are needed.

References

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