PRACTICE ABSTRACT nº 30

Authors: Sarra Jribi, Raouia Ghanem, Mahmoud Elyes Hamza & Faten Khamassi, *INAT*

Drying Systems: Case Study of Tomatoes

Many small-scale food producers struggle with food preservation, especially in rural areas with limited access to advanced drying technologies. The main challenge is the rapid deterioration of fruits and vegetables due to high moisture content, leading to significant post-harvest losses. Traditional drying methods, such as open-air drying, are often inefficient and unhygienic, leaving the products vulnerable to contamination, mold growth, and nutrient loss. These methods are time-consuming and do not provide consistent results, which limits the quality and shelf life of dried goods. For this purpose a Prototype of the solar dryer was developed and aims to address critical issues in food preservation, rural economic empowerment, and environmental sustainability.

Fig.1: Six photovoltaic cells for power supply

Solar Dryer

A forced convection prototype was designed. It was made of food grade stainless steel. This passive solar dryer with enhanced airflow and T° control is removable and washable. It has 6 photovoltaic cells for the production of electricity (Fig.1) and is composed by a big drying chamber with nine drying racks (Fig.2). The dryer is also equipped by blower (in a separate chamber down) to provide variable horizontal air flow and accelerate water removal as air is continuously renewed and there is air outlets through protected orifices. Air flow is adjustable and can be modified from 0 to 3.5 m.s-1.

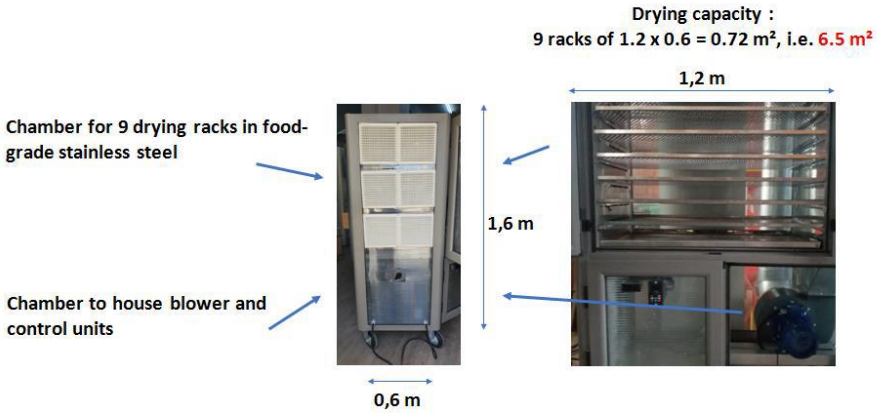

Fig.2: Different parts of the dryer

Trials on drying of tomato were conducted. These raw products have high moisture content. To reduce drying time pretreatments were applied mainly osmotic dehydration (OD) and dry salting. These pretreatments would allow a decrease in initial moisture content. In case of tomato, OD was performed using salty solution (30%+10% sucrose) during 8h. Results on drying tomatoes are shown in Table 1 & 2.

Table 1. Evolution of moisture content

Product	Applied pretreatment	Initial moisture content (%)	Obtained moisture content (%) after pretreatment	Final moisture content (%) after drying
Tomato	OD	96.58	77.56	14.32

Table 2. Some physicochemical properties of raw and dried products

Product	Rehydration capacity (g/g)	Vitamin C content (mg/100g)	Hardness (N)
Tomato	OD	96.58	77.56

FoodLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 862802. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Commission.