

Third International Conference **CONSOLFOOD2020**

Advances in Solar Thermal Food Processing

22-23-24 January 2020

INSTITUTE OF ENGINEERING; UNIVERSITY OF ALGARVE; CAMPUS DA PENHA; FARO-PORTUGAL

MATHEMATICAL MODELING OF DRYING OF NATIVE MAIZE DRYING

**Beatriz Castillo Téllez, Margarita Castillo Téllez, Martha Fabiola Martín
del Campo Solís and María de los Ángeles Camacho Ruiz**

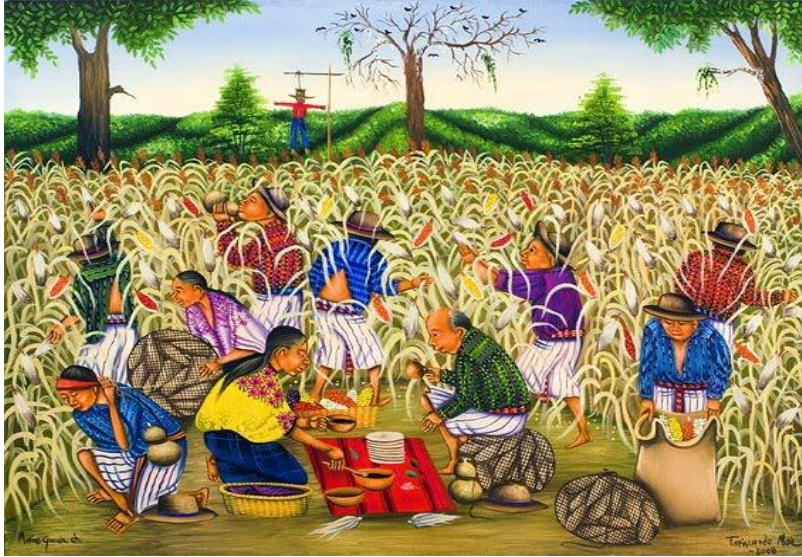
Centro Universitario del Norte, Universidad de Guadalajara



**UNIVERSIDAD DE
GUADALAJARA**
CENTRO UNIVERSITARIO DEL NORTE

CONSOLFOOD2020

Importance of corn in Mesoamerican culture



- Refreshing, digestive and gluten-free, Rich in carotenoid, manganese, phosphorus, magnesium, zinc and iron, vitamin B1, B6, B5, pantothenic acid, folic acid, provitamin A and E

In the past it was a food highly appreciated by indigenous peoples, inclusive was a reason for religious worship

Experimental design



Grinding and
alkaline
treatment

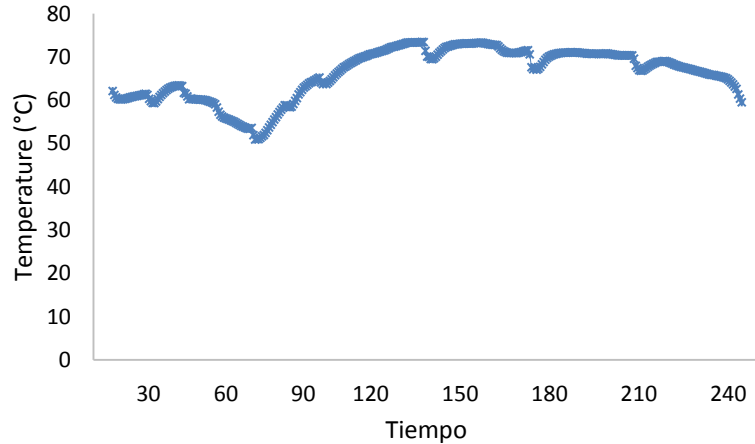
Initial moisture
measuremen,
weight.
Drying in:

- Indirect solar dryer
- Directo solar dryer
- Conventional oven at 65°



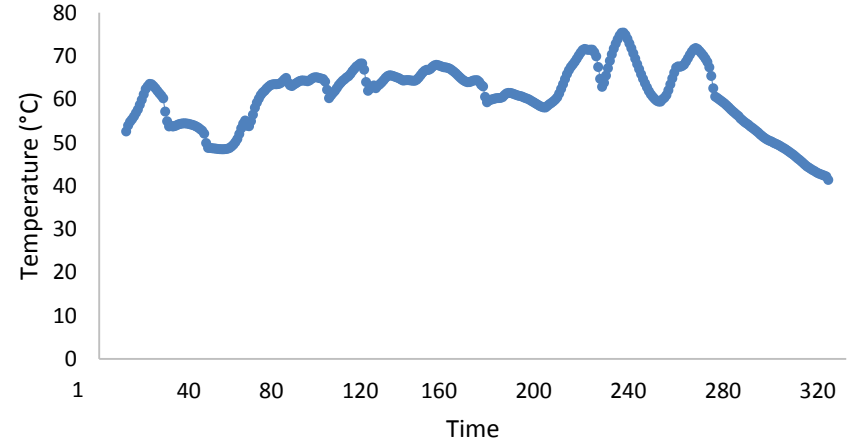
Experimental Data

Indirect Dryer



Average temperature: 66° C

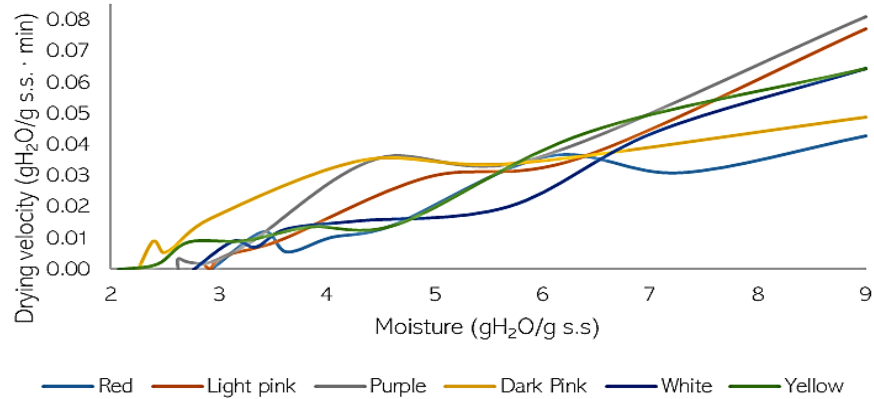
Direct Dryer



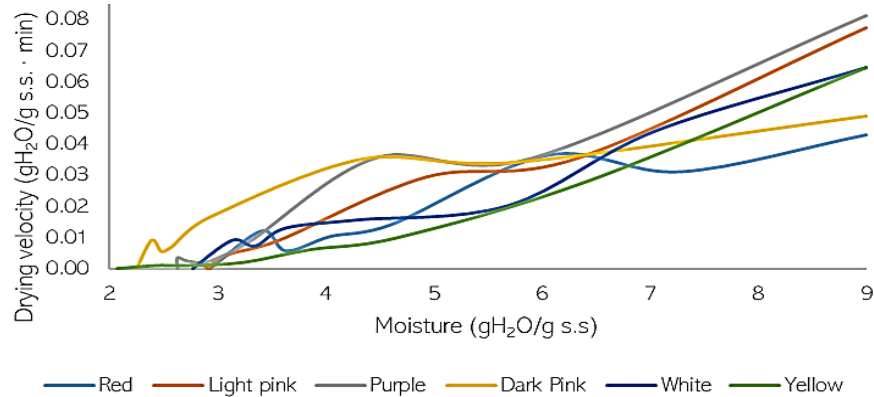
Average temperature: 62° C

Drying velocities

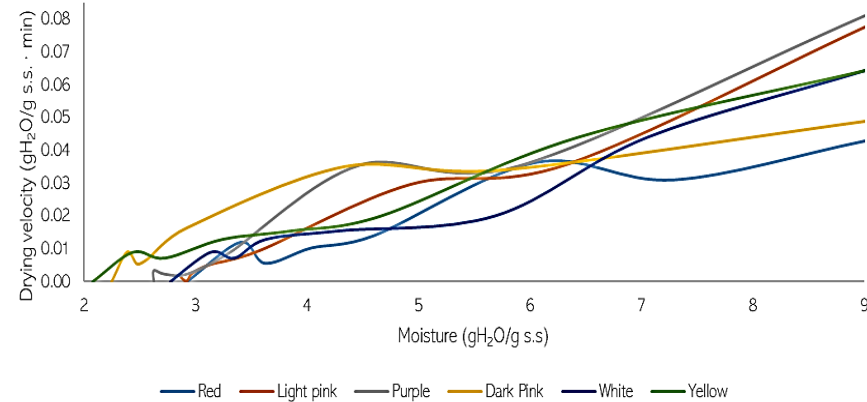
Velocity of direct drying



Drying velocity oven at 65°C



Velocity Indirect drying



Fitting models

Technology	Fitting model	R ²				
Oven at 65° C	Logaritmic	0.9921	Page	0.9912	Page Modified	0.09903
Indirect solar drying	Wang and Sing	0.9923	Page	0.9902	Page Modified	0.9892
Direct Solar Drying	Wang and Sing	0.9909	Page	0.9906	Page Modified	0.9873



Corn color

In general, the color of the maize obtained with the two solar drying technologies was preserved in the same way as using the conventional furnace with controlled conditions, as shown in the following photos.



Conclusiones

- The technical feasibility of solar drying of maize was demonstrated
- Cabinet-type solar drying achieves a significant energy economy, contributing to the reduction of the environmental impact and do not affects significantly antioxidants in native corn.



UNIVERSIDAD DE
GUADALAJARA

CENTRO UNIVERSITARIO DEL NORTE

GRACIAS