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IMPACT OF DIFFERENT DRYING TECHNIQUES ON PLUM TOMATO'S NUTRITIONAL COMPONENTS

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INTRODUCTION & AIM

One of the most widely cultivated annual commercial crops, tomatoes are frequently included in diets. According to Kumar et al. (2020), tomatoes are an excellent source of fiber, carotenes (lycopene, β-carotene), ascorbic acid, tocopherol, and phenolic compounds. Consuming tomatoes has been linked to biologically active substances that improve health and lower the risk of heart disease and cancer (Ramya, & Patel, 2019). In addition to being consumed mostly raw, tomatoes are also used to make a variety of processed goods, including juice, ketchup, sauces, and pastes. Tomatoes are a perishable and seasonal fruit that deteriorates in two to three weeks after harvest. Tomatoes are dehydrated and marketed in this state in order to extend their shelf life and increase their availability during the off-season. Products made from dried tomatoes are used as ingredients in savory dishes, sauces, and pizza toppings (Wu et al., 2022). Tomatoes are dried as a means of product preservation and extended shelf life. Even so, tomatoes that are dried naturally run the risk of being exposed to dust, rain, and high temperatures, in addition to other issues like structural cracking, bleaching, hard texture, loss of flavor and nutritional value, low capacity for rehydration, and non-enzymatic browning (Ahmed-PTPE, & LWE, 2019).

METHOD

Sample preparation

Fresh tomatoes were brought from the local market Kaduna Nigeria and were washed with clean water and were allowed to dredge for some minutes (10 to 20mins). The tomatoes that were selected for this experiment were based on the size, weight, strength and firmness in other to achieve uniformity in the samples. Plump tomatoes were selected and this is because the moisture content less compared to other types of tomatoes and their weight were measured. The experiment were carried out with 5mm tomatoes thickness at temperatures of 40^0C for heated plate and 36 ^{0}C for both sun dry and solar dryer respectively. A sharp stainless steel knife was used to cut each tomato into the thickness.

Experimental set up and procedure

Thermometer was used to calibrate the water bath to determine heat lost through the plate thickness to the tomatoes slices. This done so as to neglect the heat lost during the drying process. A aluminium plate of average diameter 1mm was place on a water bath and the samples were properly sprayed on the plate. The weight of the samples are measure using weigh balance.

Moisture content of the samples were measured at 60 min interval until constant moisture content was achieve for all the drying method.

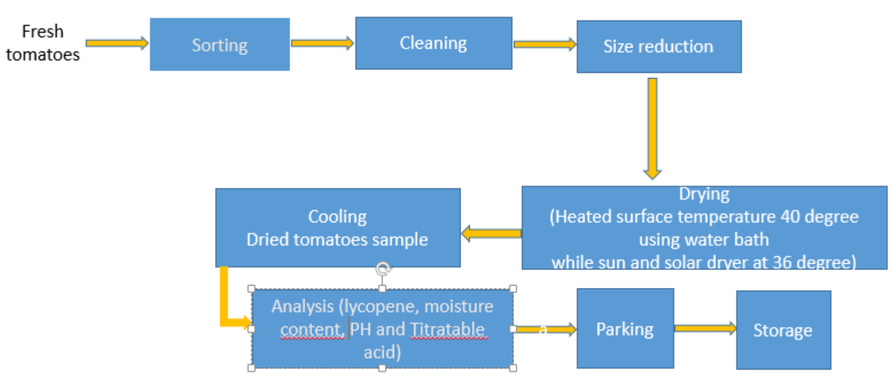

Figure 1: Graphical representation of the experimental procedure

RESULTS & DISCUSSION

Moisture, PH, and Titratable acid: The result of the moisture, PH and titratable acid of both fresh and dried tomato samples (heated plate, sun and solar dried) were presented in Table 1 below. Percentage moisture content for fresh tomato as shown in Table 1 was 93.94% which was higher in value than the dried tomato. The result confirmed the fact that the major component of fresh tomato is water as reported by FAOSTAT, 2021. % moisture content of heated plate, sun and solar dried tomato samples ranged between 13.25 to 14.97 respectively. While the titratable acid and PH for heated plate, sun and solar dried tomato samples ranged between 5.84, 5.701 and for 5.74 for titratable acid and 5, 5.4 and 5.7 for PH respectively.

Lycopene and Vitamin C: The result of the lycopene and vitamin C for dried (heated plate, sun and solar) of plum tomato samples were presented in Table 1 accordingly. Lycopene and vitamin C of fresh tomato sample in Table 1 49.26 and 0.34. Heated plate, sun and solar dried sample ranged from 52.17, 42.37 and 37.01 for lycopene and 0.41, 2.9 and 2.48 for Vitamin C respectively.

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Table 1: Evaluation of chemical, antioxidant and physical property of heated plate dried, sun-dried and solar dried plum tomato samples treated

Attributes	Fresh plum Tomato	Heated plate Sample	Sun dry Sample	Solar dry Sample
Moisture content (%)	93.94	13.25	14.21	14.97
Lycopene (mg/100g)	49.26	52.17	42.37	37.01
Ascorbic acid (Vitamin C) (g/L)	0.34	0.41	2.9	2.48
PH	4.8	5	5.4	5.7
Titratable acid	5.97	5.84	5.701	5.74

CONCLUSION

The findings demonstrated that, in comparison to the control sample, the sun-dried and solar dried sample had higher levels of pH. When compared to the control, the ascorbic acid and lycopene levels in the sun-dried and solar-dried tomato were lower. Comparing the heated plate-dried sample to the control sample, a notable rise in lycopene and ascorbic acid content was observed. The results showed that the method for maintaining the quality attributes of dried tomatoes was to use a heated plate drying method.

FUTURE WORK / REFERENCES

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