

EFFECT OF DRYING METHOD ON THE FUNCTIONAL PROPERTIES OF SOME LOCAL SPICES

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Introduction

Spices are a large group of natural ingredients such as dried seeds, fruits, roots, rhizomes, barks, leaves, flowers and other vegetative substances used in a very small quantity as food additives either as colour, aroma, flavour or preservative [1]. They are mainly used to improve the palatability/taste and the visual appearance of diets. Most Spices contain phenolic compounds that are responsible for their medicinal, antioxidant and preservative properties [2]. The three spices studied include ginger leaf, curry leaf and scent leaf dried using traditional sundried method and oven dried method. The objective of this study is to determine the functional properties of the selected spices.

Materials and Method

The spices (ginger, curry and scent leaves) were purchased from a local market in Minna, Niger State. The spices were sundried 5 h daily for 2 consecutive days and turned over at 1 h interval to achieve uniform drying. After sun drying, the sample was milled to powder form. The second sample was oven dried at a temperature of 50°C for 5 h and turned over periodically to aid uniform drying and milled to powder form. The results obtained from analysis of the functional properties were subjected to one-way ANOVA and the means were separated by Duncan Multiple Range Test using SPSS version 20.

Results and Discussion

The result of functional properties of the spices is shown in Table 1. The bulk density was in the range of 0.27 to 0.44 g/g. There was no significant difference ($p < 0.05$) in the bulk density of the samples except ginger that shows a variation between the sun dried and oven dried sample. Water absorption capacity ranged from 2.05 to 3.95 g/g. There was significant difference ($p < 0.05$) in the of the ginger and scent leaf except for curry leaf that shows no significant difference between the oven dried and the sundried sample. Oil absorption capacity ranged from 2.45 to 3.95 g/g. There was no significant difference ($p < 0.05$) in the values across the sample. Emulsion capacity was in the range of 46.56 to 55.47 %. No significant difference ($p < 0.05$) observed in the emulsion capacity of the samples. Drying of spices can be done with different method, natural and hot air drying method is widely used [3]. The slight difference recorded between the bulk density of oven dried and sun dried sample could be attributed to variation in drying process. Bulk density is an important functional property that has an implication in packaging and transportation of food materials. Lower bulk density of a given product exhibit better packaging properties than product with high bulk density [4]. The significant difference observed in the water absorption capacity of the samples is in line with the findings of Diaz-Maroto [5] who reported changes in the physical, chemical and nutritional properties of spices during drying. Water absorption capacity is the ability of a food material to absorb water [6]. Oil absorption capacity of a product helps the product to retain flavour and improve mouth feel [6]. Some differences observed in the functional properties of the spices show that method of drying affects the functionality of the spices in the food system.

Table 1: Functional properties of the spices

Samples	BD (g/ml)	WAC (g/g)	OAC (g/g)	EC (%)
Scent leaf SD	0.31 ^{cd} ± 0.00	3.95 ^a ± 0.07	3.50 ^{ab} ± 0.00	51.02 ^{ab} ± 0.47
Scent leaf OD	0.32 ^c ± 0.01	3.50 ^b ± 0.00	3.55 ^a ± 0.07	50.00 ^{ab} ± 0.00
Ginger SD	0.44 ^a ± 0.01	2.05 ^e ± 0.07	2.60 ^c ± 0.14	50.00 ^{ab} ± 0.00
Ginger OD	0.37 ^b ± 0.00	2.55 ^d ± 0.07	2.45 ^d ± 0.07	55.47 ^a ± 1.10
Curry leaf SD	0.30 ^d ± 0.00	2.90 ^c ± 0.14	3.60 ^a ± 0.00	46.56 ^c ± 0.58
Curry leaf OD	0.27 ^d ± 0.03	3.00 ^c ± 0.00	3.50 ^{ab} ± 0.00	47.59 ^c ± 0.42

Values are means ± standard deviation of duplicate determination. Values in the same column with different superscript are significantly different ($p \leq 0.05$).

SD=Sundried; OD= Oven dried

Conclusion

Sun drying and oven drying methods are effective in the processing of spices and also affect the functionality of the spices in food system. However, oven dried samples were found to exhibit better functional properties in most of the parameters investigated. Therefore, the use of oven drying method in the drying of spices is hereby recommended due to its control temperature of drying and also reduce incidence of contamination of the spices when exposed to open environment for sun drying.

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