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Research Article

INFLUENCE OF MATURITY STAGES ON SHELF LIFE OF DIFFERENT PROCESSED PRODUCTS PREPARED FROM NAGA KING CHILLI (*CAPSICUM CHINENSE* JACQ.)

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Abstract: The present experiment was carried out in the laboratory, Department of Horticulture, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema Campus during 2016-17 and 2017-18. The objective was to evaluate the influence of maturity stages on different processed products (whole dried pod, paste and powder) with 3 replications and stored at ambient condition. The results showed that, the maturity stages had significant influence on the shelf life of whole dried pod, paste and powder. For whole dried pod, the highest was recorded from turning stage and lowest from red stage. For paste and powder, the highest was recorded from red stage and lowest from matured green stage.

Keywords: *Naga King Chilli, Shelf life, Processed products, Whole dried pod, Paste, Powder*

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Introduction

Chilli is a highly perishable vegetable with high rates of water loss and decay. The fruit dehydrates, begin to turn colour and deteriorates within a few days after harvest in ambient condition [1]. Maturity at harvest is an important factor affecting quality perception and the rate of change of quality during postharvest handling [2]. Naga king chilli, botanically known as *Capsicum chinense* Jacq., is extensively grown in the north-eastern region of India, predominantly in the states of Assam, Nagaland and Manipur.

It has many ethno-medical uses for treating various ailments such as asthma, gastro intestinal, toning up body muscle, toothache, muscle pain, tender leave paste for easy removal of pus from boils, *etc* as reported by Bhagowati and Changkija, (2009) [3]. However, the fruit of Naga king chilli, despite of its immense uses and potentiality, is actually very sensitive and vulnerable that the postharvest loss is very high. Therefore, keeping in view the above problems, it was felt necessary to carry out the present investigation.

Materials and Methods

The experiment was carried out in the laboratory, Department of Horticulture, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema Campus during 2016-17 and 2017-18. Samples were collected directly from the local farmers under Dimapur district, Nagaland. The details of methodology followed in the experiment are mentioned bellow-

Experimental design: Completely Randomized Design (CRD)
Number of replications: 3(three)
Level of maturity: 3(three)
Number of processed products: 3 (three) *viz*., whole dried pod(V_1), paste(V_2) & powder(V_3)
Number of fruits/treatments: 5 (five)
Interval of observation: 30 days
Period of investigation: 2 years (2016-17 & 2017-18)

Treatment Details

Maturity stages (M)
M_1- Matured green stage
M_2-Turning (green to orange) stage
M_3-Red stage

Treatment combinations
$V_1 M_1$: Matured Green Chillies processed into whole dried pod.
$V_1 M_2$: Turning stage Chillies processed into whole dried pod.
$V_1 M_3$: Red stage Chillies processed into whole dried pod.
$V_2 M_1$: Matured Green Chillies processed into Paste.
$V_2 M_2$: Turning stage Chillies processed into Paste.
$V_2 M_3$: Red stage Chillies processed into Paste.
$V_3 M_1$: Matured Green Chillies processed into Powder.
$V_3 M_2$: Turning stage Chillies processed into Powder.
$V_3 M_3$: Red stage Chillies processed into Powder.

Observation

Shelf life (days)
Shelf life was calculated by counting the days from the date of fruit storage to the date on which the fruit become unmarketable.

Results and Discussion

Whole dried pod (V_1)
The data from the table reveals that the maturity stages had significant influence on the shelf life on all dates of observation in both the experimental years and as well as in the pooled data where the turning stage (M_2) gave the highest shelf life (166.67, 162.67 & 164.67) followed by matured green stage *i.e*., M_1 (165.0, 152.67 & 158.83) while red stage (M_3) gave the lowest shelf life (152.0, 143.67 & 147.83) respectively.

Paste (V_2)

The data from the table reveals that the maturity stages had significant influence on the shelf life of paste on all dates of observation during both the experimental years and also in the pooled data where the red stage (M_3) gave the highest shelf life (140.67, 133.33 & 137.0) followed by turning stage *i.e.*, M_2 (134.0, 126.0 & 130.0) while matured green stage M_1 gave the lowest shelf life (128.33, 122.33 & 125.33) respectively.

Powder (V_3)

The data from the table reveals that the maturity stages did not reach significance level in the first year but in the second year and pooled data it showed significant influence on the shelf life on all dates of observation where the red stage (M_3) gave the highest shelf life (186.0, 190.0 & 188.0) followed by turning stage *i.e.*, M_2 (185.0, 188.67 & 186.83) while matured green stage M_1 gave the lowest shelf life (183.33, 177.0 & 180.17) respectively.

Shelf life refers to the end of consumer acceptability, and is the time at which majority of consumers are displeased with the product [4]. Off shaped but high-quality bell pepper are available in the local market, which are non-marketable due to their appearance. This type of commodities could be subjected to minimal processing and be sold at local supermarkets as a value-added product [5] which can be achieved by developing natural paste because the thermal processing of pepper affects the physic-chemical qualities of the final product [6,7] in case of whole dried pods and powder. The data from the present study reveals that the whole dried pod developed from turning stage had highest shelf life followed by matured green stage. The lowest shelf life of red stage may be due to more dry rotting incidence which was not seen in other two stages. However, discolouration and darkening with the increase in storage time was observed in all the three products. But in case of both paste and powder the highest shelf life was recorded from red stage which may be due to better colour and aroma as compared to the other two products though discolouration and darkening was seen in all the three products because shelf life refers to the end of consumer acceptability, and is the time at which majority of consumers are displeased with the product and consumer acceptance of vegetables is highly dependent on appearance and flavour as reported by Rocha *et al.*, 2013 [8].

Fig-1 Appearance of whole dried pod of different maturity stages after 6 months

Fig-2 Appearance of paste of different maturity stages after 6 months

Fig-3 Appearance of powder of different maturity stages after 6 months

Table-1 *Influence of Maturity stages on shelf life of different processed products prepared from Naga King Chilli*

Treatments	Days		
	2016-17	2017-18	Pooled
Whole dried pod			
V_1M_1	165.00	152.67	158.83
V_1M_2	166.67	162.67	164.67
V_1M_3	152.00	143.67	147.83
SEm±	2.43	1.29	1.28
CD at 5%	8.42	4.47	4.43
Paste			
V_2M_1	128.33	122.33	125.33
V_2M_2	134.00	126.00	130.00
V_2M_3	140.67	133.33	137.00
SEm±	1.04	1.23	0.77
CD at 5%	3.59	4.26	2.66
Powder			
V_3M_1	183.33	177.00	180.17
V_3M_2	185.00	188.67	186.83
V_2M_3	186.00	190.00	188.00
SEm±	35.55	1.64	1.76
CD at 5%	NS	5.69	6.09

Application of research: The maturity stages had significant influence on the shelf life of whole dried pod, paste and powder. For whole dried pod, the highest was recorded from turning stage and lowest from red stage.

Research Category: Horticulture

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Study area / Sample Collection: Department of Horticulture, School of Agricultural Sciences and Rural Development (SASRD), Nagaland University, Medziphema, 797106

Cultivar / Variety / Breed name: Naga King Chilli (*Capsicum chinense* Jacq.)

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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