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EFFECT OF STORAGE TEMPERATURE, PACKAGING ON THE SHELF LIFE EXTENSION OF BETEL LEAVES

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ABSTRACT

Betel leaves (*Piper betle*. L) Popularly called as paan is consumed by people in Asian countries. The harvested betel leaves were sorted, packaged in bundles (100leaves/bundle) in thermocol box, Corrugated Fibre Board (CFB) box and bamboo basket (control) and stored at ambient condition. Betel leaves in different packages were observed every day for weight loss (%), spoilage (%), freshness and yellowing of leaves... The leaves were also analysed for phenols, flavonioids and antioxidants at the end of the storage period. The shelf life of the betel leaver was higher (4 days) in thermocol box and bamboo basket at ambient condition. With great freshness, no yellowing and with higher retention of antioxidants.

KEYWORDS: Betel Leaves, Thermocol Box, Bamboo Basket, Corrugated Fibre Board (CFB) Box, Shelf Life, Freshness

INTRODUCTION

Betel leaves (*piper betle. L*) Popularly called as paan is consumed by people in Asian Country. Betal leaves are used as stimulant, an antiseptic and a breath fresh. Religious importance in marriages and puja. Indian betel leaves are in great demand in several countries of the world. Leaves worth about Rupees 30-40 million are exported to European countries (Palaniappan et al. 2012)

The harvested leaves are sorted into different grades according to size; colour, texture and maturity arranged in numbers (100 numbers/bundle) and are bundled by using dried banana leaves. The leaves are subjected to spoilage due to fungal infection and dechlorophyllation. Hence there is a need for proper post harvest management of betel leaves. The research was carried out with the objectives of development of improved packages for shelf life extension of betel leaves.

METHODS

Betel leaves (cv. Hesaraghatta local) harvested in green stage by hand along with a portion of petiole. The leaves from the farmers field and transported to laboratory, sorted and graded, torn leaves and other insect damaged leaves were removed and leaves of uniform size were taken, washed, surface dried to remove the superficial moisture. The surface dried leaves were packaged in three different packages viz., Corrugated fibreboard box (CFB) of size 400mmX300mmX100mm, round thermocol box of 100mm diameter as well as in bamboo basket (control/ commercial

practice) and kept at ambient condition (Temp 29°C, RH 34%). The betel leaves in different packages were observed every day for physiological loss in weight PLW (%), spoilage (%) and moisture content (%) during storage at ambient condition. The samples were analysed for phenols (mg/100g), flavoniods (g/100g) and antioxidants FRAP (mg/100g) by using standard methods. (Ranganna, 2000)

RESULTS

The samples stored in thermocol box had longer shelf life of 5 days compared to 2 days in bamboo basket and CFB box. At the end of the storage period, the physiological loss in weight (PLW %) (57%) and spoilage (84.62%) were higher in case of CFB box as compared to bamboo basket and thermocol box which recorded PLW(%) of 15.38 and 12.3 respectively and spoilage(%) of 38.46 and 23.08 respectively (Table.1) The shelf life of the betel leaves stored in thermocol box and bamboo basket were higher than those packaged in CFB box. It may be due to insulation property of thermocol box which prevents the moisture loss to the atmosphere. The retention of moisture in the sample packaged in the thermocol box (81%) and bamboo basket (80%) were higher as compared to CFB box (40%) (Table.1) at the end of the storage period. Similarly bamboo basket also due to its biological properties had a good retention of moisture on the betel leaves. Hence betel leaves stored in these packages. The leaves packaged in these packages had no drying and withering which may be due to less moisture loss, in this way the samples stored in this thermocol box and bamboo basket had less weight loss. Similar findings were observed by Rayaguru, (2011) where storage life of betel leaves was extended by 5 days with acceptable qualities by keeping in the cold chamber.

From the table 2 it was found that the phenol content was higher (21.5mg/100g) in sample packaged in CFB box at the end of the storage period of 2 days, where as those packaged in thermocol box (12.44mg/100g) and bamboo basket (14.36mg/100g) had phenol content similar to fresh ones. At the end of the storage period the retention of antioxidants and flavonoids were higher in samples packaged in CFB box compared to those packaged in other packages. But, the samples packaged in CFB box had less shelf life of 2 days and freshness and marketable of these samples lost in 2 days as compared to those packaged in thermocol box and stored at ambient condition which retained freshness and marketable upto 5 days with less weight loss and spoilage (%).

CONCLUSIONS

Betel leaves could be stored for 4 days in thermocol box packaging at ambient condition (Temp 29°C, RH 34%) with greater freshness, no yellowing and retention of phenols flavonoids and antioxidants.

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APPENDICES

Table 1: Physiological Characters of Betel Leaves in Different Packages and Stored at Ambient Condition (Temp 29°C, RH 34%)

Treatments	Storage Period(days)	PLW (%)	Spoilage (%)	Moisture Content (%)
Initial	0	0	0	0.82
CFB Box	2	57	84.62	0.80
Bamboo Basket	2	15.38	38.46	0.80
Thermocol box	5	12.3	23.08	0.81
CD (1%)	-	1.015	0.141	NS

Table 2: Quality of Betel Leaves in Different Packages Kept at Ambient Condition (Temp 29°C, RH 34%) at the End of the Storage Period

Treatments	Phenols (mg/100g)	Flavonoids (g/100g)	Antioxidants FRAP(mg/100g)
Initial/Fresh	12.44	1.44	40.85
CFB Box	21.5	2.56	58.59
Bamboo Basket	14.36	2.56	42.55
Thermocol box	12.44	1.14	35.49
CD (1%)	0.042	0.030	0.033