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Research Article

Shelf Life Extension of Spring Roll Papers

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ABSTRACT

Primarily, the spring roll paper which is the product that used for wrapping the sugar thread before being consumed had moisture and Aw contents as 46.99% and 0.98 respectively. After three days of keeping in the room temperature, it shows the sign of microbiological perishable and uneatable. The purpose of this study is to find out the method to prolong its shelf life. Hurdle methods such as moisture content minimizing, vacuum packing and cold storage were combinedly used in this experiment. Finally, the result had shown that moisture minimizing by wind blowing for 60 mins and together with vacuum packing and keeping in the refrigerator at 12-15 °C could extend its shelf life more than 3 days with no sign of microbes.

Key words: Spring roll, Aw, hurdle, shelf life

INTRODUCTION

Roti- Saimai (Sugar thread wrapped in spring roll paper) is a typical dessert from Ayutthaya province. This kind of product is extensively sold for tourists coming to Ayutthaya and increasingly sold in the nearby provinces whereas the producers mainly situate in Ayutthaya. The products are normally packed in common plastic bags, keeping in room temperature before transferring to buyers. The spring roll papers commonly made of wheat flour, water and a little bit of salt are easily perishable because of its high moisture content and its nourishment. Normally, it shows sign of microbe within three days. The economic value of this kind of dessert is several millions bath a month. Consequently, the spoilage of this product would bring the huge economic loss. Recently, the producers add the preservatives during processing in order to prevent its spoilage. Without scientific knowledge by the producers, this could affect the consumer health. Scientifically, the methods of preservation such as chilling, drying could extend the shelf life of food. Combination of food preservation methods are used in order to extend its shelf life as well as to maintain its appearance and nutritional

value. Due to its combination, thus each method will not intense enough to ruin the appearance and nutritional value but be gentle enough to affect preservation of foods. These combination method is called hurdle technology. [2] Hurdles in foods can be kept in the optimal range, considering safety as well as quality. The objective of this experiment is to find out the way of extending the spring roll papers shelf life by hurdle technology which combined the method of storage temperature, moisture and oxygen minimizing.

Materials and Method

Material:

Freshly made spring roll papers from the most wellknown shop in Ayutthaya province “ Bung Im Ron “ were used in this experiment .

Method:

1. Sample preparation: Freshly made spring roll papers were collected from the shop and packed in common plastic bags (100 g of sample a bag).

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2. Randomly pick one sheet of spring roll paper and minimizing the moisture of each sheet by air blowing for 30 60 and 90 minutes respectively.

3. Aw content measurement and moisture content analysis of each paper above were done and comparing with the original one.

4. Keeping each of treated paper in common plastic bag and vacuum plastic bag and separately

storage in room temperature and in the refrigerator (12-15 °C)

5. Microbiological analysis (total plate count) and physical appearance observation were done in every treatments.

Results and Discussion

Aw and moisture content measurement:

Table 1: Aw and moisture content of spring roll papers

Kinds of treatment	Aw	Moisture (%)
No treat	0.98 ^a	46.99±0.58 ^a
30 mins of air blowing	0.96 ^{ad}	45.39±1.78 ^a
60 mins of air blowing	0.95 ^{bd}	37.78±1.10 ^{bc}
90 mins of air blowing	0.94 ^{cd}	32.65±2.10 ^d

The spring roll papers originally contains 46.99% moisture content and Aw as 0.98 which is suitable for microbial growth and cause the reduction of its shelf life. Air blowing for 60 mins and 90 mins could significantly minimize its Aw and moisture

content when comparing with the original one. Therefore, these 2 kinds of blowing methods were chosen for further experiments.

Total plate count of treated spring roll papers:

Table 2: Total plate count number of the treated spring roll papers with 60 and 90 mins air blown, packed within common plastic bag, vacuum bag and then further kept in room temperature (35 °C) and the refrigerator (12-15 °C)

Time of air blowing	Common plastic bag (cfu /g)		Vacuum plastic bag (cfu /g)	
	Room temp.	Refrig.temp	Room temp.	Refrig.temp
60 mins	2.70 x 10 ³	2.0 x 10 ³	1.85 x 10 ³	< 10 ²
90 mins	2.50 x 10 ³	1.5 x 10 ³	1.0x 10 ³	< 10 ²

As shown in Table 2, the total plate count (TPC) number of spring roll paper treated by 60 mins air blown and kept in common plastic bag at room temperature was the most when comparing with all treated sample. The lower the storage temperature, the less the TPC number existed. When comparing between the type of packagings, the sample in vacuum plastic bag show less TPC number. The same trends was also shown as in the sample treated by 90 mins air blowing, but its TPC number with all

treats (both types of packagings and storage temperature) were lower than the 60 mins one. However, the least TPC number in this experiment is less than 10² cfu / g, thus the recommended method of shelf life extending would be treating with 60 mins air blown then packing in vacuum plastic bag and following with refrigeration temperature storage. Within three days of keeping , the microbes were invisible when comparing with the control one (untreated sample) as shown in Fig 1 and 2 below.



Fig. 1: The untreated sample after 3 three days of keeping in common plastic bag.



Fig. 2: The treated sample with 60 mins air blown , vacuum packed and 3 days of refrigeration storage.

This could be explained that the disturbance of the homeostasis of microorganisms is the key phenomenon of food preservation and microbial stress reactions may complicate food preservation, whereas the metabolic exhaustion of microorganisms present instable hurdle technology food could foster food preservation [2]. Thus, combination food preservation such as moisture content minimizing by 60 mins air blown and vacuum packed followed by refrigeration storage could extend shelf life more than 3 days. This treated sample gave the same result as the 90 mins air blown treated sample but by energy saving, the method of 60 mins will be chosen.

Conclusion:

Combination method of food preservation such as moisture minimizing by 60 mins air blown, vacuum packed and refrigerator storage that applied to the spring roll papers could extend shelf life for more than 3 days. This was judged only by the physical appearance and the TPC number.

Nevertheless, this is the preliminary experiment that its further study is needed such as the possibility of anaerobe microorganism growth and whether the sterile of air blowing should be used or not. Therefore, these hurdle methods will be effective for this kind of product.

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