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Effect of Modified Starch, Mtr-79 and Tocopherol to Fresh Spring Roll Production and Storage

Nguyen Phuoc Minh*
Tra Vinh University, Vietnam
*Corresponding Author E-mail: dr.nguyenphuocminh@gmail.com

ABSTRACT

Spring rolls are a large variety of filled, rolled appetizers. Fresh spring rolls are packed with shrimp and crisp colorful vegetables such as carrot, bell pepper and cucumber. Fresh ginger and lime juice contribute to the flavor of the dipping sauce. In this reseach, we focus on investigation the effect of modified starch, MTR-79 and tocopherol to the quality and shelf-life of fresh spring roll during processing and preserving. Our results show that modidified starch 0.2%, MTR-79 0.6%, starch incubation time 12 hours and tocopherol 0.15% are adaptable for production and preservation of the fresh spring roll.

Keywords: *Fresh spring roll, modified starch, MTR-79, tocopherol*

INTRODUCTION

Fresh spring rolls are a Vietnamese delicacy known as Goi Cuon. Depending on region, salad rolls were made differently. Some vegetarian families make vegetarian spring rolls rather than meat spring rolls. However, the typical ingredients include slivers of cooked pork, shrimp, sometimes chicken or tofu, fresh herbs like basil and cilantro, lettuce, cucumbers, sometimes fresh garlic chives, rice vermicelli, all wrapped in moistened rice paper. Fresh Vietnamese spring rolls can be made at home or found at Vietnamese restaurants and some grocery stores. They are served at room temperature with dipping sauce. Peanut sauce is common dipping sauce.

Starch or amylum is a polysaccharide carbohydrate consisting of a large number of glucose units joined together by glycosidic bonds. Starch is produced by all green plants as an energy store and is a important energy source for humans. Several studies have been carried out on the potential use of modified starches as texture improver in the food industry[1]. It can provide crispness of crackers and biscuits, viscosity breakdown resistant for can foods, desired chewiness for certain foods and improvement in the quality of extruded products. Bread crumb prepared with phosphorylated cross-linked tapioca starch has a dry feel, whereas bread that was produced from flour substituted with native, hydroxypropylated and acetylated tapioca starches have a tacky texture[4,5]. Cross-linked cornstarches (CLCSs) and vital gluten had been used to substitute 5-15% of wheat flour in bread making[3]. While Hung, Maeda & Morita[4] explained that recent advance of starch synthesis products of waxy wheat flour (WWF) and high-amylose wheat flour (HAWF) provide the unique starch functional properties required in breadmaking. By incorporating the modified starch into the dough composition and by controlling the water absorption index of the starch-based materials, snacks can have a high degree of mouth melt, less waxiness, improved texture and increased crispiness[6]. The effect of various starch types (amylomaize, corn, waxymaize, pre-gelatinized tapioca) on quality attributes (texture, moisture content, oil content, color, coating pick up, cooking yield, volume and porosity) of deep-fat fried chicken nuggets were studied by Altunakar, Sahin & Sumnu[2].

The “Phosphate” time should have already been passed, white “Non-Phosphate” has come to be the close attention by seafood processors.

"MTR-79" is the best alternative among "non-phosphate" because "MTR-79" could show the benefit difference ; moreover "MTR- 79" is provided in very easy and convenient usage application. "MTR-79" has become the better alternative for all kinds of Seafood Industry Processing. "MTR-79" provides the same chemical reaction as polyphosphate in frozen seafood industry, however it gives you the significant advantage concerning about phosphate residue in finished products. Meanwhile, after repeated and thorough trials, the results proved that "MTR-79" is far more efficiency than Phosphate compound by Improving taste, Preserving appearance, Preserving color/texture and the most important benefit is increasing more yield.

Vitamin E is the collective term for a family of chemical substances that are structurally related to alpha-tocopherol. Lipid oxidation is one of the major problems affecting the shelf life of fatty foods. Tocopherols are sometimes used as a food preservative to prevent oils from going rancid, and in liquid castile soap made from coconut, olive, jojoba or hemp oil. Commercial products are typically loaded with tocopherol to allow them to remain fresh during the long span between the time of manufacture and the time the customer finishes using it. Tocopherol extends the longevity of the products and help keep them free from bacteria.

The main purpose of this research is to investigate the effect of modified starch, MTR-79 and tocopherol to the quality and shelf-life of fresh spring roll during processing and preserving.

MATERIAL AND METHOD

Material

Shrimp, carrot, bell pepper and cucumber are purchased in local market in fresh and clean appearance. Modified starch, MTR-79 and tocopherol are supplied from Van Dai Phat Co. Ltd, HCMC, Vietnam.

Research method

In this research, we examine the effect of modified starch and MTR-79 to the elasticity, stickness of the fresh spring roll; effect of the starch incubation time to effectiness, flavor and aroma of the product; and effect of tocopherol to product shelf-life.

Experiment #1: Effect of modified starch, and MTR-79 to the elasticity, stickness and softness of the fresh spring roll. This experiment is randomly designed with 2 factors and 3 replications. Factor A: modified starch, A1 (0%), A2 (0.1%), A3 (0.2%), A4 (0.3%). Factor B: MTR-79, B1 (0%), B2 (0.2%), B3 (0.4%), B4 (0.6%).

Experiment #2: Effect of the starch incubation time to effectiness, flavor and aroma of the product. This experiment is randomly designed with 1 factor and 3 replications. Factor C: starch incubation time, C1 (6 hours), C2 (8 hours), C3 (10 hours), C4 (12 hours), C5 (14 hours).

Experiment #3: Effect of tocopherol to product shelf-life. This experiment is randomly designed with 1 factor and 3 replications. Factor D: tocopherol concentration, D1 (0.05%), D2 (0.075%), D3 (0.1%), D4 (0.15%).

Testing

Elasticity and stickness of fresh spring rolls are checked by Rheo-tex equipment. Aroma and flavour are evaluated by numbering. Economic effectiveness is counted by quantity. Shelf-life is monitored by day.

Statistical analysis

All data are processeed by ANOVA, Statgraphics.

RESULT & DISCUSSION

Effect of modified starch, and MTR-79 to the elasticity, stickness and softness of the fresh spring roll

Table 1. Effect of modified starch, and MTR-79 to the stickness of the fresh spring roll

Sample	Root	Average score
1	A3B1	2.3[a]
2	A4B1	2.4[a]
3	A2B1	2.4[a]
4	A1B1	2.5[ab]
5	A4B2	3.0[bc]
6	A2B2	3.1[cd]
7	A1B2	3.1[cd]
8	A3B2	3.3[cde]
9	A2B3	3.4[cdef]
10	A3B3	3.5[cdef]
11	A1B3	3.6[def]
12	A2B4	3.8[ef]
13	A4B3	3.9[f]
14	A1B4	3.9[f]
15	A4B4	4.7[g]
16	A3B4	4.8[g]

Fig. 1: Sensory score of fresh spring roll by stickness

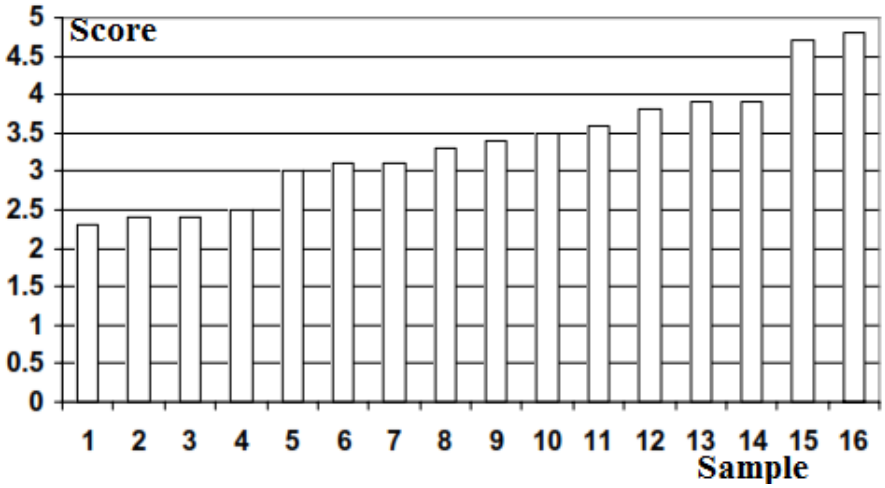


Table 2. Effect of modified starch, and MTR-79 to the elasticity of the fresh spring roll

Sample	Root	Average score (g force)
1	A4B4	442.9[a]
2	A4B3	444.5[a]
3	A4B2	445.8[a]
4	A4B1	447.0[a]
5	A3B4	449.3[a]
6	A3B3	534.0[b]
7	A3B1	610.0[c]
8	A3B2	610.8[c]
9	A2B4	830.4[d]
10	A2B3	836.9[d]
11	A2B2	843.9[d]
12	A2B1	859.0[d]
13	A1B1	1288.3[e]

Fig. 2: Sensory score of fresh spring roll by elasticity

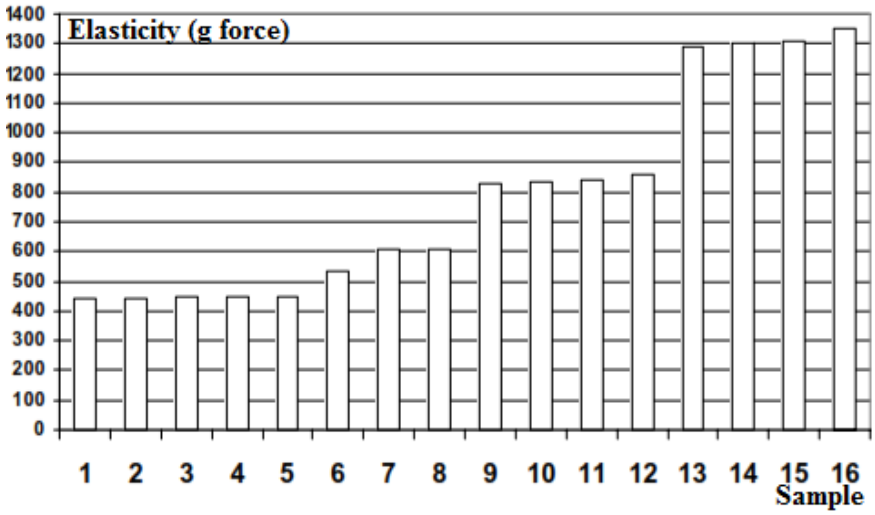
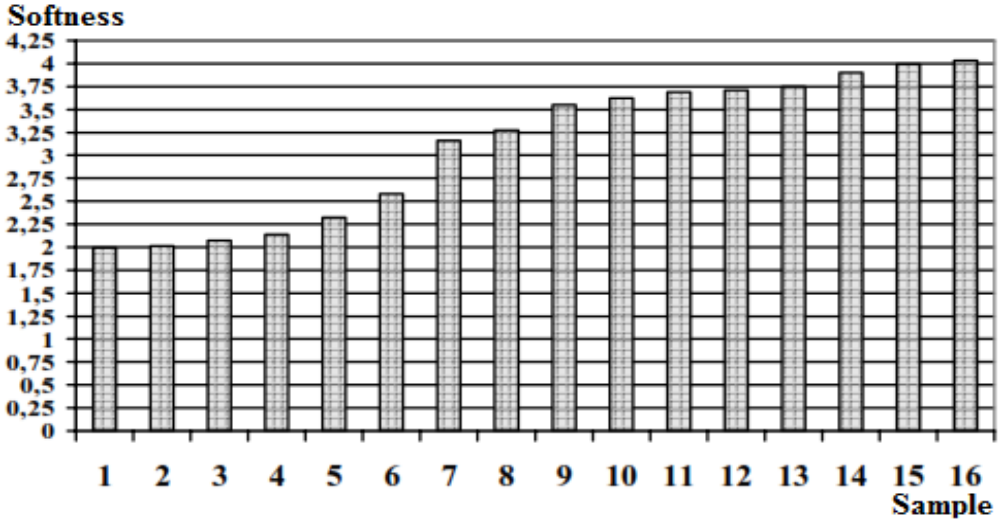


Table 3. Effect of modified starch, and MTR-79 to the elasticity of the fresh spring roll

Sample	Root	Average score
1	A1B1	1.99[a]
2	A1B2	2.01[ab]
3	A1B3	2.07[ab]
4	A1B4	2.14[b]
5	A2B1	2.32[c]
6	A2B2	2.58[d]
7	A3B1	3.16[e]
8	A4B1	3.27[e]
9	A3B2	3.55[f]
10	A2B3	3.62[fg]
11	A3B3	3.69[g]

Fig. 3: Sensory score of fresh spring roll by softness



From above results, we choose A3B4 modified starch at 0.2% and MTR-79 at 0.6% for further research.

Effect of the starch incubation time to economic effectiness, flavor and aroma of the fresh spring roll

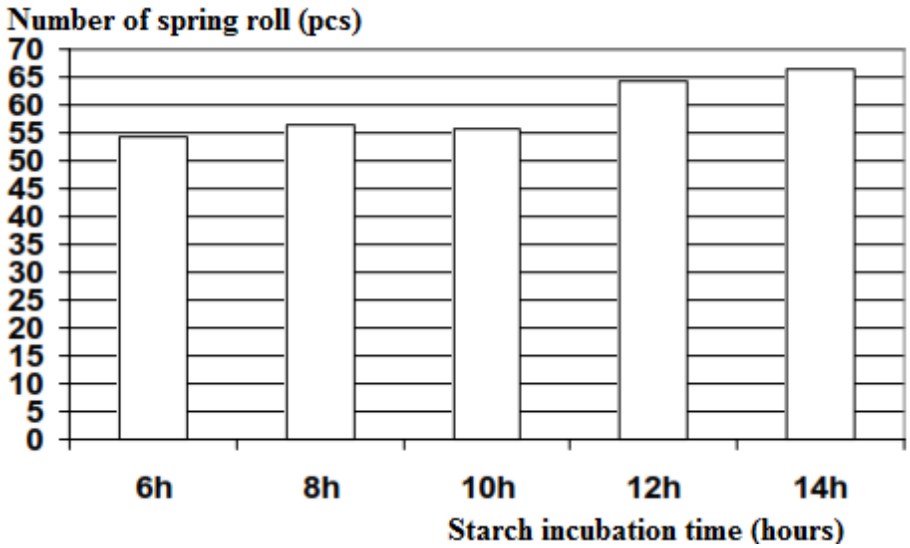
Table 4. Effect of the starch incubation time to aroma of the fresh spring roll

Starch incubation time (hours)	Average score
14	3.0[a]
06	4.2[b]
12	4.2[b]
08	4.3[b]
10	4.4[b]

Table 5. Effect of the starch incubation time to the economic effectiveness of the fresh spring roll

Number of spring roll (pcs)	
Starch incubation time (hours)	**Average**
06	54.3[a]
08	55.8[a]
10	56.5[a]
12	64.2[b]
14	66.5[b]

Fig. 4: Number of fresh spring roll by starch incubation time



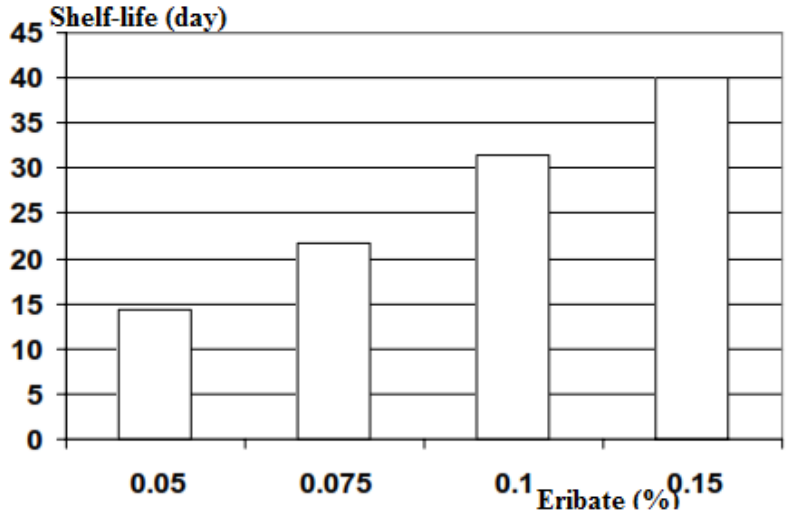
From above results, we see that 4 hours of starch incubation time showing the highest quantity. So we choose this parameter for further application.

Effect of tocopherol concentration to the shelf-life of fresh spring roll

Table 6. Effect of tocopherol concentration to the shelf-life of fresh spring roll

Shelf-life (day)	
Tocopherol (%)	**Average**
0.05	14.3[a]
0.75	21.7[b]
0.1	31.4[c]
0.15	40.0[d]

Fig. 5: Shelf-life of the fresh spring roll by tocopherol concentration



We notice that 0.15% tocopherol is appropriate for preservation and food safety.

CONCLUSION

Light, healthy and utterly fresh-tasting, spring rolls are fun fast food--fast to make and fun to eat. Casual and convenient, they can start or make a meal. They're best eaten as soon as assembled but may be made ahead and refrigerated in an airtight container.

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