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EDITORIAL

It is my proud privilege to welcome you all to the Academics World International Conference at Los Angeles, USA. I am happy to see the papers from all part of the world and some of the best paper published in this proceedings. This proceeding brings out the various Research papers from diverse areas of Science, Engineering, Technology and Management. This platform is intended to provide a platform for researchers, educators and professionals to present their discoveries and innovative practice and to explore future trends and applications in the field Science and Engineering. However, this conference will also provide a forum for dissemination of knowledge on both theoretical and applied research on the above said area with an ultimate aim to bridge the gap between these coherent disciplines of knowledge. Thus the forum accelerates the trend of development of technology for next generation. Our goal is to make the Conference proceedings useful and interesting to audiences involved in research in these areas, as well as to those involved in design, implementation and operation, to achieve the goal.

I once again give thanks to the Academics World, Institute of Research and Journals & The IIER for organizing this event in Los Angeles, USA. I am sure the contributions by the authors shall add value to the research community. I also thank all the International Advisory members and Reviewers for making this event a Successful one.

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EFFECT OF DRIED PUMPKIN POWDER ON PHYSICAL, CHEMICAL, AND SENSORY PROPERTIES OF NOODLE

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Abstract- The objective of this study was to substitute wheat flour with dried pumpkin powder in the process of noodle production. Experiments of this research were performed with different kinds of dryer and different levels of temperature (a tray dryer (75°C), single and double drum dryer (120°C and 130°C)). The result showed that drying temperature and drying method affect qualities of pumpkin powder. Using a double drum dryer at 130°C in order to dry pumpkin powder, this drying method has better qualities (color, moisture content and water activity) than other methods. Chemical compositions of pumpkin powder, 0.38 of water activity, 5.70 g/100g of moisture content, 4.63 g/100g of fat, 9.65 g/100g of protein, 2.96 g/100g of ash, 77.06 g/100g of carbohydrate and 11,093.66 µg/100 of beta-carotene. Substitution of wheat flour with dried pumpkin powder in noodle was prepared at different amounts of wheat flour to pumpkin powder (0, 10, 20 and 30% w/w). Apparently, it was found that the large quantities of dried pumpkin powder could affect physical, chemical and sensory characteristics of noodle. Ash content of noodle was increased when adding dried pumpkin powder and it increased the mineral in the noodle. Color of dried pumpkin powder noodle was lower in lightness, higher in redness and yellowness than the control sample. Cooking quality was changed when adding dried pumpkin powder, the cooking time decreased whereas cooking loss and water absorption increased. The noodle with dried pumpkin powder had higher hardness and lower elasticity (tensile strength and breaking length) than the noodle without dried pumpkin powder. The optimal level at 20% substitution of wheat flour with dried pumpkin powder gave the sensory score overall acceptability. It is not different from the control sample.

Keywords- Dried Pumpkin Powder, Noodle, Noodle Characteristic, Texture, Sensory.

I. INTRODUCTION

Pumpkin (*Cucurbita moschata*) is an important vegetable because of its nutritional values and health benefits. It is a rich source of carotenoids, water soluble vitamins, phenolics, flavonoids, polysaccharides, mineral salts, and vitamins. All is beneficial for health [1][2][3]. The consumption of carotenoids (α - and β - carotene) indicated reducing the risk of degenerative and cardiovascular diseases, cataracts, and certain types of carcinomas [4]. Pumpkin is the source of insoluble dietary fiber. Pumpkin flour contains 40% cellulose, 4.3% hemicellulose, and 4.3% lignin [5]. Moreover, pumpkin contains the high level of water (96%) that can be easily spoiled [6]. Drying is a method that used to remove moisture from food for preventing microbial spoilage and deteriorated reactions. It improves quality of food preservation and reduces the weight of food for transportation and storage [7].

Wheat noodle is the main wheat product in Asian food with almost 40% of wheat in Asia are consumed in the form of noodle [8]. The replacement of wheat flour with other ingredients such as wheat bran, difference cereal starches (waxy and non-waxy rice starches, waxy wheat starch and waxy corn starch) and Riceberry flour in noodle affected noodle qualities including chemical physical and sensory qualities. [9][10][11]. The previous study shows that the partial replacement of corn flour with pumpkin flour affected cooking yield, texture properties and sensory attributes in gluten free pasta. The moisture content, ash, cooking yield and the redness (a^*) were

increased by partial replacement of pumpkin flour in the pasta. The addition of 25% pumpkin flour led to the improvement of colour, texture and sensory properties [12]. The aim of this study was to investigate the influence of addition dried pumpkin powder on chemical, physical, cooking, and sensory characteristics of wheat noodle.

II. DETAILS EXPERIMENTAL

2.1. Dried Pumpkin Powder Preparation

Pumpkin was obtained from a local market in Bangkok, Thailand. The pumpkin fruit was peeled, removed seed, washed, cut into cubes of 0.5 cm size, blanched in hot water for 5 min, and ground in blender (Moulinex, DPA141, USA). The ground pumpkin was dried with different types of dryers and levels of temperature. The samples were dried with tray dryer at 75°C, single-drum dryer at 120, 130°C and double-drum dryer at 120, 130°C. The dried pumpkins were ground into powder and sieved through a 60-mesh screen. The dried pumpkin powder was kept in seal plastic bag at room temperature for further investigation.

2.2. Noodle Preparation

Noodle formulation based on 100 g wheat flour consisted of water (50 ml), salt (1 g), sodium carbonate (1 g). The dried pumpkin powder that the best quality with the drying method from 2.1 was substituted for the wheat flour, four levels of substitutions at 0, 10, 20 and 30% w/w. The ingredients were mixed by a Kitchen Aid food

processor (Kitchen Aid, USA), followed by hand kneading. The dough was sheeted and cut into noodle strands with 2 mm in width × 1 mm in thickness by noodle-making machine.

2.3. Chemical Analysis

Moisture, fat, protein, ash, carbohydrate, and β -carotene contents of dried pumpkin powder and noodle were determined according to the AOAC methods [13]. Water activity (a_w) was determined using a thermoconstanter (Novasina TH 200, Switzerland) at 25°C.

2.4. Color

Color of uncooked and cooked noodles was measured by using a spectrophotometer (Hunter Lab. Color Quest XE, USA) equipped with a light source illuminant D65 and 10° for observing. CIELAB system: L^* (lightness-darkness), a^* (redness-greenness) and b^* (yellowness-blueness) values were measured.

2.5. Cooking Properties of Noodle

Cooking time of noodle was determined as described by [14]. Noodle (10g) was cooked in 200 ml of boiling distilled water until disappearance of core as judged by squeezing between two glass slides. Cooked noodle was rinsed with cold water and drained for 1 min. and immediately weighed. Cooking water after determining cooking time was evaporated and dried at 105°C to constant weight. Cooking loss and water absorption were measured according to the AACC method [15] with some modification. Cooking loss (%) and water absorption (%) were calculated as follows equation of [16].

Cooking loss (%) = (Weight of dried residue in cooking water/ Weight of uncooked noodle) × 100

Water absorption (%) = ((Weight of cooked noodle - Weight of uncooked noodle)/Weight of uncooked noodle) × 100

2.6. Texture Measurement

The texture characteristics of noodle were measured by using a texture analyzer (Lloyd Instrument, TA plus, UK). Noodle dough was evaluated by texture profile analyses (TPA), compressed to 50% of original height at test speed of 50 mm/min, using cylinder probe (3.5 cm diameter) with a 1 kN load cell. The parameters were obtained hardness (N), cohesiveness, springiness index, chewiness (kgf). Uncooked and cooked Noodles strand was determined tensile strength (maximum force; N) and breaking length (distance at maximum force; mm) according to the method of Sirichokwarakit et al. [11].

2.7. Sensory Evaluation

The sensory evaluation of noodle was evaluated by a 30 panels, they are faculty members, students and staff members of Suan Sunandha Rajabhat University. Six sensory attributes were evaluated (color, odor, softness, stickiness, taste, and overall

acceptability) using a 9-point Hedonic scale (1=extremely poor and 9=excellent).

2.8. Statistical Analysis

All experiments and analytical measurements were done in triplicate. All data were processed by using the analysis of variance (ANOVA). The level of statistical significance is $p \leq 0.05$.

III. RESULTS AND DISCUSSION

3.1. Physical and Chemical Properties of Dried Pumpkin Powder

The physico-chemical properties of pumpkin powder were shown in Table 1. The results show that pumpkin powder drying with double-drum dryer at 130°C has highest in lightness and yellowness. Pumpkin powder that dried with tray dryer at 75°C had lowest in lightness and yellowness but highest in redness.

Table 1: Physico-chemical Properties of Dried Pumpkin Powder

Drying method	color			Moisture (g/100g)	Water activity (a_w)
	L^*	a^*	b^*		
Fresh pumpkin	56.58 ^a	5.72 ^b	59.55 ^a	93.40 ^a	0.98 ^a
Tray dryer (75°C)	46.30 ^c	9.00 ^a	33.45 ^c	3.82 ^c	0.42 ^c
Single-drum dryer (120°C)	65.63 ^b	4.5 ^c	61.70 ^b	10.96 ^b	0.56 ^b
Single-drum dryer (130°C)	64.22 ^b	4.93 ^c	61.66 ^b	9.89 ^b	0.53 ^b
Double-drum dryer (120°C)	71.41 ^a	3.26 ^d	60.80 ^b	7.92 ^b	0.47 ^b
Double-drum dryer (130°C)	72.03 ^a	3.94 ^d	64.25 ^b	5.70 ^b	0.38 ^b

Mean in the same column with different letters are significantly different ($p \leq 0.05$)

Moisture content and water activity of pumpkin powder with drying double-drum dryer at 130°C had the lowest and pumpkin powder with drying single-drum dryer at 120°C had the highest. Drying with hot air in tray drier using long time causes maillard reaction that gives browned pumpkin powder resulting decreased in lightness and yellowness. However, drying with double-drum dryer at 130°C is a high temperature short time that still light-yellow pumpkin powder and more evaporated water in pumpkin than other drying methods. Moisture, fat, protein, ash, carbohydrate, and β -carotene content of dried pumpkin powder at 130°C were 5.70 g/100g, 4.63 g/100g, 9.65 g/100g, 2.96 g/100g, 77.06 g/100g and 11.093.66 μ g/100g, respectively.

3.2. Chemical Composition of Noodle

The proximate composition of breads added with different levels (0, 10, 20, and 30%) of dried pumpkin powder is presented in Table 2. Noodle made of 30% dried pumpkin powder addition had the highest

moisture, fat and ash content. The high levels of ash content in noodle that improve mineral content of this product. However, addition of dried pumpkin powder was decreased the amount of protein and carbohydrate due to the dried pumpkin powder had 9.65 g/100g protein that lower than wheat flour that had 11.87 g/100g protein [11].

Table 2: Chemical Composition of Noodle

Chemical composition (g/100g)	Dried pumpkin powder level (%)			
	Control (0)	10	20	30
Moisture	39.94 ^a	39.58 ^a	39.59 ^a	40.07 ^a
Fat	0.99 ^a	1.13 ^a	1.51 ^a	1.78 ^a
Protein	8.25 ^a	7.83 ^a	7.96 ^a	7.81 ^a
Ash	1.59 ^a	1.73 ^a	1.86 ^a	2.05 ^a
Carbohydrate	49.23 ^a	49.73 ^a	49.08 ^a	48.29 ^a

Mean in the same row with different letters are significantly different ($p \leq 0.05$)

3.3. Color of Noodle

The values of color, lightness (L^*), redness (a^*) and yellowness (b^*) measured in the uncooked and cooked noodle were shown in Table 3. The results indicated that L^* , a^* and b^* values were significantly ($p \leq 0.05$) affected by the addition of dried pumpkin powder. The lightness (L^*) of noodle decreased but the redness (a^*) and yellowness (b^*) increased when addition dried pumpkin powder. Noodle with 30% of dried pumpkin powder added had the lowest value of lightness which means that the addition of dried pumpkin powder resulted a darker-colored product. Dried pumpkin powder addition affected to increased redness (a^*) and yellowness (b^*) in noodle when compared with the control due to β -carotene from dried pumpkin powder.

Table 3: Color of Uncooked and Cooked Noodle

Color parameters	Dried pumpkin powder level (%)			
	Control (0)	10	20	30
Uncooked				
L^*	71.96 ^a	63.62 ^b	61.22 ^b	58.42 ^d
a^*	-1.58 ^d	0.79 ^c	4.66 ^b	6.45 ^a
b^*	58.32 ^b	59.45 ^b	62.89 ^a	61.44 ^a
Cooked				
L^*	65.58 ^a	55.56 ^c	55.83 ^c	56.90 ^b
a^*	-1.50 ^d	-0.13 ^c	-0.43 ^c	1.98 ^a
b^*	16.07 ^d	40.21 ^a	46.92 ^b	51.46 ^a

Mean in the same row with different letters are significantly different ($p \leq 0.05$)

3.4. Cooking Properties of Noodle

The cooking properties of noodle prepared from different levels of dried pumpkin powder are shown in Table 4. The cooking parameters of cooking time, cooking loss, and water absorption were measured for different concentration of dried pumpkin powder. A high quality of noodle is supposed to have short cooking time and small amount of solid loss in cooking water [14].

Table 4: Cooking properties of Noodle Dough Different Amount of Dried Pumpkin Powder

Cooking parameters	Dried pumpkin powder level (%)			
	Control (0)	10	20	30
Cooking time (min)	4.11 ^a	3.68 ^b	3.57 ^b	3.46 ^b
Cooking loss (%)	9.09 ^a	10.43 ^a	11.73 ^a	14.67 ^a
Water absorption (%)	124.71 ^a	124.27 ^a	129.32 ^a	132.47 ^a

Mean in the same row with different letters are significantly different ($p \leq 0.05$)

The cooking time for all dried pumpkin powder substituted noodle was significantly shorter than control sample ($p \leq 0.05$). Noodle with 30% dried pumpkin powder had lowest in cooking time and highest in cooking loss and water absorption. That may cause discontinuity in gluten network because ingredients other wheat flour [17], resulting in the fast moisture penetration therefore leading to decreased optimum cooking time [14]. Cooking loss for dried pumpkin powder noodle was higher than control sample, the cooking loss increased with additional dried pumpkin powder for 10, 20 and 30%, respectively. The addition of non-gluten flour had weakened the gluten strength and interrupted the overall structure of the noodle. This describes the increasing of cooking loss from noodle into the cooking water [18].

3.5. Texture characteristics of uncooked and cooked noodle

Textural profile analysis of noodle dough with different amount of dried pumpkin powder is shown in Table 5. Addition of dried pumpkin powder gave the texture values in hardness and chewiness increased however cohesiveness and springiness index trend to decrease. The hardness of noodle dough increased as the amount of dried pumpkin powder significantly increased ($p \leq 0.05$). Noodle dough with 30% of dried pumpkin powder had the highest hardness. In this study value of hardness correlated with water absorption as a result noodle

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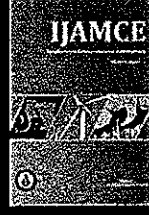
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