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Physical Properties of Direct Expansion Extruded Snack in Utilization from Thai Brown Rice

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ABSTRACT

Thai brown rice from two varieties (Patumthani 1 and Supanburi 1) were investigated for basic raw materials in the production of direct expansion extruded snack by twin screw extruder at varying feed moisture (13, 15 and 17%) and screw speed (250, 300 and 350 rpm) in a 3 × 3 factorial in randomized complete block design. Results indicated that main factor (feed moisture or screw speed) had significant effect on physical properties of extrudates by showing that reducing feed moisture or increasing screw speed provided more expandable extrudate with higher expansion ratio, lower bulk density, higher water solubility index and broad peak in texture measurements, which similar results in both varieties of brown rice. The appropriate brown rice extruded snack which operating at 13% feed moisture and 350 rpm screw speed achieved acceptable product with nutritious in pattern of nutrition labeling.

Key words: extruded snack, brown rice, physical properties

INTRODUCTION

Due to promotion for eating brown rice instead of polished rice enhance good consuming behavior of Thais. Beside of high nutritive value of brown rice, it is also important Thai agricultural raw materials in nowadays. Therefore promotion of Thai brown rice by giving them value added and more diverse in food production is the main objective of this research work. Moreover, snack food processing in Thailand has high potential for the growth of food market continuously every year. For example, snack food market in the year 2000 has high value about 10,000 million bath or 58,000 tons and the average growth rate per year is approximately 30% (Sirima, 2001). Furthermore, extrusion system is suitable for production of snack products in the aspects of giving expandable structure to get crisp texture, attractive shape, high productivity, time saving, production step reducing abilities, improve and also modify products for more diverse and good quality. For this reason, the purpose of this study was to investigate the effect of operating conditions on physical properties of direct expansion extruded snack from two varieties of Thai brown rice. Owing to physical properties effect directly to texture quality of snack products which the product's crispness is a key factor in affecting the consumer's enjoyment of the snack and therefore decision to make that all important repeat purchase. Furthermore, the knowledge from this study will be beneficial for application in product development of brown rice in other extruded products and transfer technology to the manufacturer in food industry.

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MATERIALS AND METHODS

Preparation of raw materials

Brown rice of both varieties (Patumthani 1 and Supanburi 1) was supplied by Patumthani Rice Research Center. Brown rice at each variety was grounded by Fitz Mill and then sifted through the screen between 40 and 60 mesh by the Vibroscreen Separator to get the required size (40 – 60 mesh). Defatted soy flour, full fat soy flour and seasonings were supplied by Archer Daniels Midland company in USA, the Royal Project and Flavorplus Ltd respectively. After preparation, raw materials were examined by proximate analysis (AOAC, 1990) and amylose determination (Juliano, 1971).

Experimental design

To study the production of brown rice snack from both varieties of brown rice by extrusion process, the 3 × 3 factorial in randomized complete block design was employed with two independent variables at three levels of variation. The independent variables were operating conditions which one was feed moisture (13, 15 and 17%), the another was screw speed (250, 300 and 350 rpm). Nine experimental conditions per one replicates, three replicates of each variety of brown rice were carried on. The dependent variables were physical properties of extrudates such as expansion ratio, bulk density, water absorption index, water solubility index and texture measurement by instrumental and sensory methods. Experimental data were analyzed by using the Statistical Analysis System (SAS) and a second order polynomial equation was fitted to each response variable.

Extrusion process

For each test run of experimental design (nine experimental units per one replicate; three replicates) at each variety of brown rice snack, the weighed raw materials which composed of brown rice (Patumthani 1 or Supanburi 1) 70%, defatted soy flour (DFS) 17.5%, full fat soy flour (FFS) 6%, sugar 6% and calcium carbonate ($CaCO_3$) 0.5% were thoroughly mixed by a mixer before fed into a laboratory co-rotating twin screw extruder (Hermann Berstorff Laboratory Corotating Twin Screw Extruder ZE25 × 33D). This extruder comprised 7 parts of barrel ended with a 24.5 mm thick die plate with one slit (1 mm × 20 mm) and the barrel length-to-diameter ratio (L/D) of the extruder was 870:25. The mixture of raw materials at each test run was adjusted to the desired moisture content (13, 15 or 17%), according to the experimental design. Then they were fed into the extruder with a volumetric twin screw feeder (K-Tron soder AG 5702, type 20, Switerland) and set the screw speed varied with experimental design (250, 300, or 350 rpm). After extrusion, the extrudates were dried at 80°C for 15 min in an electric oven and examined for physical properties next.

Physical properties by instrumental and sensory methods

The extrudates from each test of experimental design at each variety of brown rice were examined physical properties as below.

Expansion ratio (Halek and Chang, 1992). Expansion ratio was determined by applying a vernier caliper to measure the average thickness of extrudate (10 randomly choosen pieces of extrudate from each test run of each replicate and calculated as the ratio between the thickness of the extrudate and the die hole (slit).

Bulk density (Rahman, 1995). Bulk density is the density of a material when packed or stacked in bulk. It was determined by replacing the extrudate into a 500 ml graduated cylinder. The volume and weight of the extrudate were recorded to determine the bulk density as the weight of extrudate per volume occupied by extrudate.

Water absorption index and Water solubility index (Anderson *et al.*, 1969 and Damardjati and Luh, 1987). A 2.5 g of the ground dry sample was suspended in 30 ml of water in a 50 ml tared centrifuge tube. The sample was stirred intermittently over a 30 min period and centrifuged at 3000 × g for 10 min. The supernatant was poured carefully into a tared evaporating dish. The remaining gel was weighed and the WAI was calculated as follows:

Water absorption index (WAI) =

$$\frac{\text{Weigh ofgel - weight of ground dry sample}}{\text{Weight of ground dry sample}}$$

The supernatant liquid from the WAI study was vacuum dried at 70°C until constant weight was reached. The amount of dried solid (%) recovered from evaporating the supernatant was expressed as a percentage of dry solids in the 2.5 g ground dry sample and defined as water solubility index (WSI).

Texture measurement (Claytor, 1996). For measuring the textural quality of extrudate, the TA-XT2i texture analyzer was fitted with the Warner Bratzier blade set (HDP/BSK). Testing condition was set at 1.0 mm/s pre-test speed, 1.0 mm/s test speed, 10.0 mm/s post test speed and 5.0 mm distance. Ten measurements were conducted on extrudate at each test run of each replicate for analyzing force-time curves to evaluate the slope and area whish related to the crispness of extrudate.

Sensory method for texture of extrudate. The sensory test was conducted with trained panels (18) in balanced incomplete block experimental design (t=9, k=4, r=8, b=18, λ=3) who have experienced with food product development by using 9-point hedonic scale (1-extremely dislike to 9-extremely like) to determine the preference in texture which suitable for snack product.

Scanning electron microscopic observations. Additionally, the representatives of each test run of extrudate at both varieties of brown rice were viewed and photographed on a JEOL JSM-5600 LV Scanning Electron Microscope operating with magnification 35× to show the surface appearance of extrudates at different operating conditions which related to expandable characteristics of products.

Sensory evaluation and Nutrition labeling

Choose the most appropriate extrudate at each variety of brown rice to flavor with cuttlefish or Bar-B-Q seasonings and determine the preference in color, flavor, texture and overall acceptance. The sensory test was conducted with trained panels (14) who have experienced with food product development by using balanced incomplete block experimental design (t=8, k=4, r=7, b=14, λ=3). The representative of brown rice snack product which have highest scores of preferences in organoleptic properties should be evaluated nutrition labeling according to the Announcement of the Public Health Ministry No. 182, 1998.

RESULTS AND DISCUSSION

Proximate analysis and amylose content of raw materials used in brown rice snack production

The basic raw materials used for snack production in this research work is Thai brown rice to promote and add value of Thai agricultural raw materials. Two varieties of Thai brown rice (Patumthani 1 and Supanburi 1) with different amylose content as shown in Table 1 bas been studied. Apart from the protein fortification, defatted soy flour and full fat soy flour were used as ingredients to enhance dietary fiber in brown rice snack production for improving nutritive value.

The effect of feed moisture and screw speed on physical properties of brown rice extrudate (rice varieties : Patumthani 1 / Supanburi 1) by instrumental and sensory methods

Due to the interactions between feed moisture and screw speed did not have significant effect on physical properties of extrudates from both varieties of brown rice, so it should be considered at the effect of main factor (feed moisture or screw speed) which had significant effect on physical properties of extrudates as shown in Table 2, 3 and Table 4, 5 when rice varieties were Patumthani 1 and Supanburi 1 respectively. They were found that they had similar effect in both of rice varieties to show that feed moisture and screw speed had significant effect on physical properties of extrudate such as expansion ratio, bulk density, water solubility index and texture measurement, except water absorption index which the results did not show clearly difference. When the feed moisture increased, the extrudate had less expansion resulting in lower expansion ratio, higher bulk density and lower water solubility index. For texture measurement, it claimed that crispness might be expressed physically as a function of peak, slope and area under the force-deformation curve (Skierkowski *et al*., 1990). It was clearly shown in the measurement that the less expandable extrudate would occurred the sharp peak which appeared to increase the slope and decrease the area under the curve. Conversely, when the screw speed increased, the extrudate had more expansion resulting in higher expansion ratio, lower bulk density and higher water solubility index. For texture measurement it was also clearly shown that the more expandable extrudate would occurred the broad peak which appeared to decrease the slope and increase the area under the curve.

The other authors (Badrie and Mellowes,

Table 1 Proximate analysis and amylose content of raw materials.

Raw materials	Proximate composition (% w.b)						
	Moisture	Fat	Protein[1/]	Ash hydrate	Carbo[2/] fiber	Dietary (%)	Amylose[3/]
Brown rice (Patumthani 1)	12.62	2.63	7.52	1.29	74.24	1.7	23.86
Brown rice (Supanburi 1)	11.61	2.76	7.78	1.55	72.90	3.4	35.30
Defatted soy Flour	7.48	0.73	49.96	6.54	19.19	16.1	Not analyzed
Full fat soy flour	4.41	22.85	40.68	5.24	12.82	14.0	Not analyzed

[1/] Rice ; Protein factor = 5.7
Soy ; Protein factor = 6.25
[2/] not included dietary fiber
[3/] Standard amylose : Zigma (Type III)

Table 2 Physical properties of direct expansion extrudate from mixtures of brown rice (Patumthani 1), DFS, FFS, Sugar and $CaCO_3$ at different feed moisture.

Feed moisture (%)	Expansion ratio	Bulk density (g/cm^3)	Water absorption index	Water solubility index (%)	Texture measurement	
					Slope (N/s)	Area (Ns)
13	8.07±0.79^A	0.07±0.01^C	3.62±0.20^{AB}	28.40±2.49^A	9.37±2.99^A	47.99±7.88^A
15	6.54±0.74^B	0.10±0.02^B	3.50±0.17^B	25.20±2.50^B	20.74±7.82^B	31.54±8.66^B
17	5.09±0.45^C	0.16±0.02^A	3.77±0.18^A	20.89±1.88^C	35.62±8.68^C	20.24±5.97^C

In a column, means with the same letter are not significantly different at 0.05 significance level.

1991; Tsue and Moreira, 1996) using instrumental methods to investigate effect of extrusion parameters such as feed moisture, extrusion temperature, feeding rate and screw speed on textural properties of extruded products made from different materials have reported the results corresponding with this research. Since both of reducing moisture content and increasing screw speed had more trends to increase product temperature, shearing and pressure which occurring more gelatinization of starch raw materials and causing the product easily expand with extensive flashing of moisture to obtain open structure and crisp texture. Moreover, the water solubility index was related to the quantity of soluble molecules which increased with expansion (Mercier *et.al.*,

Table 3 Physical properties of direct expansion extrudate from mixtures of brown rice (Patumthani 1), DFS, FFS, Sugar and $CaCO_3$ at different screw speed.

Screw speed (rpm)	Expansion ratio	Bulk density (g/cm^3)	Water absorption index	Water solubility index (%)	Texture measurement Slope (N/s)	Texture measurement Area (Ns)
250	5.92±1.10^C	0.13±0.04^A	3.49±0.16^B	23.41±4.10^C	27.72±13.22^A	27.03±11.61^B
300	6.56±1.32^B	0.11±0.04^B	3.64±0.20^{AB}	24.84±3.62^B	21.98±13.09^B	32.86±14.58^{AB}
350	7.23±1.58^A	0.09±0.04^C	3.76±0.18^A	26.26±3.67^A	16.03±10.59^C	39.89±13.89^A

In a column, means with the same letter are not significantly different at 0.05 significance level.

Table 4 Physical properties of direct expansion extrudate from mixtures of brown rice (Supanburi 1), DFS, FFS, Sugar and $CaCO_3$ at different feed moisture.

Feed moisture (%)	Expansion ratio	Bulk density (g/cm^3)	Water absorption index	Water solubility index (%)	Texture measurement Slope (N/S)	Texture measurement Area (NS)
13	7.80±0.72^A	0.06±0.01^C	4.52±0.85^A	16.38±0.62^A	7.87±2.27^C	41.29±4.27^A
15	6.41±0.53^B	0.09±0.01^B	4.30±0.64^A	14.99±0.60^B	14.28±3.03^B	30.11±10.53^B
17	5.02±0.32^C	0.14±0.02^A	4.34±0.37^A	13.95±0.72^C	24.16±4.28^A	15.30±1.90^C

In a column, means with the same letter are not significantly different at 0.05 significance level.

Table 5 Physical properties of direct expansion extrudate from mixtures of brown rice (Supanburi 1), DFS, FFS Sugar and $CaCO_3$ at different screw speed.

Screw speed (rpm)	Expansion ratio	Bulk density (g/cm^3)	Water absorption index	Water solubility index (%)	Texture measurement Slope (N/s)	Texture measurement Area (Ns)
250	5.96±1.13^C	0.11±0.04^A	4.46±0.82^A	14.50±1.04^C	18.90±8.47^A	25.27±11.91^B
300	6.40±1.22^B	0.10±0.03^B	4.25±0.57^A	15.15±1.18^B	15.09±6.99^B	28.73±12.34^{AB}
350	6.87±1.42^A	0.09±0.03^C	4.44±0.53^A	15.67±1.17^A	12.31±6.23^C	32.70±12.16^A

In a column, means with the same letter are not significantly different at 0.05 significance level.

1989). Therefore, the results showed expandable extrudate with higher expansion ratio, lower bulk density and higher water solubility index when operating with lower moisture content and higher screw speed.

Owing to the studied factors (feed moisture and screw speed) were quantitative factors, hence response surface analysis could be studied to show trends of response when levels of studied quantitative factors had changed as shown in Table 6 and Table 7 which rice varieties were Patumthani 1 and Supanburi 1 respectively.

For sensory methods, it was found that the interactions between feed moisture and screw speed have significant effect on texture scores of extrudates. Similar results were found in both of rice varieties (Patumthani 1 and Supanburi 1) showing that the extrudate which operating at lower feed moisture (13%) and higher screw speed (350 rpm) would obtain more expandable structure and give trends for suitable texture of snack products as shown in Table 8.

Additionally, the effect of operating conditions could affect the differences in the surface

Table 6 Response surface function of physical properties of direct expansion extrudate mixtures of from brown rice (Patumthani 1), DFS, FFS, Sugar and $CaCO_3$ when feed moisture and screw speed changed.

Physical properties		Response surface function
Expansion ratio		$Y = 6.5248 – 1.5128 X_1 + 0.6344 X_2 + 0.0561 X_1^2 – 0.2450 X_1 X_2 + 0.0311 X_2^2$
Bulk density		$Y = 0.1026 + 0.0459 X_1 - 0.0193 X_2 + 0.0107 X_1^2 – 0.0045 X_1 X_2 + 0.0017 X_2^2$
Water absorption index		$Y = 3.5173 + 0.0752 X_1 + 0.1364 X_2 + 0.1923 X_1^2 + 0.0319 X_1 X_2 + 0.0193 X_2^2$
Water solubility index		$Y = 25.2057 – 3.7542 X_1 + 1.4256 X_2 - 0.5553 X_1^2 – 0.1562 X_1 X_2 + 0.00017 X_2^2$
Texture measurement	Slope	$Y = 20.8059 + 13.1223 X_1 + 5.8450 X_2 + 1.7574 X_1^2 – 1.1456 X_1 X_2 - 0.1031 X_2^2$
	Area	$Y = 32.6207– 13.8759 X_1 + 5.3199 X_2 + 0.3517 X_1^2 – 1.4883 X_1 X_2 + 1.7128 X_2^2$

When X_1 = feed moisture
X_2 = screw speed

Table 7 Response surface function of physical properties of direct expansion extrudate from mixtures of brown rice (Supanburi 1), DFS, FFS, Sugar $CaCO_3$ and when feed moisture and screw speed changed.

Physical properties		Response surface function
Expansion ratio		$Y = 6.3963 – 1.3911 X_1 + 0.4533 X_2 + 0.00556 X_1^2 – 0.1833 X_1 X_2 + 0.0189 X_2^2$
Bulk density		$Y = 0.0926 + 0.0397 X_1 - 0.0133 X_2 + 0.0099 X_1^2 – 0.0044 X_1 X_2 + 0.0015 X_2^2$
Water absorption index		$Y = 4.1676 - 0.09 X_1 + 0.0081 X_2 + 0.1289 X_1^2 + 0.223 X_1 X_2 + 0.1943 X_2^2$
Water solubility index		$Y = 15.0273 – 1.219 X_1 + 0.5813 X_2 + 0.1782 X_1^2 – 0.0737 X_1 X_2 + 0.0599 X_2^2$
Texture measurement	Slope	$Y = 13.9355 + 8.1433 X_1 – 3.2970 X_2 + 1.7341 X_1^2 –1.2916 X_1 X_2 + 0.5132 X_2^2$
	Area	$Y = 29.9454 – 12.9972 X_1 + 3.7171 X_2 + 1.8188 X_1^2 – 0.6424 X_1 X_2 + 0.2522 X_2^2$

When X_1 = feed moisture
X_2 = screw speed

structure of extrudates as shown in Figure 1 and Figure 2. The scanning electron microscopic observations from both rice varieties (Paumthani 1 and Supanburi 1) indicated in similar ways that the extrudate which operating at lower feed moisture (13%) and higher screw speed (350 rpm) had better puffing showing more expandable structure or disrupted microstructure while dense structure occurred in extrudate which operating at higher moisture content (17%) and lower screw speed (250 rpm). This phenomena had encouraged the relationship in physical properties of brown rice extrudate at each operating conditions.

Sensory evaluation and nutrition labeling of the appropriate brown rice snack

Theoretically, the amylose-amylopectin ratio influences the textural properties of the finished starch-based extruded products. Amylopectin promotes puffing, giving a very light and fragile product and homogeneous texture with a smooth and sticky external surface. Conversely, high amylose produce harder product and less expansion (Harper, 1981). In addition, water solubility index (WSI) is related to the quantity of soluble molecules which increase with expansion. The stickiness of extruded starch is related to increased solubility (Mercier *et al.*, 1989). For this reason, this study has shown slightly more expansion ratio and water solubility index in brown rice extrudate from rice variety Paumthani 1 than the extrudate from rice variety Supanburi 1 as shown in Table 2-5. However, when the brown rice extrudate from both rice varieties were chosen at each suitable operating conditions (13%, 300 rpm and 13% 350 rpm) which gave the most texture scores from Table 8 to be flavored with cuttlefish or Bar-B-Q seasonings and evaluate the preference in color, flavor texture and overall acceptance of finished products as shown in Table 9, the results have no significant effect on both rice varieties and seasonings. Although both rice varieties have different amylose contents but not much and the effect will show distinctly in puffed snack if amylose content is greater than 50% giving an exceeding dense product lacking puff (Mercier *et.al.*, 1989). Thus, Thai brown rice from both varieties (Patumthani 1 and Supanburi 1) could be used as raw material for extruded snack production, if the appropriate operational conditions were applied.

The representative of brown rice extruded

Table 8 Texture scores of direct expansion extrudates from mixtures of brown rice (Patumthani 1 or Supanburi 1), DFS, FFS, Sugar and $CaCO_3$.

Treatment		Texture scores	
Feed moisture (%)	Screw speed (rpm)	Rice variety (Patumthani 1)	Rice variety (Supanburi 1)
13	250	6.11 ± 1.48^{AC}	6.59 ± 1.14^{AC}
13	300	6.86 ± 1.70^{A}	7.14 ± 1.56^{A}
13	350	6.85 ± 1.40^{A}	7.21 ± 1.11^{A}
15	250	5.72 ± 0.81^{AE}	5.95 ± 0.75^{AE}
15	300	5.84 ± 1.78^{AD}	6.99 ± 1.23^{AB}
15	350	6.20 ± 1.60^{AB}	6.44 ± 1.31^{AD}
17	250	3.88 ± 1.22^{G}	4.10 ± 1.71^{G}
17	300	4.72 ± 1.73^{BCDEFG}	5.95 ± 1.83^{AF}
17	350	5.60 ± 1.17^{AF}	5.55 ± 1.44^{BCDEFG}

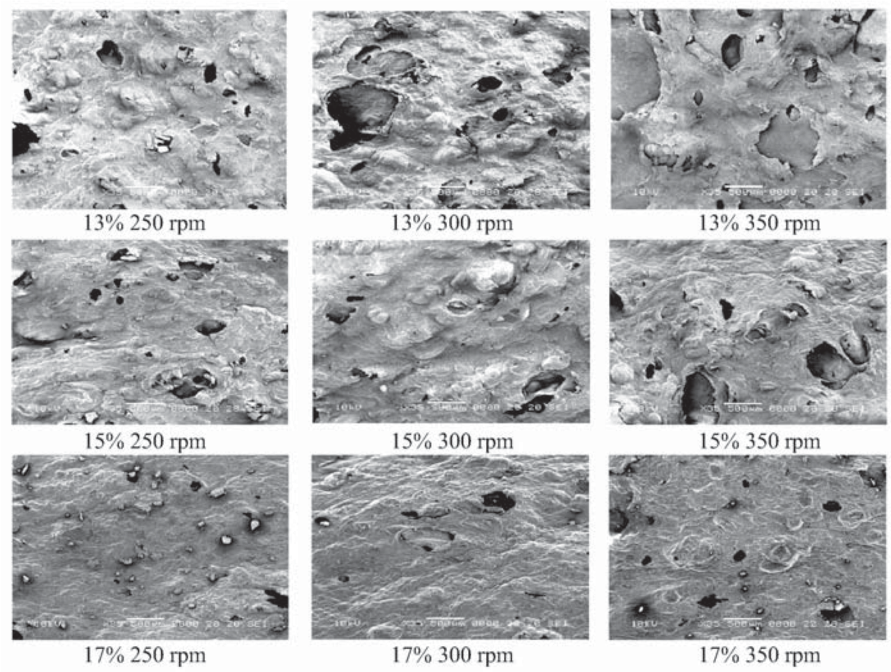

Figure 1 Scanning electron microscopy images of extrudates obtained from mixtures of brown rice (Patumthani 1), DFS, FFS, Sugar and $CaCO_3$ at different feed moisture and screw speed.

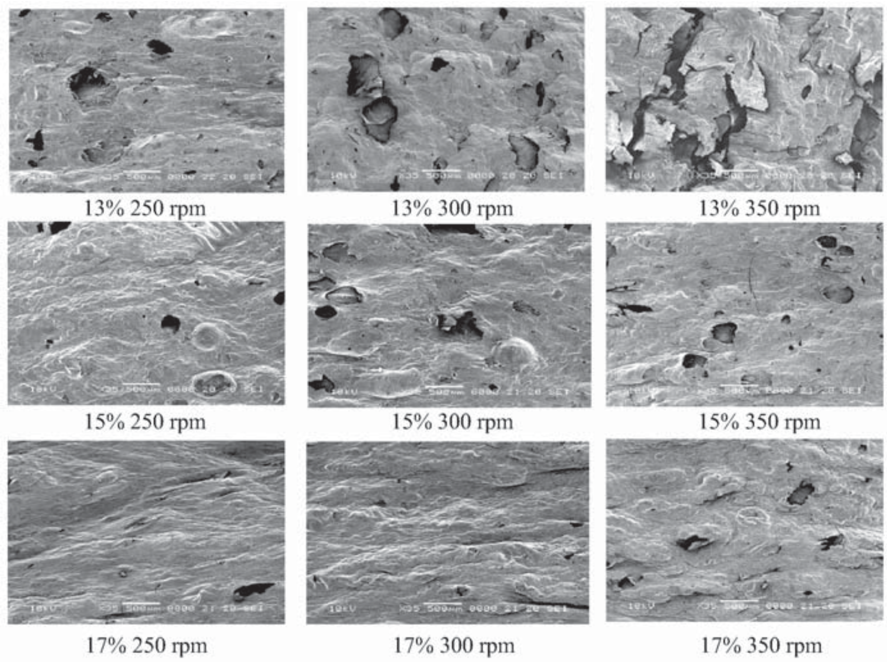

Figure 2 Scanning electron microscopy images of extrudates obtained from mixtures of brown rice (Supanburi 1), DFS, FFS, Sugar and $CaCO_3$ at different feed moisture and screw speed.

snack product (rice variety Supanburi 1, operating conditions at feed moisture 13% and screw speed 350 rpm, seasonings : cuttlefish) which gave the most preference in texture and overall acceptance scores from Table 9 was evaluated in nutrition labeling as shown in Table 10. The nutrition facts of this product has shown good condition for health due to high protein quantity (5 g per one serving) when compared to other marketable snack products. Beside from nutrition claim of this product as good source of protein and dietary fiber (according to Nutrition Claim, appendix to the Announcement of the Public Health Ministry No.182, 1998), it still had low fat, low cholesterol and without saturated fat which brought to good nutrition condition also. In the aspects of vitamins and minerals, although they are rather little amount from natural raw materials but it can supplement directly to the next adjustable formula.

CONCLUSION

For promoting Thai Agricultural raw materials to have value added, Thai brown rice of both varieties (Patumthani 1 and Supanburi 1) were suitable for using as basic raw material in the production of direct expansion extruded snack. Owing to the effect of feed moisture and screw speed which were significant on physical properties of extrudates, the appropriate operating conditions should be applied at lower moisture content (13%) and higher screw speed (350 rpm) to achieve expandable structure. For nutritive values, this product enhanced good consuming behavior and better health according to the recommended daily allowances for Thais. Thus, apart from producing enjoyable crispness texture and nutritious of extruded snack, this research was beneficial for developing snack products to increase consumption of snack from Thai brown rice utilization.

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Table 9 Sensory evaluation of direct expansion extruded snack from mixtures of brown rice (Patumthani 1 or Supanburi 1), DFS, FFS, Sugar and $CaCO_3$.

Variety of brown rice	Extruded snack Treatment (Feed moisture, Screw speed)	Seasoning	Sensory score Color	Flavor	Texture	Overall acceptance
Patumthani 1	13 % , 300 rpm	Cuttlefish	6.24±1.38^{A}	6.57±0.95^{A}	6.65±0.90^{A}	6.46±0.82^{A}
		Bar-B-Q	6.19±1.38^{A}	5.32±1.25^{A}	6.44±1.25^{A}	5.50±0.95^{A}
	13 % , 350 rpm	Cuttlefish	6.13±1.52^{A}	6.28±0.98^{A}	6.56±1.07^{A}	6.46±1.11^{A}
		Bar-B-Q	6.34±1.57^{A}	6.20±1.63^{A}	6.94±1.11^{A}	5.92±1.73^{A}
Supanburi 1	13 % , 300 rpm	Cuttlefish	6.55±0.76^{A}	6.78±1.07^{A}	6.69±0.69^{A}	6.71±1.07^{A}
		Bar-B-Q	6.00±1.50^{A}	5.95±1.34^{A}	6.82±0.58^{A}	5.84±1.34^{A}
	13 % , 350 rpm	Cuttlefish	6.07±1.40^{A}	6.57±0.38^{A}	7.11±0.76^{A}	6.80±0.58^{A}
		Bar-B-Q	6.69±1.34^{A}	5.90±1.53^{A}	6.65±0.49^{A}	6.00±1.29^{A}

In a column, means with the same letter are not significantly different at 0.05 significance level.

Table 10 Nutrition labeling of the appropriate brown rice extruded snack.

Nutrition Facts			
Serving size : 1 package (30 g)			
Serving per package : 1			
Amount per serving			
Calories 120		Calories from fat 15	
		% Daily Value*	
Total fat 1.5 g		2 %	
Saturated fat 0 g		0 %	
Cholesterol less than 5 mg		1 %	
Protein 5 g			
Total Carbohydrate 21 g		7 %	
Dietary fiber 1 g		4 %	
Sugar 5 g			
Sodium 320 mg		13 %	
% Daily value*			
Vitamin A less than	2 %	• Vitamin B_1 less than	2 %
Vitamin B_2	0 %	• Calcium	2 %
Iron	6 %		
* Percent Daily Values are based on a 2000 calorie diet.			
Your daily values may be higher or lower depending on your calorie needs.			
Total fat		Less than	65 g
Saturated fat		Less than	20 g
Cholesterol		Less than	300 mg
Total carbohydrate			300 g
Dietary fiber			25 g
Sodium		Less than	2,400 mg
Calories per gram :			
Fat = 9 ; Carbohydrate = 4 ; Protein = 4			

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