International Journal on
Advanced Science
Engineering
Information Technology

Vol.5 (2015) No. 1
ISSN: 2088-5334

Physical and Chemical Properties of Restructured Sweet Potato Stick from Three Sweet Potato Cultivars

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***Abstract*— Restructured Sweetpotato Stick (RSS) was developed in attempt to overcome the lack of sweetpotato availability during off season. Moreover, RSS was produced aimed to control of the adequate qualities caused by the variation characteristics of sweetpotato. The making of RSS from 3 sweetpotato varieties was to study physicochemical and sensory attributes of the final product. RSS was produced using three sweetpotato (SP) varieties with different flesh colour namely White, Yellow and Orange. Samples, including raw materials, intermediate and final products were analyzed for physicochemical attributes. White and Orange cultivars judged generated the good quality RSS. A similar hardness and shearing force of RSS made of White and Orange was found. Proximate compositions on dry base (db) were: protein 3.59 and 2.74%, fat 21.44 and 35.91%, carbohydrate 71.83 and 59.19%; and ash 3.13 and 2.17%, respectively. White cultivar produced the RSS having yellow bright colour, high firmness and low fat content, whereas Orange cultivar generated RSS with bright orange colour, medium firmness but high fat content. RSS made from White and Orange cultivars were preferred with sensory score above the average. Result from this study illustrates that White and Orange sweetpotato cultivars can be used to make a convenient restructured product (RSS).**

***Keywords*—RSS, texture, physicochemical, sensory**

I. Introduction

Sweet potato is a nutritious vegetable with a good complement of energy, vitamin and minerals. The intervention of humans by domestication and artificial selection of the sweet potato has resulted in the existence of a large number of cultivars. Cultivars differ from one to another in the physical properties and chemical composition [9], [12], [17]. Starch is the major component of SP, can comprise from 50-70% of total dry matter [28]. It was noted that the variation in starch content depends on variety. Other important physical characteristic is flesh colour that may be exploited to introduce an attractive colour into food made of sweet potato.

The popular frying products of SP are French fried-type products or sticks and chips. Sweet potato French fries and chips were judged to be of a good quality and acceptability by a consumer panel [25],[11], [16]. Conventional processes for preparing French fries from potato fresh roots have several drawbacks. The quality of fried product varies among varieties. Further difficulties arise due to physical and chemical characteristics of the raw materials such as size, shape, sugar content, solid content, etc. All these variations affect colour, texture and flavour of the finished product and must be controlled. Controlling of the adequate qualities can be made by prepared “fabricated” French fries or sticks from restructured SP roots [18],[19],[25],[22]. Sweet potato French fries or sticks from restructured SP roots known as Restructured Sweet potato Stick (RSS). Therefore, the development of RSS was studied in an effort to overcome these problems.

The objectives of this study are to determine the physical and chemical properties and sensory characteristics of restructured sweet potato stick (RSS) made from three sweet potato cultivars; and selecting the suitable cultivars based on chemical and physical characteristics of raw material is a key to produce the desirable RSS.

II. Materials and Methods

A. Materials Preparation

Three sweet potato (SP) cultivars consist of *White* and *Yellow* was collected from farmer field in Sepang and Ipoh Malaysia, respectively, while *Orange* cultivar was bought from Bukittinggi, Indonesia. Refined bleached and deodorized (RBD) palm olein was obtained from a local store. Carboxymethylcelullose (CMC) and Sodium tripolyphosphate (STP) were of food grade. All chemicals and solvents used were of analytical grade unless otherwise specified. Sweetpotato-flour (SP flour) was prepared in Food engineering laboratory, Faculty of Food Science and Technology, UPM. SP tubers were peeled and shredded manually. Drying was conducted using a cabinet drier at 55 °C for 24 hours. Dried material was then milled and sifted through a 70 mesh. RSS was made using the method in previous study [21].

B. Characterizations

Textural characteristics of SP tubers and RSS were evaluated. Hardness, adhesiveness, springiness and chewiness were quantified by Texture Profile Analysis (TPA) method [4]. Texture analyzer (TA.TX2i) was fitted with a 25 Kg load cell with a probe having 50 mm diameter compression plate (P/50). Each sample was compressed longitudinal for two cycles. The test condition was: pre-test speed, 2 mm/s; test speed, 1 mm/s; post-test speed, 2 mm/s; time between two cycles, 5 second; and degree of compression, 35 % of its initial height. The measurement was subjected into cylindrical sample of cooked tubers and RSS. TPA curves were obtained for 15 replicates per samples. Firmness of dough was recorded as a force needed during extruding the dough into sticks. Texture of fried stick was determined using two methods i.e. puncture and cutting-shear test. Firmness was expressed as force needed of the P/2 probe puncturing the samples. Texture of fried stick was determined using two methods i.e. puncture and cutting-shear test. Firmness was expressed as force needed of the P/2 probe puncturing the samples. Shearing force was a force required shearing and cutting the samples by the single downward action of the shear blade (HDP/BS). The test speed, both puncture and shearing was 1 mm/s until it reached 110 % distance. Firmness of dough and hardness of fried stick were expressed in Newton (N). Data collection and analysis were accomplished by the EXTRAD Dimension Software of the texture analyser.

The colour of fried stick was determined by the Hunter Colour Instrument (Hunter Lab, Reston, Virginia, USA) and values (L, a, b) were collected. L describes Lightness (0 = black, 100 = white), a intensity in red (a > 0) and b intensity in *Yellow* (b > 0). Three pieces of RSS covered with plastic sheet were then used to determine the colour value through the reading hole. Ten replication of reading per sample were done.

Moisture content of root, blanched chip and dough before extrusion, frozen stick and fried stick was determined by an oven drying method [2]. Dry matter content of dough was calculated by subtracting 100 with moisture content. Proximate analysis was determined on the final product. Moisture, protein, fat, and ash were determined by the AOAC method [2]. Protein was calculated as nitrogen (Kjeldahl) x 6.25. Starch content of SP tubers was determined by acid-hydrolysis method and total sugars produced were calculated quantitatively by Nelson-somogyi method [3]. Amylose content was determined using colorimetric iodine binding procedure [1].

Sensory evaluations were performed on all fried samples includes colour, texture, flavour and overall acceptability. Forty untrained panellists evaluated the products consist of students and staff of Faculty of Food Science and Technology, UPM, Malaysia. A 7-point hedonic scale is used for scoring the samples (1=*dislike extremely*; 2=*dislike moderately*; 3=*dislike slightly*; 4=*neither like nor dislike*; 5=*like slightly*; 6=*like moderately*; 7=*like extremely*). Samples are coded with 3 digits in a randomized arrangement to equalize the effect of samples sequence food preference.

C. Statistical Analysis

The experiment is arranged with a randomized complete block design with 3 replications. The data collected were analysed by the analysis of variance (ANOVA) and the significant differences among means were determined by Duncan's multiple range test (DMRT) using MSTAT-C statistical software.

III. Results and Discussion

A. Physicochemical characteristics of 3 raw sweet potato cultivars

A characteristic of raw material is an important in producing a certain product, such as moisture content, texture and chemical composition. Table 1 exhibits moisture content of 3 commercial cultivars. Moisture content of fresh or steamed tubers was different within the 3 cultivars. Moisture content of *White* and *Yellow* increased during steaming, but *Orange* decreased. Moisture content of samples was slightly changed after steaming in 100 °C for 20 min in the range of 1 to 4% and it is in agreement with the result of Bradbury & Holloway [6]. The increase of White and *Yellow* was 2.14 and 2.01% respectively, whereas the decrease of *Orange* was 1.04%. The fluctuation of moisture content after cooking occurred due to the stages of gelatinization process that were initiated by absorption of water by starch grain until maximum swelling; the increasing volume of starch grain in between 55 to 65 °C [27], by the increasing temperature, disorganizing of starch polymer occurred to form gel. Generally, steaming would increase the moisture content, but the decrease which happened to the *Orange* cultivar that might be caused by the evaporation after the gelatinization was complete.

TABLE I.
MOISTURE CONTENT OF 3 SWEETPOTATO COMMERCIAL CULTIVARS

Cultivar	Fresh (%)	Steamed (%)
White	73.82 ^{c}	75.96 ^{b}
Yellow	78.53 ^{a}	80.54 ^{a}
Orange	76.48 ^{b}	75.44 ^{c}

$^{a-c}$ Means within column followed by different superscripts letters are significantly different at P < 0.05

TPA data are shown in Table 2 for the texture profile characteristics of the 3 sweet potato cultivars. *White* has the highest hardness followed by *Orange*, however they not significant different (P>0.05). *Yellow* had the lowest hardness and showed significant difference (P<0.05) with *White* and *Orange*. *White* cultivar has the lowest adhesiveness value followed by *Orange* and *Yellow*.

Springiness of *White* was the highest compared with the two other cultivars. It shows that the sample was able to recover it's the initial form. Chewiness is an important character that is expressed as the force needed to masticate the material. *White* and *Orange* showed insignificant chewiness.

TABLE II
TEXTURE PROFILE CHARACTERISTICS OF 3 SP COMMERCIAL CULTIVARS

Cultivar	Hardness (N)	Adhesiveness (Ns)	Springiness (%)	Chewiness (N)
White	6.73 [a]	0.18 [b]	92.57 [a]	2.73 [a]
Yellow	4.95 [b]	0.23 [a]	84.81 [b]	1.93 [b]
Orange	5.94 [a]	0.21 [ab]	86.63 [ab]	2.53 [a]

[a – c] Means within column followed by different superscripts letters are significantly different at P < 0.05
N = Newton ; Ns = Newton second

Starch content of White was the highest and followed by Orange and Yellow. The amylose content of starch from three cultivar was significantly different. Orange contained the highest amylose content and followed by White and Yellow (Table 3).

TPA attributes of sweet potato commonly are affected by the chemical component of the tuber, such as moisture, starch and amylose content. Several studies reported that amylose-amylopectin ratio was responsible for the textural characteristics of sweet potato [28], [29], however Noda [13] explained in term of the molecular architecture of amylopectin. Besides that, the variation of TPA attributes could be explained by the varietal differences in the magnitude of degradation of starch and cell wall substances during cooking. From 3 cultivars studied showed that moisture content of steamed specimen affected the TPA attributes, especially hardness; the higher the moisture content, the lower the hardness.

TABLE III
STARCH CONTENT OF FRESH TUBER AND AMYLOSE CONTENT OF STARCH 3 CULTIVARS

Cultivar	Starch (%,fwb)	Amylose (%,fwb in starch)
White	19.30 [a]	25.54 [b]
Yellow	12.34 [c]	24.83 [c]
Orange	14.43 [b]	27.15 [a]

[a – c] Means within columns followed by different superscripts letters are significantly different at P < 0.05

Also it was found that, hardness of sweet potato tubers was high positively correlated with starch content of fresh tubers (r = 0.92, P<0.01) (Figure 1a), but was not affected by the amylose content. Starch content of SP tubers was reported to be varied depending on the varieties. Onwueme [14] reported 8-29% starch in fresh tubers. Den [7] stated that varietal variation of starch content ranged from 11 to 25%. Whereas Bradbury & Holloway [6] and Paul & Southgate [15] reported that the starch content of selected fresh SP tuber was 20.1 and 11.8% respectively. Starch content of the 3 commercial cultivars varied from 12.34 to 19.30 %, with *White* was the highest, followed by *Orange* and *Yellow*. Also, *Orange* contained the highest amylose (27.15%) followed by *White* (25.54%), and lowest being *Yellow* (24.84%). This proved that *White* having the highest hardness was due to the highest starch content. Other texture profile attributes affected by starch and amylose content was springiness. Springiness of tubers was positively correlated with starch content (r = 0.74, P<0.01) (Figure 1b) but negatively with amylose content (r = 0.79, P<0.01) show in (Figure 1c).

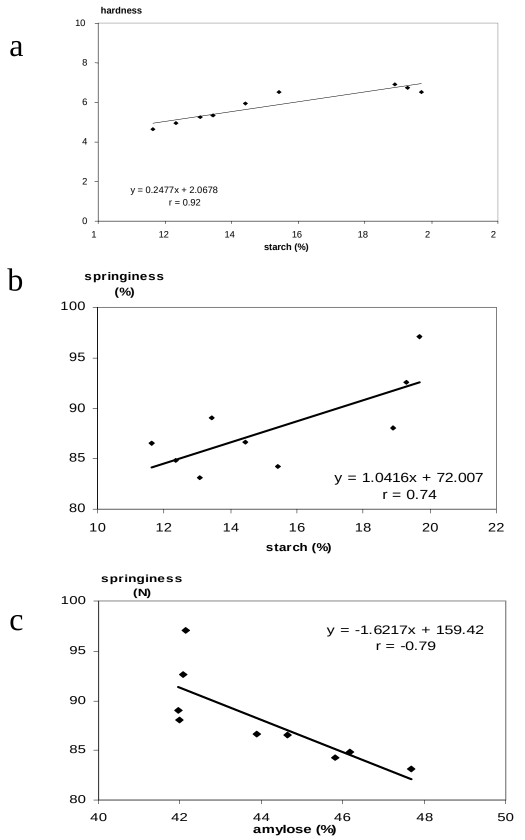

Fig 1. a. Correlation between hardness and starch content for combination of 3 commercial cultivars. b. Correlation between springiness and starch content for combination of 3 commercial cultivars. c. Correlation between springiness and amylose content for combination of 3 commercial cultivars.

Previous study found that not only starch and amylose content influenced the springiness value, but also the cooking process, including the conversion of starch into simple sugars and dextrin by amylase enzymes [24] and the interaction of pectic compounds with sugars or dextrin which generate certain textural characteristics [23]. Chewiness was measured in term of the energy to masticate a solid food involving compressing, shearing, piercing, grinding, tearing and cutting. In the three cultivars, chewiness was positively affected by the starch content (r = 0.87, P<0.01).

B. Moisture content changes

A moisture content change during process of food production is an important factor regarding the texture of the product. Figure 2 shows the changes of moisture content during preparing the RSS.

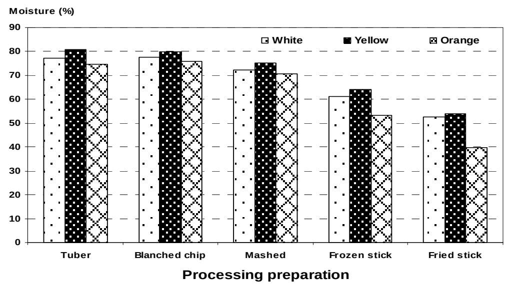

Fig 2. Moisture content changes during RSS processing for *White, Yellow and Orange* varieties.

Slight increase of moisture content was occurred in blanched chip. In the next stage, the moisture content of mashed or dough decreased. The decrease of moisture content continued until the final product which in this case was caused by frying. First frying of the raw sticks was conducted at about 163 °C for 1 min, then packaged in plastic bags and frozen at -20 °C, whereas the second frying was done by deep frying in 175 °C for 2 minutes as a final preparation.

TABLE IV
PHYSICAL CHARACTERISTICS OF DOUGH MADE OF 3 CULTIVARS

Cultivars	Dry matter (%)	Firmness (N)	Work of extrusion (Ns)
White	27.68 a	112.3 a ns	4,513 a ns
Yellow	24.79 b	125.1 a	3,063 a
Orange	29.29 a	116.1 a	3,926 a

a – b Means within columns followed by different superscripts letters are significantly different at P < 0.05
N = Newton ; Ns = Newton second

The fluctuation of moisture content of the three cultivars was monitored during production of RSS Based on cultivars, the fluctuation of moisture content followed similar pattern. Increase of moisture content occurred during blanching due to gelatinized of the starch; however small decrease occurred in *Yellow* cultivar. Addition of SP flour caused reduction in dough moisture content; however the decrease of moisture content in the 3 cultivars followed similar leaning. In this stage, addition of 5% SP flour was generated significant (P<0.05) dry mater content of dough. *White* and *Orange* contained 27.68 and 29.29% dry matter or 72.32 and 70.71% moisture content, respectively; whereas *Yellow* cultivar had 24.79% dry mater or 75.21% moisture content. Nonetheless, the different dry mater contents did not provide any effect on firmness or work during extrusion of dough (Table 4). The decrease of moisture content for *White*, *Orange* and *Yellow* was 5.29; 4.69; and 5.12% respectively. The different tendency of declining moisture occurred during frying process. *White* and *Yellow* had similar tendency of decreasing moisture content, whereas *Orange* declined sharply. The difference of this occurrence might be due to the amylose content. *Orange* contained the highest amylose compared with *White* and *Yellow*. The water trapped in dough was easily removed by the frying temperature. The decrease of moisture content from dough to final product was 19.87; 21.29 and 31.1% respectively for *White*, *Yellow* and *Orange*. Removing water from the food during frying affected the fat absorption, and it is found the linier relationship between oil uptake and moisture content of final product [8], [22].

C. Physicochemical characteristics of RSS

Texture of dough was measured by reason of the relation between its characters and the quality of product. Table 4 exhibits the physical characteristics of dough. Dry matter content of dough generated from *White* and *Orange* was not significant different (P>0.05), and considered higher than *Yellow*. Although the dry matter content of *Yellow* dough did not meet the requirement of Gutcho [10], the deformation of stick during first frying did not occur. According to Gutcho [10], products containing more than 73 % by weight of water tend to puff undesirably during frying. There was no significant different (P>0.05) on firmness and work extrude of SP mashed during extrusion process. Although the dry matter content of dough showed sign of difference, firmness and work of extrusion exhibited insignificant difference (P>0.05). It seems that the texture of SP mashed was not only influenced by moisture but also by other factors such as starch, amylose and amylopectin content. It was proved that the work of extrusion was correlated with starch and amylose content of tubers i.e. r = 0.71, P<0.05; and r = -0.67, P<0.05 respectively. Amylose content of *Orange* was higher than *White* and *Yellow* cultivars [20].

TABLE V
PHYSICAL CHARACTERISTICS OF RSS MADE OF 3 CULTIVARS

Physical characteristics	Cultivars		
	White	*Yellow*	*Orange*
Moisture (%)	52.45 a	53.92 a	39.61 b
Firmness (N)	1.02 a	0.52 b	0.71 c
Shearing force (N)	4.72 a	2.38 b	3.97 a
TPA:			
Hardness (N)	13.65 a	8.19 b	15.37 a
Springiness (%)	78.33 a	70.67 b	71.33 ab
Cohesiveness (Ns)	0.38 a	0.36 b	0.23 c
Chewiness (N)	3.45 a	1.90 b	1.86 b

a – c Means within rows followed by different superscripts letters are significant different at P < 0.05
N = Newton ; Ns = Newton second

Textural characteristics of RSS made of 3 cultivars evaluated using three methods is shown in Table 5. In puncture test, result showed that the firmness value of *White* RSS was the highest and different from two other samples, whereas *Orange* was higher than *Yellow* RSS. Cutting-shear test generated the force needed to cut the RSS. The value of shearing force was higher than puncture test. RSS made from *White* had the highest value of firmness and shearing force, and *Orange* produced RSS with medium firmness and shearing force, though for shearing force it was not significant different (P>0.05). *Yellow* cultivar generated the RSS with the lowest firmness and shearing force. According to the statistical calculation, it appeared that the puncture test was more sensitive than shear test proved by lower coefficient of variation compared with shear test. Even though, shear test still need to be done due to know the force needed to cut the sample as a simulation of biting the RSS as conducted by many researchers.

Based on TPA, *White* and *Orange* cultivars generated RSS which was not significant value (P>0.05) of hardness compared with *Yellow* RSS. This result was similar tendency as hardness of the tubers (Table 2). The similar pattern was also occurred in springiness, that RSS made of *White* and *Orange* cultivars had the higher springiness value than *Yellow*. Adhesiveness of the RSS could not be determined because the oil covering the surfaces that avoid attaching samples into platform of texture test instrument. *White* cultivar produced the RSS with the highest cohesiveness and followed by *Yellow* and *Orange*, moreover *White* and *Orange* generated RSS that were higher in chewiness value than *Yellow*. The TPA method resulted in similar trend between hardness and shearing force. *White* and *Orange* generated insignificant difference (P>0.05) hardness of RSS, whereas *Yellow* RSS was significant different (P<0.05) with two others. Hardness of the RSS was significantly negative correlation with moisture content of the fresh tuber through the final product. Besides that, hardness of RSS was also having similar tendency with the hardness of cooked tubers. *White* and *Orange* cultivars had higher springiness value than *Yellow*. Cohesiveness of RSS was not affected by the cohesiveness value of tubers. It's because of the mashing, addition of SP flour and CMC. Chewiness indicates the force needed to masticate the product. *White* cultivar generated RSS with the highest chewiness compared with *Yellow* and *Orange*.

TABLE VI
COLOUR OF RSS MADE OF 3 CULTIVARS

Cultivars	*L*	*a*	*b*
White	55.63 [a]	6.17 [b]	16.33 [a]
Yellow	44.09 [b]	5.84 [b]	12.63 [b]
Orange	45.28 [b]	21.84 [a]	16.94 [a]

a – b Means within columns followed by different superscripts letters are significantly different at P < 0.05

According to the result of the colour measurement in Table 6, *White* RSS had the highest *L* value meaning it was brighter compared with *Yellow* and *Orange* RSS. It might be because of the colour of raw materials and the changes during RSS preparation. The *a* and *b* value expresses the intensity of redness and yellowness respectively. Statistically, *White* and *Yellow* RSS had similar *a* value; and exhibits significant difference (P<0.05) with *Orange* that had very high *a* value. Even though insignificant difference (P>0.05) was found between *White* and *Yellow* RSS, the dissimilarity of *L* and *b* generated the difference colour visually. The Colour of RSS was depended on the colour of tubers. *White* tubers produced *white* frozen stick and light yellow RSS; and *Yellow* cultivar generated darker frozen stick and RSS compared with *White*. Moreover, bright orange frozen stick and RSS was produced from *Orange* cultivar. Colour of fresh tubers was the decisive factor to the colour of RSS. *White* cultivar produced the frozen RSS as *white* as the colour of the tubers. *Yellow* RSS was looked darker than *White* result of lower *L* value. The colour of *Orange* RSS was the combination of high redness and high yellowness. Based on the colour attributes values in Table 6, *White* RSS was brighter than *Yellow* which was resulted of significantly higher *L* value of *White* RSS than *Yellow* RSS. The different of *Orange* with *White* and *Yellow* RSS was the *a* or redness value. *Orange* cultivars generated RSS having very high redness colour. However, the colour of the final product turned darker after final frying. The colour change occurred during frying which might be caused by browning. Browning might be caused by the activity of polyphenol oxidase enzymes in the presence of tannin or tannin-like compounds that exists in SP flour and also non enzymatic browning, especially caramelization, occurred during frying due to the high content of sugar in sweet potato. It is possible that SP flour contains high sugar leading to browning during frying.

The chemical characteristic of RSS made from 3 cultivars is shown in Table 7. Fat is considered to be an important factor in fried product. Fat content of frozen and fried RSS made of *Orange* was higher than *White* and *Yellow*. It's because the decreasing of moisture content from mashed to frozen, and frozen to fried RSS was higher than others (Figure 2). High fat content in restructured product occurred by the fat replacing water during frying. Oil absorption occurs as moisture is removed from the food during frying [22] and there is a linear relationship between oil uptake and water content of final product (Gamble *et al*., 1987). Figure 2 shows that decreasing of moisture content during frying in *Orange* was sharper compared to the other 2 cultivars. Protein is not an important compound in sweetpotato and its product and it is well known that SP is not a source of protein. As not a source of protein, protein content of RSS was found between 2.55 and 3.59% (db), whereas carbohydrate ranged from 59.19 to 71.83% (db) within the 3 cultivars. The result found that RSS was a good source of mineral based on the ash content.

TABLE VII
CHEMICAL CHARACTERISTICS OF RSS MADE OF 3 CULTIVARS

	Cultivars		
Chemical characteristics	*White*	*Yellow*	*Orange*
Frozen stick:			
Moisture (%)	61.10 [b]	63.91[a]	53.08 [c]
Fat (%, db)	15.68 [b]	16.98 [b]	32.94 [a]
Fried Stick:			
Moisture (%)	52.45 [a]	53.92 [a]	39.61 [b]
Fat (%, db)	21.44 [b]	24.80 [b]	35.91 [a]
Protein (%, db)	3.59 [a]	2.55 [b]	2.74 [ab]
C.hydrate (%,db)	71.83 [a]	69.40 [a]	59.19 [b]
Ash (%, db)	3.13 [ab]	3.25 [a]	2.17 [b]

a – c Means within rows followed by different superscripts letters are significant by different at P ≤ 0.05

D. Sensory properties

Table 8 presents the mean panel scores for quality attributes of RSS affected by different raw materials. With regards to colour, panels significantly (P<0.05) preferred RSS made from *Orange* cultivar having the bright orange colour compared to *White* and *Yellow*. The mean score of colour for *Orange* RSS was 5.8 (slightly below *like* *moderately*), whereas *White* RSS had a mean score 5.4 (midway between *like slightly* and *like moderately*). There was no significant different (P>0.05) of the texture preferences decided by the panels with the mean score around 5.0 ("like slightly"). Although the firmness or shearing force or hardness measured by instrument exhibit the different value, the panel did not detect any differences or in other words the texture was in the range of their preferences.

TABLE VIII
SENSORY SCORES1 FOR COLOUR, TEXTURE, FLAVOUR AND OVERALL ACCEPTABILITY OF RSS MADE FROM 3 CULTIVARS

Cultivars	Colour	Texture	Flavour	Overall Acceptability
White	5.4 [b]	5.0 [a ns]	5.1 [ab]	5.1 [b]
Yellow	4.9 [c]	4.9 [a]	4.9 [b]	5.0 [b]
Orange	5.8 [a]	5.0 [a]	5.2 [a]	5.2 [a]

[a – c] Means within columns followed by different superscripts letters are significantly different at P < 0.05

[1] Hedonic scale: 1 = *dislike extremely*; 2 = *dislike moderately*; 3 = *dislike slightly*; 4 = *neither like nor dislike*; 5 = *like slightly*; 6 = *like moderately*; 7 = *like extremely*

The panel significantly (P<0.05) preferred the RSS made of *White* and *Orange* for flavour, which had a mean score slightly above 5.0 ("like slightly"). Flavour of RSS might be from the specific sweet potato flavour and also the flavour produced during processing such as caramelization. Caramelization flavour is produced when sugars contained in sweet potato were burned by the frying temperature. Although the significant difference (P<0.05) was found for overall acceptability, the mean sensory score was slightly different and above "like slightly". The significant difference (P<0.05) was found for overall acceptability between RSS made from *White* and *Yellow*, and *Orange*. From these finding, one may conclude that the suitable cultivars for RSS were *Orange* and *White*.

IV. CONCLUSIONS

RSS is a "fabricated" product from SP patties which is moulded into finger like and fried to be a french-fry type. Textural characteristics of 3 commercial cultivars varied significantly. Fresh tuber of *White* and *Orange* cultivars had a hard texture, elastic and not sticky, whereas *Yellow* was soft, less elastic and sticky. These characteristics were affected by starch and amylose content of the tubers. *White* cultivar contained high starch with medium amylose content; *Yellow* had low starch with low amylose content; and *Orange* contained medium starch with high amylose content. *White* cultivar produced the RSS having yellow bright colour, high firmness and low fat content, whereas *Orange* cultivar generated RSS with bright orange colour, medium firmness but high fat content. RSS made of both varieties were evaluated as acceptable by a sensory panel. RSS made from *White* and *Orange* cultivars were preferred with sensory score above the average. Result from this study illustrates that *White* and *Orange* sweetpotato cultivars can be used to make a convenient restructured product (RSS).

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