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RESEARCH ARTICLE

Various Technical Variables in Blanching, Coating, Frying to the Physicochemical Properties Fried Pigmented Potato (*solanum tuberosum* l.) Crisp

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Abstract

Pigmented potato (*Solanum tuberosum* L.) varieties are a rich source of anthocyanins, in particular acylated derivatives. The potato products such as French fries, chips, balls etc. are also fried products which absorb high amount of oil. These products though taste good, pose health problems due to high calorie and cholesterol intake. The consumers prefer to low fat and fatfree fried foods. This research has been focused on different parameters of blanching, coating, frying, kind of frying oil for minimum oil absorption and sensory palatability while maintaining the most phytochemical components such as total phenolic, total flavonoid and anthocyanin during preservation. Results revealed that blanching 95^{o}C in 30 seconds with ascorbic acid of 0.05 g/100g potato, coating with carrageenan 0.20%, frying 4 mm of potato crisp in sunflower oil heating at 155^{o}C in 2 minutes was appropriated. Fried potato crisp could be preserved for 12 weeks at ambient 4^{o}C. Moisture and oil content, as well as colour and texture are important quality attributes of fried potato products which were significantly affected by blanching. Reducing the oil content of fried potato slices by application of coating is an effective method. Frying of potato crisps is carried out to convert the tubers to value added products. Frying method brings out unique flavor and texture to the products that improve their overall acceptability. Kind of oil used for frying also positively affected to oxidative reaction in fried potato crisps. The present study has examined various technical aspects to minimize the oil uptake in fried foods still retaining the desirable texture and flavor of the final product.

Keywords: *Potato crisp, Blanching, Coating, Frying, Shelf life, Anthocyanin, Flavonoid, Carrageenan.*

Introduction

Solanum tuberosum commonly known as potato belongs to solanaceae family. A number of pharmacological activities of potato have been reported viz. Antioxidant, anticancer, antiallergy, antibacterial, anti-inflammatory, antiobesity, anti-ulcer activity. Potato contains Phenolic acids, anthocyanin, flavonoids, vitamin B6, vitamin B3, pantothenic acid, potassium, manganese, phosphorous; copper and fibres [1]. Anthocyanins are the important pigments responsible for the red and purple fleshed potatoes, were recognized for their contributions to health, as they have been shown to have strong antioxidative activity, anti-influenza virus activity and anti-stomach cancer activity.

Anthocyanin-containing red-fleshed potato Inca Red (red potato) and purple-fleshed potato Inca Purple (purple potato) have beenbred from hybrid seedlings between cultivars of *Solanum tuberosum* ssp. and *S. tuberosum* ssp. Andigena. potato anthocyanins have been recognized for their contributions to health, as they have been shown to have strong antioxidative activity, anti-influenza virus activity and anti-stomach cancer activity Structure of anthocyanin[2]. The frying process results in unique flavor, colour and texture attributes which are the main drivers of consumer acceptability of the products [3,4].

Consumer preference for low-fat food products has been the driving force for the food industry to produce good quality Fried potatoes with reduced oil uptake[5]. Too much oil content in a Fried product endows it with an oily taste while too little oil content deprives it of the typical appealing taste and odour of the Fried product. Oil uptake in Fried potato products has generally been related to the amount of moisture, starch and dry matter content of the raw potato as well as temperature of the frying oil [6, 7]. Several other approaches may include modification of the frying techniques, preprocessing of the chips (blanching, drying, and freezing), employing desirable frying practices/ procedures and finally the use of coatings and batters onto the product before frying.

The use of hydrocolloids in many food formulations have been reported to improve the quality attributes and shelf-life of the fried foods [8]. Coatings were used to reduce fat uptake in chips as the application of a coating is a promising route to reduce oil content [3]. Since the surface properties of foods affect the oil absorption during frying, coatings make the surface stronger and more compact, with fewer less porous, the surface modification by the coatings can contribute to reduce water evaporation and leads to less oil uptake; also, coatings alter the water-holding capacity by trapping moisture inside and preventing the replacement of water by oil [9]. Additionally, hydrocolloids can be used as emulsifiers in composite films, the surface tension between the oil and the food could also be reduced, consequently contributed to decrease oil uptake.

The mechanisms of the oil uptake during frying are associated with heat transfer from the frying oil to the food. The hydrocolloid coatings significantly reduced the heat transfer coefficients as well as oil uptake which became more apparent at higher concentrations [10, 11]. There were some studies mentioned to potato (*Solanum tuberosum L.*) blanching, coating and frying. The effect of high-pressure (HP) pretreatment on oil uptake of potato slices was examined.12 The effect of different hydrocolloids on reduction of oil absorption and other quality parameters of taro chips during deep fat frying were investigated [13].

Influence of temperature and time fried potato (*Solanum tuberosum*) was examined [14]. Effect of blanching and coating with hydrocolloids on reduction of oil uptake in French fries was observed [15]. The effects of coating agent (locust bean gum [LBG]) concentration (0–1%), frying time (30–120 s) and frying temperature (160–190C) on oil content, moisture content and volume of fried potato chips was carried out [16]. A study was conducted to investigate the influence of growing environment and blanching on chips quality of potato [17]. Effect of guar gum with sorbitol coating on the properties and oil absorption of french fries was investigated [18].

Potato strips treated with different coatings (Carboxymethyl cellulose (CMC), pectin, agar and chitosan) at concentrations of 1 and 2% then fried for various durations (5, 7, 9, 11 and 13 minutes) were investigated for organoleptic and other quality parameters [19]. Effect of slice thickness and frying temperature on color, texture, and sensory properties of crisps made from four Kenyan potato cultivars was examined [20]. The effect of type of frying oil and temperature on the oxidative stability of potato chips during storage was studied. Cottonseed oil, soybean oil, olive kernel oil and palmolein were used as frying media[21]. The people now become health cautious and demand for less dense and low calorie foods. It is important to investigate blanching, coating, frying, thickness of material, kinds of oil during processing conditions for use by potential small scale processors while ensuring acceptable quality of potato crisp. Hence, the objective of this study was to determine the effect of blanching, frying temperature and time, thickness of potato crisp on the moisture retention, oil uptake and sensory quality of fried potato crisp.

Material & Method

Material

Potato tubers (*Solanum tuberosum L.)* were collected in Soc Trang province, Vietnam. After harvesting, it must be temporarily preserved in dry cool place. In laboratory, it was thoroughly washed to remove dirt and foreign matter. The potato tubers were washed, peeled, and sliced with a manual slicer. Potato would be sliced into pieces with different thickness depth. The slices were then washed in cold water to remove any adhering starch. The washed slices were dried with a tissue paper before being processed further. These potato slices will be blanched in different time and temperature; and then coated with carrageenan in different concentration.

The oil tank was filled with 10 liters of soybean oil and preheated. Once the oil temperature reached the target value, the frying basket with 1kg of sliced potato crisp was placed in the frying vessel and the lid was closed. After frying, the fried potato crisps were removed from the basket, allowed to cool to ambient temperature for 20 minutes, and then be packed in metalized polyethylene pouches.

Figure 1: Pigmented Potato (*Solanum tuberosum L.)*

Research Method

Effect of Blanching Temperature and Time on Physicochemical and Sensory Properties of Fried Potato Crisp

Four levels of blanching temperature (°C) namely (i) 85°C in 60 seconds (ii) 90°C in 45 seconds (iii) 95°C in 30 seconds (iv) 100°C in 15 seconds were carried out. During blanching, all samples were treated with ascorbic acid of 0.05 g/100g potato. The best blanching temperature and time was selected based on the values of moisture (g/kg) and oil (g/kg) content; total phenolic (mg GAE/ g), total flavonoid (mg QE/g), anthocyanin (mg/ 100g); sensory score of Fried potato crisp.

Effect of Edible Carrageenan Coating on Physicochemical and Sensory Properties of Fried Potato Crisp

Four levels of edible carrageenan coating (%) namely (i) 0.1% (ii) 0.15% (iii) 0.20% (iv) 0.25% were carried out. All samples were blanched at 95°C in 30 seconds before coating with carrageenan. The best coating concentration was selected based on the values of moisture (g/kg) and oil (g/kg) content; total phenolic (mg GAE/ g), total flavonoid (mg QE/g), anthocyanin (mg/ 100g); sensory score of Fried potato crisp.

Effect of Frying Temperature and Time on Physicochemical and Sensory Properties of Fried Potato Crisp

Four levels of frying temperature (°C) namely (i) 145°C in 3.0 minutes (ii) 150°C in 2.5 minutes (iii) 155°C in 2.0 minutes (iv) 160°C in 1.5 minute were carried out. The best frying temperature and time was selected based on the values of moisture (g/kg) and oil (g/kg) content; total phenolic (mg GAE/ g), total flavonoid (mg QE/g), anthocyanin (mg/ 100g); sensory score of Fried potato crisp.

Effect of Thickness of Potato Crisp on Physicochemical and Sensory Properties of Fried Potato Crisp

Thickness of potato crisp was examined in four different size levels (2.0 mm, 3.0 mm, 4.0 mm, 5.0 mm). The best primary thickness of potato crisp was selected based on the values of moisture (g/kg) and oil (g/kg) content; total phenolic (mg GAE/ g), total flavonoid (mg QE/g), anthocyanin (mg/ 100g); sensory score of Fried potato crisp.

Effect of Kind of Frying Oil on Shelf Life of Fried Potato Crisp

Raw potato crisps were fried by four different kinds of oil (soybean, peanut, sunflower, and canola) and stored in ambient temperatures (28°C) during 12 weeks of storage. Shelf life of fried potato crisps was based on the changes in thiobarbituric acid (TBARs) (mg malonaldehyde/ kg).

Physico-chemical and Statistical Analysis

Moisture (g/kg) content of Fried potato crisps was determined in triplicate according to the AOAC
method (AOAC, 2000) using a hot air oven. Oil (g/kg) content of Fried potato crisps was determined in triplicate by petroleum ether extraction using the Soxhlet extraction unit. Total phenolic (mg GAE/ g) content was determined by the method based on oxidation–reduction reaction by Folin–Ciocalteu reagent using gallic acid as a standard. Total flavonoids (mg QE/g) content was determined by colorimetric method [22]. Total anthocyanin content (TAC) was determined by following the procedures of Mancinelli, Hoff, and Cottrell (1988) with few modifications [23]. Sensory score was based on 9-point hedonic scale. The thiobarbituric acid (TBARs) (mg malonaldehyde/ kg) of Fried potato crisps was determined in triplicate by a distillation method [24]. Data were statistically summarized by Statgraphics Centurion XVI.

Result & Discussion

Effect of Blanching Temperature and Time on Physicochemical and Sensory Properties of Fried Potato Crisp

Blanching is essential to producing fries of good quality in terms of both color and texture.25 Blanching inactivates enzymes, leads to leaching out of sugars, gelatinizes starch and causes cell separation [26, 29]. Blanching temperature and frying time had a greater impact on texture and appearance of Fried crisps than blanching time [30].Some authors showed that using low-temperature blanching may reduce oil content compared to high-temperature blanching[31, 32].

Table 1: Effect of blanching temperature and time on physicochemical and sensory properties of Fried potato crisp

Blanching	Moisture (g/kg)	Oil (g/ kg)	Total phenolic (mg GAE/ g)	Total flavonoid (mg QE/g)	Anthocyanin (mg/100g)	Sensory score
85°C in 60 seconds	0.51±0.02^{a}	1.63±0.02^{a}	2.65±0.01^{b}	0.81±0.01^{b}	27.41±0.02^{b}	7.38±0.02^{ab}
90°C in 45 seconds	0.50±0.01^{ab}	1.61±0.03^{ab}	2.71±0.02^{ab}	0.83±0.03^{ab}	27.58±0.02^{ab}	7.55±0.01^{ab}
95°C in 30 seconds	**0.50±0.01^{ab}**	**1.60±0.01^{ab}**	**2.80**±0.01^{a}	**0.87**±0.02^{a}	**27.79**±0.00^{a}	**7.66±0.03^{a}**
100°C in 15 seconds	0.47±0.03^{b}	1.59±0.00^{b}	2.68±0.01^{ab}	0.82±0.00^{ab}	27.48±0.01^{ab}	7.10±0.01^{b}

Data are expressed as mean ± SD values (n = 3). Mean value with different superscript in each column differs signifcantly ($p<0.05$)

Sliced potatoes were blanched to minimise enzymatic reactions which cause degradation of anthocyanins [33]. The effect of high-pressure (HP) pretreatment on oil uptake of potato slices was examined. High-pressure blanching was used to reduce the frying time, but not oil uptake [12]. Effect of blanching and coating with hydrocolloids on reduction of oil uptake in French fries was observed. French fries pretreated with 0.5% aqueous solution of CaCl2 and coated with 1% aqueous solution of HPMC resulted better product in moisture retention and oil uptake than the French fries with other hydrocolloids (MC, guar gum and xanthan gum). However, the French fries pretreated with 1% aqueous solution of citric acid and coated with 1% aqueous solution of HPMC resulted in better sensory quality than the fries with other hydrocolloid [15]. A study was conducted to investigate the influence of growing environment and blanching on chips quality of potato. Blanching resulted in a better acceptability of potato chips [17].

Effect of Edible Carrageenan Coating on Physicochemical and Sensory Properties of Fried Potato Crisp

During frying, the water evaporates from the food into the frying medium (oil), which in turn penetrates inside the product [34]. The oil uptake of crisps is of concern because of the need to replace the oil absorbed by the product in the fryer. The distribution and the amount of oil absorbed are affected by the oil quality and composition, frying temperature and time, product composition, moisture content, shape, porosity, pre-frying treatment, surface treatments, initial interfacial tension and crust size [25]. The major challenge for the food industry is to produce low fat fried product with desirable texture, color and flavor.

Some edible coatings, particularly hydrophilic polymers, have the desirable barrier properties to gas/moisture and good mechanical characteristics, which gives them potential to decrease oil uptake, to prevent moisture loss, preserve texture, and maintain color, consequently extending the product shelf-life in fried products [36].

Table 2: Effect of edible carrageenan coating on physicochemical and sensory properties of Fried potato crisp

Carrageenan concentration (%)	Moisture (g/kg)	Oil (g/ kg)	Total phenolic (mg GAE/ g)	Total flavonoid (mg QE/g)	Anthocyanin (mg/100g)	Sensory score
0.10	0.50 ± 0.01^{a}	1.60 ± 0.01^{a}	2.80 ± 0.01^{b}	0.87 ± 0.02^{b}	27.79 ± 0.00^{b}	7.66 ± 0.03^{a}
0.15	0.50 ± 0.01^{a}	1.51 ± 0.01^{ab}	2.87 ± 0.02^{ab}	0.90 ± 0.00^{ab}	27.94 ± 0.02^{ab}	7.69 ± 0.00^{ab}
0.20	**0.51 ± 0.03^{a}**	**1.44 ± 0.02^{b}**	**2.98**$\pm0.01^{a}$	**0.95**$\pm0.02^{a}$	**27.98**$\pm0.03^{a}$	**7.95 ± 0.02^{a}**
0.25	0.51 ± 0.00^{a}	1.30 ± 0.01^{c}	3.00 ± 0.01^{a}	0.96 ± 0.01^{a}	28.01 ± 0.01^{a}	7.95 ± 0.00^{a}

Data are expressed as mean ± SD values (n = 3). Mean value with different superscript in each column differs signifcantly (p<0.05)

The effect of different hydrocolloids on reduction of oil absorption and other quality parameters of taro chips during deep fat frying were investigated. The optimum conditions for uncoated chips for chips thickness, frying oil temperature were 1.5 mm, 170°C and 3 minutes, respectively. The slices of 1.5 mm thickness were blanched in 0.5% CaCl2 at 80°C for 5 minutes followed by dipping in aqueous solution of hydrocolloids (pectin, guar gum and methyl cellulose) having concentration from 0.5-1.5%. The coated chips partially dried at 60°C in a tray dryer to get a final moisture content of 40% (wet basis) followed by deep frying in refined sunflower oil at 170°C for 3 min. Among different gums that used in this study, Methyl cellulose coating with 1.5% concentration resulted in better quality chips as compared to pectin and guar gum coating having highest potential to reduce the oil absorption and better sensory quality [13]. Effect of guar gum with sorbitol coating on the properties and oil absorption of french fries was investigated. Pretreatment of blanching with calcium ions and coating with guar gum and sorbitol could significantly reduce the structural oil (STO) and penetrated surface oil (PSO) of French fries and have no negative effects on its texture and also effectively control the final moisture content [18].

Effect of Frying Temperature and Time on Physicochemical and Sensory Properties of Fried Potato Crisp

Frying is a process of simultaneous heat and mass transfer in which heat is transferred from the oil to the food that leads to moisture transfer in the form of vapors and the fat is absorbed by the food.

The process remains a complex operation because of the two mass transfers in opposite directions within the material being Fried. A number of physical and chemical changes occur during frying starting with dehydration to cooking, starch gelatinization, protein denaturation, aromatizing, and coloring via Maillard reactions and fnally oil uptake [37].

Table 3: Effect of frying temperature and time on physicochemical and sensory properties of Fried potato crisp

Frying	Moisture (g/kg)	Oil (g/ kg)	Total phenolic (mg GAE/ g)	Total flavonoid (mg QE/g)	Anthocyanin (mg/100g)	Sensory score
145oC in 1.0 minutes	0.51±0.03a	1.44±0.02a	2.98±0.01ab	0.95±0.02ab	27.98±0.03b	7.95±0.02b
150oC in 1.5 minutes	0.48±0.03ab	1.40±0.02ab	3.00±0.02ab	0.98±0.02ab	28.03±0.02ab	8.02±0.01ab
155oC in 2.0 minutes	**0.46±0.02ab**	**1.36±0.02ab**	**3.03**±0.01a	**1.01**±0.03a	**28.11**±0.01a	**8.17±0.03a**
160oC in 2.5 minute	0.45±0.01b	1.31±0.00b	2.94±0.01b	0.90±0.01b	27.62±0.03c	7.84±0.01c

Data are expressed as mean ± SD values (n = 3). Mean value with different superscript in each column differs signifcantly (p<0.05)

From table 3, the potato crisp should be Fried at 150^{o}C in 2 minutes to achieve the best physicochemical and sensory properties of finished products. Frying is a simultaneous heat and mass transfer process where moisture leaves the food in the form of vapour bubbles, while oil is absorbed simultaneously. The frying process results in unique flavor, color and texture attributes which are the main drivers of consumer acceptability of the products. Moisture and oil content, as well as colour and texture are important quality attributes of Fried potato. The effects of coating agent (locust bean gum [LBG]) concentration (0–1%), frying time (30–120 s) and frying temperature (160–190C) on oil content, moisture content and volume of fried potato chips was carried out. Optimal coating and frying conditions were achieved with 1% LBG concentration, 120 s frying time at 175C frying temperature [16]. In another research, potato strips treated with different coatings (Carboxymethyl cellulose (CMC), pectin, agar and chitosan) at concentrations of 1 and 2% then fried for various durations (5, 7, 9, 11 and 13 minutes) were investigated for organoleptic and other quality parameters.

Strips were submerged in coating solutions for 5 seconds prior deep fat frying. Frying for 11 and 13 minutes gave the most significantly accepted fries while all coating treated strips obtained lower sensory quality scores and the concentrations used did not significantly affect sensory parameters of strips (p<0.05). Coatings reduced the amount of oil absorbed by strips by 12.93% (pectin), 11.71% (CMC), 8.28% (chitosan) and 5.25% (agar). Coating treatments and concentration significantly improved moisture retention of strips (p<0.05). Strips treated with hydrocolloids at 1% and fried for 11 minutes revealed that texture and yellowness (b*) values were not significantly different from the control strips [19].

Effect of thickness of potato crisp on physicochemical and sensory properties of Fried potato crisp

Mode of heat transfer from medium into the food pieces during initial heat-up stage was convection, subsequently when the temperature inside reached the boiling point, moisture started to evaporate during the constant rate stage. The last stage was falling rate, food surface became dry and crust, moisture was slowly removed by moisture diffusion mechanism [38, 39].

Table 4: Effect of thickness (cm) of potato crisp on physicochemical and sensory properties of Fried potato crisp

Thickness (mm)	Moisture (g/kg)	Oil (g/ kg)	Total phenolic (mg GAE/ g)	Total flavonoid (mg QE/g)	Anthocyanin (mg/100g)	Sensory score
2	0.46±0.02^{ab}	1.36±0.02^{a}	3.03±0.01^{b}	1.01±0.03^{b}	28.11±0.01^{b}	8.17±0.03^{b}
3	0.47±0.02^{ab}	1.31±0.02^{ab}	3.07±0.01^{ab}	1.09±0.01^{ab}	28.15±0.02^{ab}	8.22±0.01^{ab}
4	**0.48±0.03^{a}**	**1.29±0.01^{ab}**	**3.11±0.01^{ab}**	**1.11±0.02^{ab}**	**28.21±0.02^{ab}**	**8.34±0.02^{a}**
5	0.51±0.02^{a}	1.27±0.02^{b}	2.13±0.01^{a}	1.14±0.01^{a}	28.34±0.00^{a}	7.93±0.01^{c}

Data are expressed as mean ± SD values (n = 3). Mean value with different superscript in each column differs signifcantly (p<0.05)

From table 4, the potato crisp should be sliced into bars in 2.0 cm of thickness to achieve the best physicochemical and sensory properties of finished products during frying. In another research, effect of slice thickness and frying temperature on color, texture, and sensory properties of crisps made from four Kenyan potato cultivars was examined. Potato tubers were peeled, washed, and cut into slices of thickness 1.0, 1.5 and 2.0 mm. Each size was fried at 170°C for 2-5 min. Slice thickness significantly influenced the lightness color parameters [20].

Effect of Kind of Frying Oil on Shelf Life of Fried Potato Crisp

Shelf life is the time period in which a food product still retains its quality and safety and is acceptable to consumers. Shelf life evaluation of food stored under actual condition may take much longer time; hence an accelerated shelf life testing is often used for shelf life prediction [40]. Rancidity is often considered an unpleasant flavor in Fried foods and can be indicated by the thiobarbituric acid (TBARs) value.

Table 5: Effect of kind of frying oil on shelf life (thiobarbituric acid, mg malonaldehyde/ kg) of fried potato crisp during storage

Storage (weeks)	Soybean	Peanut	Sunflower	Canola
0	0.50±0.01b	0.50±0.01b	0.50±00.01b	0.50±0.01b
4	0.56±0.02ab	0.54±0.03ab	0.53±0.03ab	0.56±0.03ab
8	0.59±0.00ab	0.57±0.01ab	0.55±0.01ab	0.57±0.01ab
12	0.61±0.01a	0.60±0.03a	0.56±0.01a	0.59±0.01a

Data are expressed as mean ± SD values (n = 3). Mean value with different superscript in each column differs signifcantly (p<0.05)

From table 5, fried potato crisp should be fried by sunflower oil to get the lowest thiobarbituric acid value with the lowest the rancidity reaction. In one report, the storage stability of potato chips fried in regular (RCO), hydrogenated (HYCO), low-linolenic (LLCO), and high-oleic (HOCO) canola oils was compared. Potato chips were fried in each kind of oil over a 5-d period for a total of 40 h of frying. Chips from frying day 1 and 5 were packaged and stored at 60°C for 0, 1, 2, 4, 8, and 16 days. Potato chips fried in RCO, LLCO and HOCO developed an intense painty odor, whereas chips fried in HYCO developed an intense stale/musty odor by the end of the 16 d of storage.

Chips fried in RCO had greater rates of accumulation of peroxides, FFA, CDA, and polar components and developed higher levels of total volatiles over the 16 d of storage than chips fried in the other three oils. Chips fried in HYCO had lower rates of accumulation of peroxides and CDA than chips fried in LLCO and HOCO, and lower rates of FFA accumulation than chips fried in LLCO. Chips fried in HYCO and HOCO had the lowest amounts of total volatiles during storage [41].In another investigation, the effect of type of frying oil and temperature on the oxidative stability of potato chips during storage was studied. Cottonseed oil, soybean oil, olive kernel oil and palmolein were used as frying media. The chips were packaged in metallized cellophane bags and incubated at 63 °C. Olive kernel oil and palmolein absorbed into the chips showed better stability, whereas soybean oil presented the higher oxidation rate. Frying temperature (170, 180 or 190 °C) did not affect the oxidation rate during storage [21].

Conclusion

Potato (*Solanum tuberosum*) is a useful source of bioactive compounds. in addition to carbohydrates and protein and vitamins. They comprise a rich source of phenolic acids, flavonoids, phytates, folates, anthocyanins and carotenoids. Frying involves several chemical and physical changes including starch gelatinization, protein denaturation, water vaporization, and crust formation as well as nutritional changes. Frying of any product improves its taste making it juicy and crisp due to the light outer crust formed during the frying process. Consumers have desired Fried foods because of their unique combination of flavor and texture. Consumers are increasingly health conscious and trends are moving toward foods with low oil content. The quality of the products from frying depends not only on the frying conditions, but also on the storage of Fried potato crisp. This study demonstrated that blanching, coating, frying temperature and time; thickness of potato crisp; packaging and storage temperature had signifcantly affected quality of Fried potato crisps.

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