

ABSTRACT

Mohamed El-Amin Mohamed Moussa. Factors Affecting the Quality Characteristics of some Processed Vegetables. Unpublished Ph.D. Dissertation, Ain Shams Univ., Fac. of Agric., Department of Food Science, 2006.

This investigation was carried out to provide useful information about the selection of suitable methods of treatment for producing the high quality of French fried potatoes. These factors were included verifying the appreciate variety of potatoes, type and condition of pretreatments and selecting the suitable coating and recoating materials and its levels. The impact of the studied factors was monitored through assessment of proximate analysis and the changes in enzymatic activities of Peroxidase (POD) and Polyphenol oxidase (PPO) as well as sensory characteristics.

The higher rate of moisture content was observed by using 0.1% hot solution of CaCl_2 with diamont potato strips and 0.3% hot solution of CaCl_2 after 5 min of blanching. While, either increasing the concentrations of CaCl_2 or the time of blanching the lower total protein content was occurred. Also, the increasing the concentration of CaCl_2 with progress blanching time the increasing of total carbohydrate was noticed.

Dehydrated santana potato strips pretreated with blanching in hot 0.7% CaCl_2 had higher contents of moisture, protein, ash and crude fiber than that for diamont. The moisture content was gradually increased by increasing the level of sodium alginate and/or pectin as hydrocolloid materials. Since, the total carbohydrates of diamont French fried potato was increased gradually by increasing the level of sodium alginate and pectin as hydrocolloid coating materials.

Enzymes exhibited varying degrees of activity for the two potato varieties, where, the residual activity of peroxidase and polyphenol oxidase reduced gradually by increasing the time of blanching either in hot water (85°C) or in hot CaCl₂ solutions (85°C) at different concentrations ranged from 0.1 – 0.7%. However, blanching of potato strips in a hot 0.7% CaCl₂ showed more effective for inhibiting peroxidase activity.

Residual POD activity would be expected to be lower in semi fried santana recoated with 2.5% pectin than other tested samples.

There was >94% loss of PPO activity was noticed at 6% sodium alginate and pectin for all tested potato samples, semi fried potato coated with either sodium alginate and pectin was little effect on loss of PPO activity, there is a continues decrease in residual activity of PPO was observed during frozen storage for all tested samples comparing with that just after frying. Generally, the POD was considered more suitable indicator to judge for blanching treatment of potatoes than the PPO.

Consequently, the variety and the pretreatment used and both coated materials and their concentrations in the tested fried potatoes seems to play an important role for reducing the browning rate, the browning rate of all blanched tested samples were decreased gradually by increasing the time of blanching and CaCl₂ concentration. But, the rate of browning either semi fried potatoes coated with sodium alginate or pectin was increased gradually by increasing the concentration of coated material. Its useful to use Sodium alginate at low concentration to reduce the browning rate of semi fried potatoes. On the other hand, with increasing the shelf life of frozen semi fried potatoes up to 6 months, the reduction of browning rate was continued.

Sensory evaluation indicated that, type of coated hydrocolloid materials used at various levels had greater effect on sensory attributes for color, dryness, texture, flavor, taste and overall acceptability for obtained French fried potatoes of the two tested varieties. Where, French fried potatoes coated with 5% and 6% pectin recorded the highest scores for sensory evaluation. On the other hand, French fried potatoes recoated with 2% CMC, sodium alginate and pectin recorded the highest scores of colors, dryness, flavor, texture, taste and overall acceptability.

Fresh baladi (*Colocasia antiquorum*) taro had the highest contents of moisture, Protein, ash, crude fiber, ether extract, reducing sugars, total sugars and acidity than American (*Colocasia esculenta*). While, American taro was more starchy, less protein and mucilage contents than baladi. The protein, ash and crude fiber contents were minimized by blanching for the two taro varieties . Since, the protein, ash and reducing sugars contents were reduced gradually by increasing the time of frozen storage at -18°C up to 6 months.

Consequently, the ash content was increased immediately after dehydration for both the two tested taro varieties but decreamental rate of ash, reducing, non-reducing and total sugars were observed through storage at $5 \pm 1^{\circ}\text{C}$ for 9 months.

Baladi taro was loss more activity of POD than American variety by extraction of mucilage. While, blanching in hot water at 85°C for 5 min caused a greater loss of POD and PPO activity reached to about 95 and 97% for both the two tested varieties.

Results also indicated that, the recovery of POD and PPO was increased gradually by extending the shelf life of frozen and dehydrated of blanched taro at -18°C and $5 \pm 1^{\circ}\text{C}$ up to 9 months. On the other hand, the browning rate was reduced by extraction of

mucilage and blanching in hot water at 85°C for 5 min. While, the browning rate of frozen and dehydrated blanched taro were increased gradually by extending the shelf life at -18°C and at 5 ± 1°C up to 9 months. But American taro recorded the highest rates of browning than baladi.

Key Words: Potato, taro, varieties, Proximate analysis, Semi fried, Coating materials, Peroxidase, polyphenol oxidase, residual activity, Browning, dehydrated, sensory evaluation and Taro Powderds.

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List of Abbreviations

AA	Ascorbic acid
AAO	Ascorbic acid oxidase
°C	Degree centigrade
CA	Citric acid
CaCl ₂	Calcium chloride
cm	Centimeter
CMC	Carboxy methyl cellulose
cv.	Cultivar
DM	Dry matter
e.g.	Exempli gratia (for example)
°F	Degrees Fahrenheit
FAO	Food and Agriculture Organization
Fig.	Figure
FW	Fresh weight
g	gram
hr	Hours
IFT	Institute of Food Technology
Kg	Kilogram
L	Litter
M	Molar
mg	Milligram
min.	Minute
mL	Milliliter (s)
mM	Millimolar
mm	Millimeter (s)
N	Normal
nm	Nanometer (10 ⁻⁹ m)
O.D.	Optical density

P	Probability
POD	Proxidase
PPM	Part per million
PPO	Polyphenol oxidase
s	Second
S.A	Sodium alginate
SDS	Sodium dodecyl sulfate
T.A	Titratable acidity
T.S	Total solids
v/v	Volume per volume
var.	Variety
w/w	Weight per weight
WHO	World Health Organization
wk	Weck
wt	Weight
µg	Microgram (10^{-6} g)
%	Percent