

Application of Response Surface Methodology Optimizing the Phenolic Content and Anthocyanin Extraction of Purple Sweet Potato Flour

Rebecca Jebaseeli Edna K. S Elizabeth Amudhini Stephen, M. Vijila, Surya Prabha

Abstract: Anthocyanin from purple sweet potato can fill in as normal colorant and are generally utilized in juices, mixed drinks, jam, dessert shops, bread, tidbits and noodles. Anthocyanin contained in PSP have useful wellbeing impact. They are dried in various temperature (50°, 60° 65°) for 6hr to 7 hr, citrus extract focus is about (1%-3%w/v) and drenching time 1-2 min. Flour can be utilized as thickener in soup, sauce, and bread kitchen item. PSP flour are to be upgrade natural substance such has phenolic content and anthocyanin content. improvement of anthocyanin substance and phenolic content were utilized in Box – Ben ken technique present in the Response surface approach.

Key Words: Anthocyanin content, phenolic content ,purple sweet potato, Box - Ben Ken Method

I. INTRODUCTION

Indonesia is known as a rural, tropical nation with the capacity to deliver different harvests and ranch items. One of those items is the sweet potato, which involves 89% in its use as the staple nourishment. Its utilization rate is 7.9 kg per individual every year. It is likewise utilized for modern uses like sauce and creature feed. (Lee and others 2000; yamakawa and yoshimoto 2002; philpott and others 2003)

Purple fleshed sweet potato has a high source starches and dietary fibre. purple sweet potato demonstrates that more grounded cell reinforcement movement than numerous different vegetables it contains high measure of anthocyanin (zhang et al., 2009). They are high in potassium, B6,

supplement C, fiber, and cell fortifications—purple sweet potatoes are really one of nature's supernatural occurrences. The Anthocyanin are phenolic mixes in charge of the exceptional shade of many foods grown from the ground, for example, red grapes, berries, red cabbage and sweet purple Potatoes (Boca Raton 1993) purple sweet potato has an enormous measure of nutritious and impact emphatically on physical health (Galvano et al., 2004). Purple sweet potato anthocyanin have potential free radicals scavenging, antioxidant anti mutational and hypoglycaemic effect and also tend to cause cancer. Most of the research tell that on physiochemical in roots of sweet potato indicates that high level of polyphenols. Recent report on the nutritional ingredients from purple sweet potato shows high radical scavenging activity and anti mutagenic activity. PSP showed high antioxidant activity compared to vegetables due the anthocyanin. (Zhang Et Al, 2009). The anthocyanin present can act as a natural colour and due its high light and heat stability (tsukui et al 2002). The di glycosylation, combined with acylation on the glycosides adds to the shading security. It is most steady in acidic conditions. anthocyanin are dissolvable in polar solvents and are regularly remove rich anthocyanin and phenolic content by fluid blend of natural solvents such has ethanol, methanol or acetone (Kano, Takayanagi, Harada, Makino & Ishikawa, a, 2005). citrus extract is broadly utilized in nourishment as a PH alteration and flavor improvement operator and is in charge of 70% and making up the staying 30% for fermentation and chelating (Dhillon et. Al., 2011 Altunkaya and Gokmen 2009). Purple sweet potato are handled into flour. Flour can be utilized has thicker in soup, bread kitchen item expelled item and drinks. it is can be utilized to upgrade on palatable covering on foods grown from the ground, shading, flavor and regular sugar. Sing et al. (2003) utilized potassium metabisulphite, citrus extract and sodium chloride to improve the nature of chips from sweet potatoes. The investigation about advancement on fundamental treatment are drying temperature, citrus focus and drenching time for anthocyanin and phenolic content utilizing RSM

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* Correspondence Author (s)

Rebecca Jebaseeli Edna K Assistant Professor, Department of Mathematics

S. Elizabeth Amudhini Stephen Associate Professor, Department of Mathematics, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

M. Vijila Assistant Professor, Department of Mathematics

Surya Prabha M. Tech Food Processing & Engineering, Department of Food Processing and Engineering, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

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MATERIALS AND METHODS

RAW MATERIALS

Sweetpotato were purchased from local market.

FLOUR PREPARATION

Sweet potato without vermin and development were washed and dried at incorporating temperature(20°c). The sweet potato were secured at 14°c for 15 days without any added substances it was stripped and washed using water, and cut small (1,5 mm thick) by using slicer. The cut models was steam-brightened in a steamer for 5 minutes at the temperature of 95°C. By then, the brightened model was dried using authority drier at the assorted temperature of 60°C 65°C 70°C for 8 hours. Whenever dried, the PSP chips was smashed using processor, and later sieved using 80 work strainer. The flour was secured in a diminish vacuum holder.

II. EXPERIMENTAL DESIGN

The three variables set has parameter are temperature of drying , concentration of citric acid and time for soak to set anthocyanin and phenolic content as response valves . Based on the Box –Behken method the experiment. Was conducted with quadratic model 17 individual run points were taken for analysis . the values are given in the below table.1

Std	Run	Factor 1 Drying temperatur e (°C)	Factor 2 concentr ation of Citric acid (%w/v)	Factor 3 Time of Soaki ng (min)	Response 1 Anthocya nin Content Mg/100g wet wt	Respon e 2 Phenoli c content Mg/gw etwt
15	1	60	2	2	25.77	56.22
12	2	60	3	3	35.88	45.22
8	3	65	2	3	32.56	64.11
3	4	55	3	2	21.44	59.46
11	5	60	1	3	40.16	49.28
14	6	60	2	2	27.16	51.36
17	7	60	2	2	39.46	41.23
13	8	60	2	2	20.02	63.26
7	9	55	2	3	28.11	54.17
9	10	60	1	1	40.79	48.29
6	11	65	2	1	36.2	56.58
4	12	65	3	2	22.89	44.64
1	13	55	1	2	33.55	47.82
2	14	65	1	2	29.57	64.32
16	15	60	2	2	40.52	58.15
5	16	55	2	1	24.33	60.22
10	17	60	3	1	38.25	48.96

Table 1. Experimental Design Matrix Developed by Response Surface Methodology

III. RESULT AND DISCUSSION STATISTICAL ANALYSIS

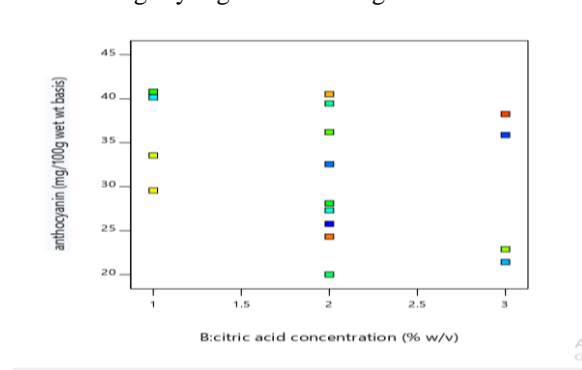
The two independent variables and each dependent variable are anthocyanin and phenolic content were checked for optimal conditions using three dimensional RSM. Response model plot are characterized to be adequate. These are coded as A, B, and C as they are the independent variables

.The dependant variables (Y) measured for the purple sweet potato were anthocyanin (Y1) and phenolic content(Y2)
 $Y1 = -844.25750 + 29.88495A - 28.05025B - 0.406500C + 0.271500AB + 0.371000AC - 0.4355000BC - 0.244510^2A + 2.35725^2B + 5.79475^2C$
 $Y2 = 690.74500 - 24.06290 A + 116.5292 B - 35.74075 C - 1.566000 AB + 0.679000AC - 1.18250AC + 0.216970^2A - 5.40825^2 B - 0.698250^2C$

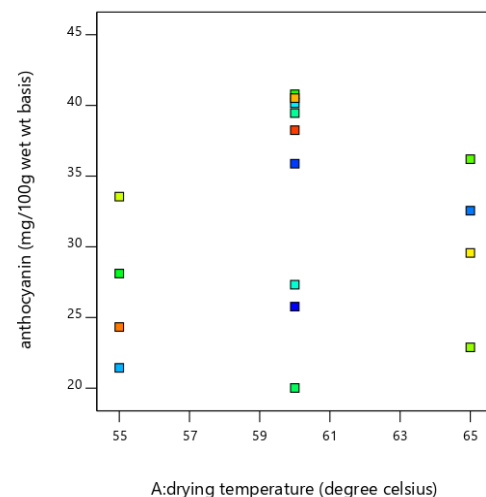
IV. ANTHOCYANIN CONTENT

Citric acid concentration and drying temperature has an interaction effect on the anthocyanin content. Citric acid concentration is at its lowest, the anthocyanin is found to increase along drying temperature but citric acid concentration is at highest reaches to particular point and slower rate is decreases.

- citric acid concentration vs anthocyanin :anthocyanin level is high , citric acid concentration is low.
- anthocyanin vs drying temperature : anthocyanin level is slightly high than drying temperature
- anthocyanin vs soaking time :anthocyanin level is slightly high than soaking time



(a)



(b)



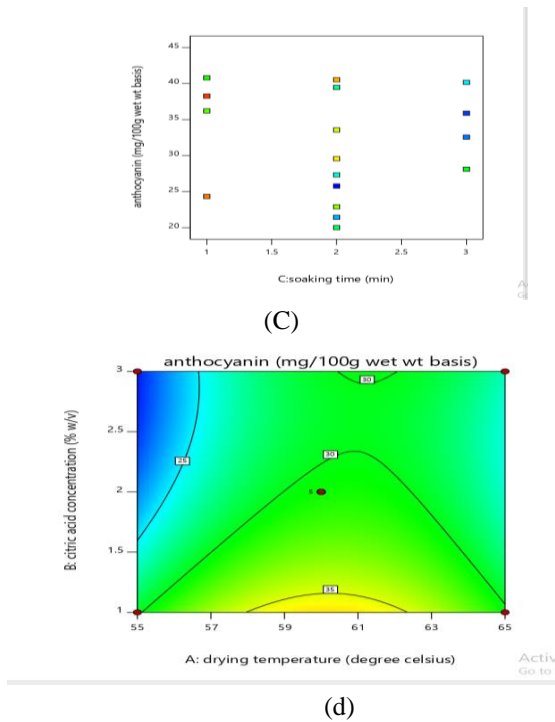


Figure 2: Effects on citric acid concentration and anthocyanin (a) ,drying temperature and anthocyanin (b),soaking time and anthocyanin (C) ,Shows the Relationship of anthocyanin with the citric acid concentration and drying temperature(d).

V. PHENOLIC CONTENT

Citrus extract focus and drying temperature has a cooperation impact on the phenolic content. Drying temperature is to be most reduced , anthocyanin level is increment in citrus extract fixation

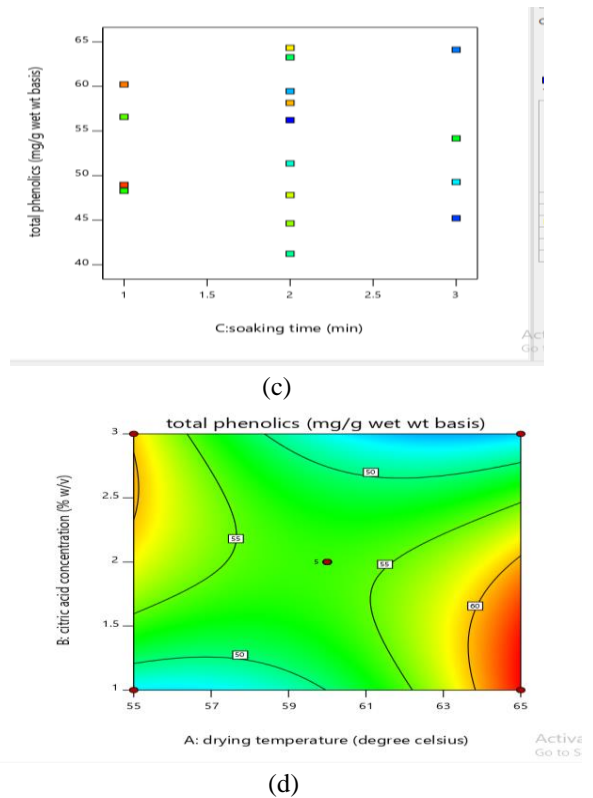
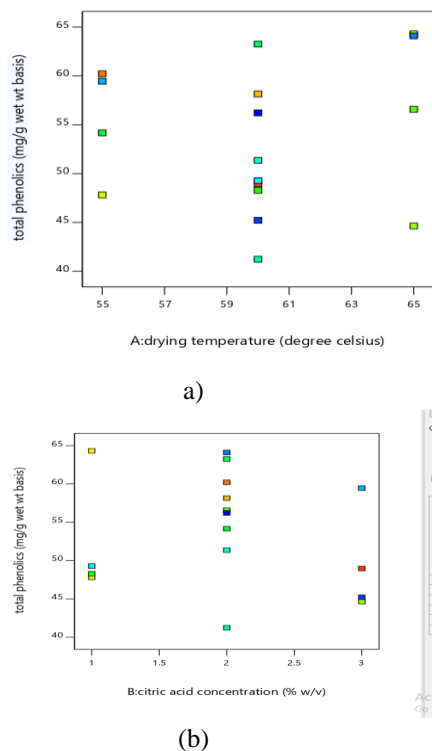


Figure 3: Effects on citric acid concentration and phenolic (a) drying temperature and phenolic(b)soaking time and Phenolic (C) . Shows the Relationship of phenolicwith the citric acid concentration and drying temperature(d)

VI. CONCLUSIONS

Drying temperature , dousing time and citrus extract focus are fluctuates in purple sweet potato, anthocyanin and phenolic content.The RSM was performed to anticipate the procedure parametersThe ideal condition for drying temperature is 58 °C ,citrus extract fixation is 2.27 % and splashing time is 2 minutes. The relating trial reaction of anthocyanin substance is increment and phenolic content is decline than the past detailed qualities. The flour can be utilized for thicker of soup , bread shop item and manufactured sustenance.

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4. Jong-Bang Eun, Department of Food Science & Technology, Chonnam National University, 77 Yongbong-ro Buk-gu,
5. Gwangju 500-757, South Korea. Tel: 82 62 530 0255. Fax: 82 62 530 2149.

