

Utilization of Bamboo Charcoal as Additives in Cakes

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Asia Pacific Journal of Multidisciplinary Research

Vol. 3 No.5, 82-86
December 2015 Part II
P-ISSN 2350-7756
E-ISSN 2350-8442
www.apjmr.com

Date Received: November 24, 2015; Date Revised: December 30, 2015

Abstract - Charcoal has been used for healing various diseases, as antidote to poisoning and as purifying agent to filtered water. This study is conducted to utilize charcoal as additives in making cakes. Specifically, it is intended to determine the acceptable level of charcoal when used as additives in the production of brownies, dark brown chocolate, and chiffon cakes. It can be concluded that an addition of 1 tablespoon of bamboo charcoal gave the highest sensory evaluation to brownies and 3 tablespoon to dark brown chocolate. The control (no charcoal added is still the best treatment for chiffon cake.

Keywords: Bamboo Charcoal, Cake Additive,

INTRODUCTION

Charcoal is a carbon fuel derived from partial burning of wood or other carbon containing materials [1]. It is used basically for cooking [2], deodorizing in refrigerators [3])and as substrate in growing orchid, anthurium and other plants [4]. It has been used effectively in the healing arts for centuries [5]. Doctors still use it today as a healing agent, an antidote for poisons[6, 7], and an effective treatment for indigestion and gas [8]. Charcoal can remove ammonia from diluted sulfuric acid [9].

In industry, charcoal are used to deodorize, decolorize and purify solutions[10]. Charcoal has adsorbent property[11, 12] that is it has the ability to attract other substance to its surface and clamps them. It can absorb harmful gases[13], heavy metals, poisons and other chemicals [14].

Aside from being used in industries, charcoal is also used in agriculture[15]. Charcoal can remove germs, bacteria, heavy metals[16], pesticides, and other harmful substances from fresh fruit and vegetables. Charcoal also has the ability to absorb ethylene gases released by the fruits and vegetables as they ripen. Thus delaying its ripening process and allowing them to stay fresh longer.

A lot of inventions have already been made on the use of charcoal as component in portable water treatment facilities. Charcoal has filtering capacity to remove harmful, distasteful substances. The water treated with charcoal has balanced pH and water will be slightly mineralized [17, 18, 19, 20].

Among beauty enthusiasts, activated charcoal has been used to maintain a stronger and healthier skin[21]. It has exfoliating potential that can remove dead skin cells[22]. Activated bamboo charcoal can create a soothing, relaxing hot spring-water like effect due to the release of minerals such as calcium, potassium and magnesium.

Charcoal is harmless [23] when swallowed or breathed in, or when it comes in touch with the skin. It can mildly irritate bowels in sensitive persons but has no side effect or allergic reaction to the person ingested it. For the past centuries, charcoal has been used effectively in healing arts. Medics still use it today as a therapeutic agent, an antidote for poisons, and an effective treatment for indigestion and gas[24]. As poison antidote, it can prevent the absorption of poison in the stomach [25, 26].

Due to its ability to adsorb toxic substances, some health enthusiasts formed tablet to treat various forms of diseases including diarrhea. Charcoal in this form is hard to ingest especially among children. Hence, this study is conducted.

OBJECTIVES OF THE STUDY

This study was conducted to utilize charcoal as additives in making cakes.

Specifically, it is intended to determine the acceptable level of charcoal when used as additives in the production of brownies, dark brown chocolate, and chiffon cakes.

METHODS

Project location

The project was conducted at ASC processing center at Luna, Apayao. The processing center is a DOST funded project of the college where food products are being processed. The processing center also serves as venue for various food processing trainings.

Treatments Preparations

Bamboo charcoal was used in the study. Bamboo charcoal was mixed with various ingredients in the preparation of three types of cakes namely: Brownies, dark brown chocolate, and Chiffon cakes. Standard procedure in baking the three cakes were used. The following were the treatments preparations:

- T0- control (no charcoal additives)
- T1- 1 tablespoon powdered Charcoal
- T2- 2 tablespoon Charcoal
- T3- 3 tablespoon Charcoal
- T4- 4 tablespoon charcoal

Process Flow Chart

Figure 1 presents the schematic diagram of the processes involved in the production of charcoal enriched cakes. Bamboo charcoal is pulverized, sieved using fine nets, mixed with ingredients such as flour, sugar and others, cooked in oven. The cooked charcoal-enriched cakes were subjected to sensory evaluation to evaluate its taste, aroma and appearance.

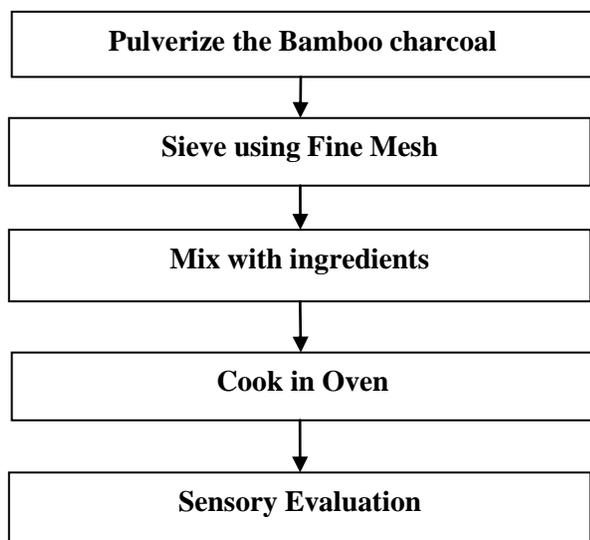


Figure 1. Schematic Diagram of the processes involved in the study

Data Gathered

Samples were coded and were subjected to sensory evaluation. Samples were evaluated by 30 panel of examinees consisted of students (20) and faculty (10) of the college using purposive sampling. The student respondents are cake lovers while the respondents from the faculty members of the college are experts in cake production. These teachers are teaching Food Technology and related subjects.

Each samples were evaluated in terms of color, aroma and taste. The samples were evaluated using the 5-point likert scale.

Statistical Analysis of Data

Data were analyzed using 5-point likert scale.

Table 1. Scale and verbal interpretation of 5-point Likert scale

Scale	Limits of Description	Interpretation
5	4.20-5.00	Like Very much/ Very much accepted
4	3.40- 4.19	Like Much/ much accepted
3	2.60- 3.39	Like/ accepted
2	1.80- 2.59	Moderately like/ moderately accepted
1	1.00-1.79	Not like/ not accepted

Each of the rating (scores) given by the panellist for each sensory evaluation category (taste, appearance and color) were tabulated and added to get the mean scores.

Discussion of Results

The process of producing bamboo charcoal added cakes involved the following steps: crushing/ pulverizing the charcoal, sieving using fine nets, mixing with the ingredients, cooking (baking) and sensory evaluation. The samples were evaluated by 30 panelist in all the three cakes produced.

Table 2 shows that treatment 1-1 tablespoon charcoal added in the preparation of brownies gave the highest rating on taste with a mean rating of 4.4, like very much. On appearance and aroma both the control and treatment 1 have the highest mean rating of 4.42 and 4.4 respectively. Treatment 1 has the highest overall mean rating, 4.41 followed by the control, treatment 2, and treatment 3. Treatment 4 has the least overall mean rating.

Table 2. Preference test of charcoal cakes

Preference test of Brownies charcoal cake				
Treatment	Taste	Appearance	Aroma	Overall- Verbal Interpretation
T0-control	4.3	4.42	4.4	4.37- Like very much
T1- 1 Tablespoon	4.4	4.42	4.4	4.41- Like very much
T2- 2 Tablespoon	4.3	4.20	4.3	4.27- Like very much
T3- 3 Tablespoon	3.9	4.20	4.1	4.06 – Like much
T4-4 Tablespoon	3.8	4.16	4.0	3.99 –Like much
Preference test of Dark Brown Chocolate charcoal cake				
Treatment	Taste	Appearance	Aroma	Overall- Verbal Interpretation
T0-control	4.32	4.13	4.2	4.22- Like very much
T1- 1 Tablespoon	4.38	4.22	4.22	4.27- like very much
T2- 2 Tablespoon	4.39	4.33	4.25	4.32- like very much
T3- 3 Tablespoon	4.45	4.34	4.2	4.33-like very much
T4-4 Tablespoon	4.18	4.1	4.0	4.09- like much
Preference test of Chiffon charcoal cake				
Treatment	Taste	Appearance	Aroma	Overall- Verbal Interpretation
T0-control	4.39	4.22	4.34	4.32 - Like very much
T1- 1 Tablespoon	4.24	4.20	4.12	4.19- like much
T2- 2 Tablespoon	4.13	4.10	4.13	4.12- like much
T3- 3 Tablespoon	3.9	3.80	4.0	3.90- like much
T4-4 Tablespoon	3.6	4.14	3.9	3.88- like much

The addition of 1 tablespoon bamboo charcoal added flavor to the brownies. The slight bitter taste of the brownies blended to the overall taste of the cake. Jamie waters pointed out that charcoal bringing flavor, color, texture and a touch of playfulness to plates of food and bottles of juice[27]. The black color of the charcoal masked with the color of the brownies improving the color of the new cake. The addition of charcoal as coloring agent has been permitted[28].

To add flavor to dark chocolate some food processor add coffee to taste. When charcoal is added, three tablespoon is needed to give the highest rating of 4.45 on treatment 3 followed by treatment 2 and treatment 1. On appearance Treatment 3 has the highest mean rating while on aroma treatment 3 has the highest mean rating. Treatment 3 has the highest overall mean rating of 4.33, followed by treatment 2, treatment 1 and the control. Treatment 4 has the least overall mean rating.

The addition of powdered charcoal up to 3 tablespoon improves the flavor of the dark brown chocolate. Charcoal lessens the bitter taste of dark brown chocolate which is not appealing to most children. Activated charcoal called charcodote mixed with chocolate or coca-cola in 1:1 ratio improved taste but do not improve ease of swallowing in drinks such as chocolate and coca-cola when these given to pediatric patients[29].

The control (with no charcoal additive) is the most preferred chiffon cake, followed by treatment 1,

treatment 2, treatment 3 and treatment 4 with mean ratings of 4.32, 4.19, 4.12, 3.90 and 3.88 respectively. Chiffon cakes are soft in nature, the addition of charcoal may destroy the soft texture of the cake. Charcoal as additives can be used depending on the kind of food to add. Some food manufacturer uses charcoal as main ingredient in the production of delicacies. Kitchen tigris manufactured bamboo charcoal [30] while Lucindaville manufactured charcoal biscuits[31].

CONCLUSION AND RECOMMENDATION

Believed to have been effective Charcoal has been used for various medical practices healing various diseases, as antidote to poisoning and as purifying agent to filtered water. This study is conducted to utilize charcoal as additives in making cakes. Specifically, it is intended to determine the acceptable level of charcoal when used as additives in the production of brownies, dark brown chocolate, and chiffon cakes.

It can be concluded that an addition of 1 tablespoon of bamboo charcoal gave the highest sensory evaluation to brownies and 3 tablespoon to dark brown chocolate. The control (no charcoal added is still the best treatment for chiffon cake.

It is recommended that the Mass production of charcoal added cake products should be done as part of the income generating activity of the college. Promotion of the developed technology through

trainings and attendance to trade fairs should be done. Utilize bamboo charcoal to other products such as cookies, candies and others.

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