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RESEARCH ARTICLE

Optimization of Ready-to-Drink Beverage and Ready-to-Reconstitute Mix of Ginger Based Appetizer

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ABSTRACT: Ginger is well known for its medical property and curd is consumed for its probiotics properties. Using these two ingredients an appetizer drink has been developed and this product is optimized using Response Surface Methodology. It provides 77 kCal per serving of 100ml when the appetizer mixes with cold water. For making dry appetizer fresh curd is replaced by curd powder. The product usually has a shelf life of 6 months in ambient condition. Using the Response surface methodology optimization of this appetizer shows a maximum acidity score of 2.38 % for ginger powder (2g-4g), asafoetida powder (200g -500g), salt (1g-2g) using RSM (Box- benhken method). In a similar study, the acceptability score of the drink is 7.0 to 7.8 using Overall acceptability score.
Keywords: Optimization, Response Surface Methodology, appetizer drink, acceptability score

INTRODUCTION

Appetite is one of the major factors in deciding the food intake of a person. The biological or environmental conditions can sometimes lead to reduction of food consuming. The components like gingerol and shaogol (pungent compounds) are well known for anti-emetic and appetizing properties (Kawai *et al*. 1994, Wadikar *et al*.2010). The digestion probiotics of curd is immersive as the probiotics but the formation and quality of curd will not be uniform throughout the year in cold regions. The lack of appetite is one of the major problems they face. Soo keeping in view of appetite stimulation of ginger, an appetizer drink has been developed in the form of dry powders for easy transportation to remote areas. Ginger containing curd (Takahashi Yok 1990), stimulating appetite and digestion health beverage having 12 medicinal components including ginger (Wu 2002),honey-ginger beverage (Yanzhong 2003) and a fermented health beverage which is a mix of milk and corn (Yue-Chun *et al*. 2002). The present studies describe the optimization process RTR (ready to reconstitute). Optimizing the Phenolic and anthocyanin extraction of purple sweet potato flour was carried out by RSM method (Elizabeth Amudhini Stephen et al 2019)., Optimization using response surface methodology on Soy - cakes by infrared microwave combination (Elizabeth Amudhini Stephen et al 2019). 'Optimizing food materials for development of nutritious pasta 'was done using RSM method.

1. MATERIALS AND METHODS:

1.0. RAW MATERIALS:

The sugar, salt, citric acid, ginger powder, asafoetida were collected from local market in Coimbatore. All chemicals were bought from M/S sd fine chemicals (Mumbai, India).

1.1. PROCESSING OF CURD POWDER:

` Milk of good quality seeded with (2%) curd and kept in room temperature of 18-33° for 6 h with 10% incorporation of sugar and undergone freeze drying (Hull Corporation, Hatboro, Pennsylvania, USA) by freezing to -30 ±2 °for 2-3 hrs in trays made of stainless steel and dried under 100-300 µ using variable plate temperature of 35-70° for 18 hr to get a free-flowing powder with moisture content less than 2%. Dehumidified packaging was done in a room.

1.2. PROCESSING CURRY LEAVES:

Curry leaves are separated from the branch, washed and undergone blanch processing in water containing magnesium oxide (0.1%), salt (1%) for 3 min and sodium meta-bisulphate (0.1%) and dehydrated in a cross-flow drier for 3h to reduce moisture content to less than 5%. The dried curry leaves are powdered.

1.3. PROCESSING OF APPETIZER DRINK:

Appetizer drink was processed through aseptic processing. Milk was pasteurised and cooled down to 44°C and mixed well with 2% curd. This was kept incubated for 4 hr to reach 4.1 pH, mixed with 0.2% pectin and homogenized. The spice mixture was added with properly diluted curd at 95°C for 30 secs (HTST Treatment) and packed in 200ml tetra packs aseptically.

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1.4. DESIGN OF EXPERIMENT:

The surface response methodology is used for defining the acidity score of Ginger Based Appetizer. The independent variables used are ginger powder (A), asafoetida powder, salt. The response is made with Box – Benhken method is tabulated in Table.1. The results were interpreted with the help of 12 runs. The dependent variable (Y) used is acidity score (Y_1)

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3. RESULTS AND DISCUSSIONS:

3.0. STATISTICAL ANALYSIS:

To establish predictive models from the experimental data for each response variable were shown in the following equation.

Acidity score (Y_1) =0.327500+ 0.322083 X_1 +0.005042 X_2+ 0.40667 X_3-000667

X_1X_2+0.005000 X_1X_3-0.001833 X_2X_3

Were X_1, X_2, X3 are ginger powder, asafoetida powder and salt respectively.

3.1. EFFECT OF GINGER POWDER, ASAFOETIDA POWDER AND SALT ON ACIDITY SCORE:

pH is the measure of acidity and if the pH is above 7 it is alkaline in nature otherwise it acidic or neutral. The acidity of the reconstituted beverage is also affected by the level of salt. Therefore, the optimized composition of the mix had 3g ginger powder; 1.5g salt and350g asafoetida while other ingredients present in the optimized product are curd powder, sugar powder, curry leaves powder and citric acid. The storage studies of appetizing mix revealed that the acidity is 2.02833%. Similar work was conducted by Wadikar *et al*. (2008) on the increases of acidity for three appetizer mixes on storage. Therefore, it can be concluded that ginger based appetizer can be used as RTR dry mix and as RTD beverage because of its 6 months shelf-life at ambient temperature. Acidity score increases with increase in the amount of asafoetida powder defines in the fig (1,2,3,4,).

4. CONCLUSION:

The optimization of this appetizer shows a maximum acidity score of 2.38 % for ginger powder (2g-4g) , asafoetida powder (200g -500g) , salt (1g-2g) using RSM(Box- benhken method). In a similar study, the acceptability score of the drink is 7.0 to 7.8 using Overall acceptability score.

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Fig.1. acidity score vs ginger powder

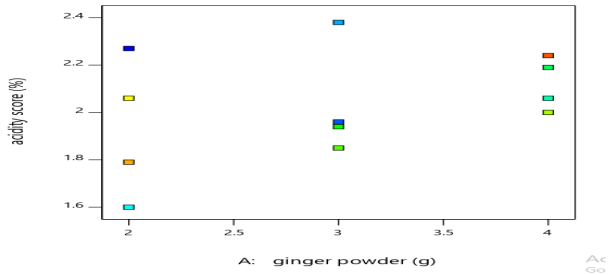

Fig.2. acidity score vs asafoetida powder

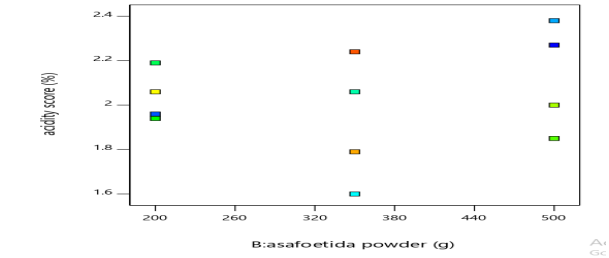

Fig.3.Acidity score vs salt

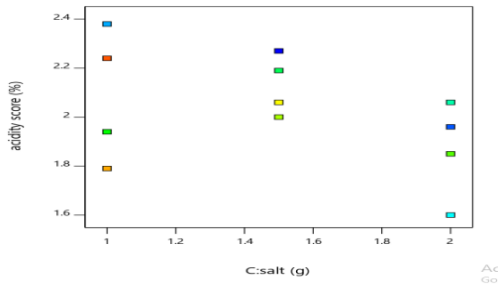

Fig.4. Acidity score vs ginger powder and asafoetida powder

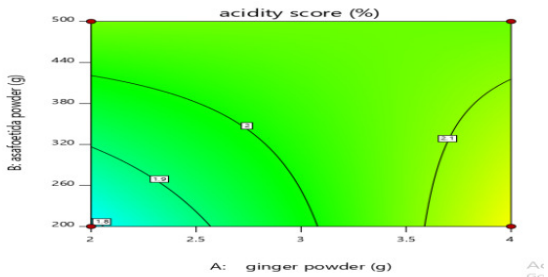

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Table. 1 worksheet of box Benhken experimental design

	Std	Run	Factor 1 A: ginger pow... g	Factor 2 B:asafoetida po... g	Factor 3 C:salt g	Response 1 acidity score %
	3	1	2	500	1.5	2.27
	11	2	3	200	2	1.96
	10	3	3	500	1	2.38
	7	4	2	350	2	1.6
	8	5	4	350	2	2.06
	2	6	4	200	1.5	2.19
	9	7	3	200	1	1.94
	12	8	3	500	2	1.85
	4	9	4	500	1.5	2
	1	10	2	200	1.5	2.06
	5	11	2	350	1	1.79
	6	12	4	350	1	2.24

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CONFLICTS OF INTEREST

"The authors declare no conflict of interest".