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"INNOVATE THREE NEW DESSERTS FOR DIABETIC PATIENTS AMONG THE HOTELS & RESTAURANTS OF NAGPUR CITY."

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ABSTRACT

This study systematically examined research on programs that aim to improve eating habits in people with diabetes. Researchers searched three major health-science databases and several diabetes journals for studies published since 1990 that: involved adults with type 1 or type 2 diabetes, tested a dietary-change intervention and reported results, measured participants both before and after the program, and included at least one eating-behaviour outcome. Twenty-three studies met these criteria. The authors extracted key details such as participant numbers, program length, and the specific diet strategies used and compared the studies to highlight similarities and differences among the interventions.

The purpose of this study is to review the literature on healthy-eating interventions in diabetes care. as many times it has seen that guest lack the enjoyment of enjoying the dessert courses because of their diabetes and skip the course, as a result the researcher tries to innovate 3 desserts made for those sugar alternative (jaggery). the study gains the results from the panel of judges like industrial experts, doctors and hospitality professors. during the survey it's seen that the panel of judges are also initiate interest in this research work as it is beneficial not only for the diabetic patients and health-conscious people of Nagpur city. The databases PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and PsycINFO were searched for abstracts containing

the terms “healthy eating” or “dietary” and “intervention” and “diabetes.” In addition, electronic searches were conducted for articles published in Diabetes, Clinical Diabetes, Diabetes Care, Diabetes Spectrum, and Diabetic Medicine.

KEY WORDS

diabetes, jaggery, Indian sweets, healthy dishes and fitness.

INTRODUCTION

Desserts are sweet courses that typically come at the end of meal. Research on dessert include developing new desserts without added sugar, and exploring the growth of dessert for diabetic patients (Sons, 2025) . A range of courses ranging from fruit or dried nuts to multi-ingredient custards and laddu’s. Using different type of natural sugars which can give the sweetness but not grow the diabetes. (Mellitus, 2020)

These diabetes friendly swaps can make the occasional dessert an acceptable part of your diabetes management. Substitute full fat milk with low fat milk. Replace sugar with natural low GI sweeteners such as jiggery, dates, figs raw honey and cinnamon. These ingredients can help you stay within your recommended carbohydrates intake for the day without negatively affecting your blood sugar. (Rachel Nall, 2024)

Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Glucose is your body’s main sources of energy. Your body can make glucose, but glucose also comes from the food you eat (Fernandes, 2022). Research shows that’s you can prevent or delay type 2 diabetes by losing weight by following a low fat, reduced calorie eating plan and by being more active. (Zahalka, January 6, 2023).

Diabetic patients today commonly face issues like cardiovascular disease (heart attacks, strokes), nerve damage, kidney damage, eye damage, hearing impairment, and challenges managing blood sugar levels. (Sahu, 2018-06-26)

SCOPE OF STUDY

For individuals with diabetes, housing insecurity interferes with diabetes related expenses and creates a lack of control and consistency necessary to maintain diabetes routines and diets, which are foundational to self-management. Diabetes processes of care are conducted within the context of the healthcare system and are designed to prevent or delay complications. Diabetes self-care behaviours are often daily self-management routines conducted by individuals with diabetes. Both aspects of care are an integral part of comprehensive care for diabetes, and help with preventing diabetes related morbidity and mortality.

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Individuals who have diabetes can predict positive outcomes by engaging in seven essential activities related to self-care. Good diet, exercise, frequent medication administration, blood sugar monitoring, coping mechanisms, problem solving skills, and risk-taking are all associated with improved quality of life, reduced complications, and glucose control. As a result of inadequate health literacy and un-favourable attitudes toward the condition, it has been shown that there is a low level of compliance with treatment regimens in the Indian socio-cultural environment.

Significance of Study

Nowadays, the number of diabetes cases is increasing day by day. And it is clearly seen that all these patients are afraid of having sweet dishes because of after circumstances and the result are always avoiding the desserts by a huge majority. Diabetic patients often prefer to have desserts, which is why we are innovating three desserts specifically for them. These desserts are designed to be both enjoyable and beneficial for their health

Instead of using sugar, we are using natural sources of sweeteners such as jiggery, coconut palm sugar, and monk fruit. These natural sweeteners are eco-friendly and can have a smaller number of problems for diabetic patients, allowing them to enjoy these desserts without affecting their health.

AIM

To innovate and check the potential for acceptance of three new desserts for diabetic patients among the Hotels & Restaurants of Nagpur city.

OBJECTIVES

1. To innovate 03 new recipes of desserts for diabetic patients to be served in Hotels & Restaurants of Nagpur city.
2. To innovate practically 03 Indian dessert in Tirpude college of HMCT training kitchen.
3. To find the alternative ingredients needed in preparing desserts for Diabetic Patients.
4. To find out the acceptability of these 03 desserts recipe through the panel experts of Nagpur city.

LIMITATIONS

1. Time, energy and money were the major constraints.
2. Sample size was limited to 10 judges which includes college professors, Doctors and employees serving desserts in the hotel.
3. Study was limited to 03 desserts only.

Research methodology

The methodology section describes the rationale for the application of specific procedure techniques used to identify, selection and analyses information applied to understanding the researcher problems, thereby, allowing the reader to critically evaluate a studies overall validity and reliability.

Selection of Samples:

The Sample were selected by judgmental sampling method and descriptive sensory evaluation of innovating three Desserts for the Diabetic Patients, was conducted for which score card was given to the judges and after tasting they were requested to fill the score cards.

Total number of 10 judges are approached for the survey.

- 03 doctors of Nagpur city (including General Medicine Doctor, General Physician)
- 04 experts from Nagpur reputed hotels.
- 03 professors for reputed hospitality institute of Nagpur city.

Data Collection:

- Primary Data:

Primary data was collected through the score card for which the researcher went to the panellist with the prepared dishes and served them for tasting and after tasting the researcher requested the judges to fill the score card.

- Secondary Data:

Secondary data was collected by referring various books, websites, journals, electronic media and encyclopaedia.

Analysis of data:

The collected data was tabulated, organized segment-wise and category-wise by dividing into 3 desserts. The data was analyzed and interpreted suitably by using ANOVA single factor test.

Oat Energy Bite

Preparation Time: 15 minutes

Cooking Time: 5 minutes

Ingredients:

- Almonds – ¼ Cup
- Cashews-2 Tbsp
- Cinnamon Stick – 3 Nos
- Fenugreek Seeds – 1 Tsp
- Oats – 1 Cup
- Ragi Flour – ½ Cup
- Ghee – 2 Tbsp

- Pepper Powder – ½ Tsp
- Coconut Palm Sugar – 4 Tbsp
- Cardamom Powder – ¼ Tsp
- Desiccated Coconut – 4 Tbsp
- Water – 1 Tbsp

Recipe:

1. Take a pan on flame, add Almonds and Cashews then lightly roast the dry fruits, cinnamon stick and fenugreek seed.
2. Then add Oats in that and make a coarse powder and keep aside.
3. Also add ragi flour and in the oats powder. (Mix it well)
4. Take a pan on flame add ghee and pepper powder then add the prepared oats, ragi powder and add coconut
1. palm sugar. (Mix it properly)
5. turn off the flame and keep aside.
6. Add the cardamom powder and add some water then prepare a laddu.
7. Coat the laddu with desiccated coconut.

Golden Date Pudding

Preparation Time: 7 minutes

Cooking Time: 20 minutes

Ingredients:

- Dates – 10-12
- Milk – ½ Liter
- Pomegranate- for garnish
- Custard Powder – 2 ½ Tbsp
- Cashews – 2 Tbsp
- Walnuts – 1 Tbsp
- Coconut Palm Sugar – 2 Tbsp

Recipe:

1. Soak seedless dates in warm water for about 15 minutes.
2. Boiled milk for 15 minutes, stir in between.
3. Add custard powder to some warm milk. (Mix well)
4. Make a puree out of the boiled milk and stir it well, still till the custard gets little thicker consistency.
5. After thick consistency keep it in the refrigerator for 2 hours.
6. Then custard will chill and will add some dry fruits (Cashews & Walnuts).
7. Transfer the custard to a bowl and mix the dry fruits in it and then serve.

Nutty Lauki Delight

Preparation Time: 5 minutes

Cooking Time: 15 minutes

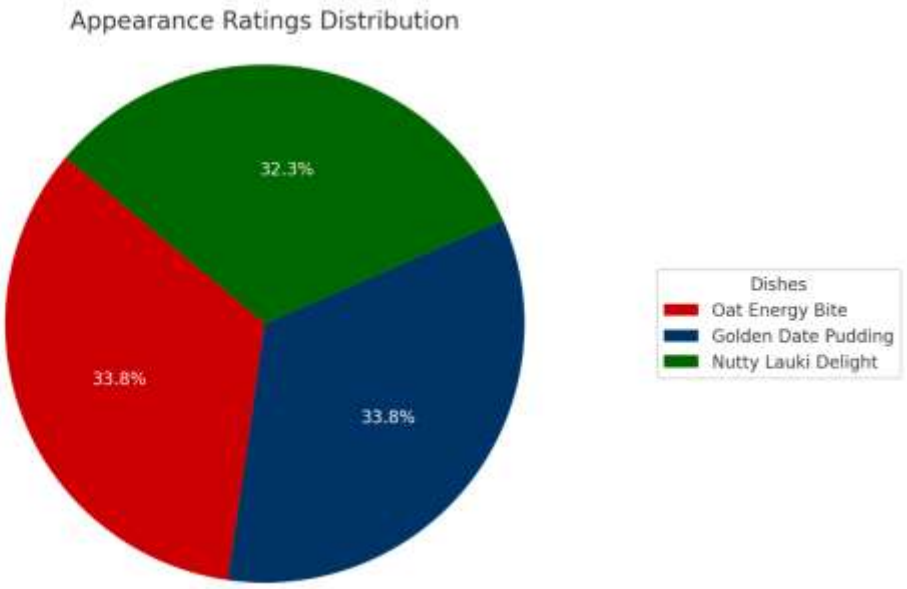
Ingredients:

- Lauki – ½ Kg
- Ghee – 2 Tbsp
- Cashews –2 Tbsp
- Almond – 5gm
- Milk – ½ Liter
- Coconut Palm Sugar – 2 Tbsp
- Cardamom Powder – 1 Tsp

Recipe:

1. Peel the Lauki then grate the lauki.
2. Take a pan on flame add ghee and add some dry fruits then lightly roast them.
3. Take out the dry fruits from the pan and add grated lauki on ghee.
4. Fry it for 10-12 minutes, then add milk and stir it.
5. Then add coconut palm sugar, cardamom powder and add the roasted dry fruits.

DATA ANALYSIS AND DISCUSSION



the above pie chart shows the result of the test conducted to determine the appearance of 3 new desserts for Diabetic Patients. As per the result Oat Energy Bite and Golden Date Pudding was more liked by the judges. So, it is inferred that all the judges liked the appearance of both Oat energy Bite and Golden Date Pudding as compared to Nutty Lauki Delight.

Anova Test:

Appearance:

OEB		GDP		NLD	
X1	X12	X2	X22	X3	X32
5	25	4	16	5	25
4	16	4	16	4	16
5	25	5	25	3	9
4	16	5	25	3	9
4	16	5	25	5	25
5	25	4	16	4	16
5	25	4	16	5	25
4	16	5	25	4	16
5	25	4	16	5	25
4	16	5	25	5	25
$\sum X_1$= 45	X12 = 205	$\sum X_2$= 45	X22 = 205	$\sum X_3$= 43	X32 = 191

* Performing Test Statistic:

Step 1: T = ∑X1 + ∑X2 + ∑X3

=45+45 +43

=133

Step 2: CF = T^2/N

= [[133] ^2/30

=17.689/30

CF= 589.63

Step 3: SST = [X12+X22+ X32] – T^2/N

= [205 + 205 + 191] – 589.63

= 601 – 589.63

SST= 11.37

Step 4: SSB=[((x_1) ^2)/n1+((x_1) ^2)/n1 + ((x_1) ^2)/n1]– T^2/N

= [((45) ^2)/10+((45) ^2)/10+((43) ^2)/10] –589.63

= [202.5 + 202.5 + 184.9]–589.63

= 589.9 – 589.63

SSB = 0.27

Step 6: SAW or SSE = SST – SSB

=11.37– 0.27

= 11.1

Step 7: MSB or MSC = SSB/(K-1)

= 0.27/2

= 0.135

Step 8: MSW or MSE = SSW/ (N.K)

= 11.1/27

= 0.411

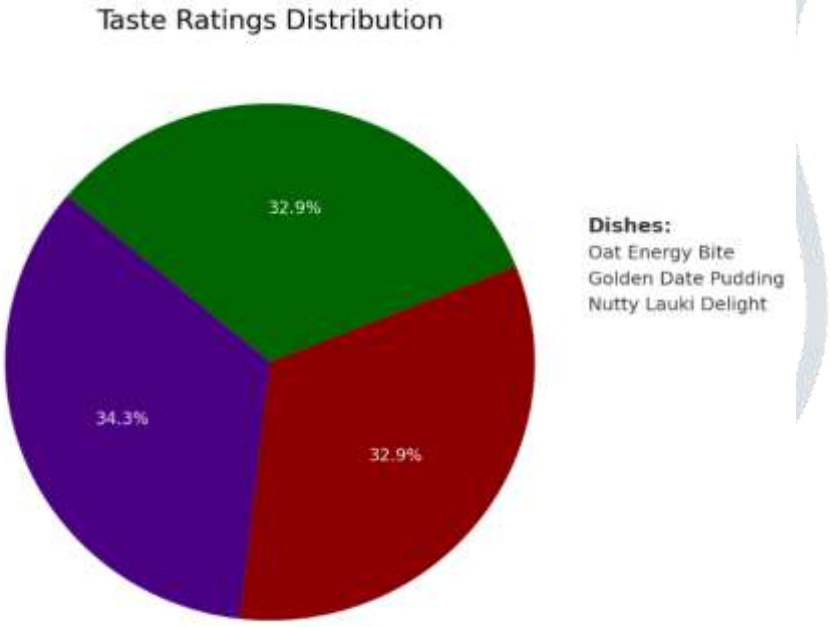
Step 9: F = MSB/MSW

= 0.135/0.411

= 0.328

Conclusion:

Computed value 0.328 is lesser than the critical value (table value) 3.354 at υ 1 = 2 and υ 2 =27 at 5% Level of significance (or 95% Level of Confidence). Hence the difference in the mean Appearance of three varieties is not significant because of randomization. We do not reject the null hypothesis, all three varieties in appearance are same



Above chart Shows the result of the test conducted to determine the appearance of 3 new desserts for Diabetic Patients. As per the result Oat Energy Bite and was more liked by the judges. So, it is inferred that all the judges liked the appearance of Oat energy Bite as compared to Golden Date Pudding and Nutty Lauki Delight.

Anova Test:

TASTE: -

OEB		GDP		NLD	
X1	X12	X2	X22	X3	X32
5	25	4	16	5	25
5	25	4	16	5	25
5	25	5	16	4	16
5	25	4	16	4	16
5	25	5	25	5	25
4	16	5	25	4	16
5	25	5	25	5	25

5	25	5	16	4	16
4	16	4	16	5	25
5	25	5	25	5	25
$\sum X_1 = 48$	X12 = 232	$\sum X_2 = 46$	X22 = 214	$\sum X_3 = 46$	X32 = 214

*Performing Test Statistics:

Step 1: T = ∑X1 + ∑X2 + ∑X3

= 48 + 46 + 46

= 140

Step 2: CF = 〖T/N〗^2

= ([140] ^2)/30

= 19600/30

= 653.33

Step 3: SST = [X12 + X22 + X32] –T^2/N

= [232 + 214 + 214] – 653.33

= 660 – 653.33

= 6.67

Step 4: SSB = [((x_1) ^2)/n1+ ((x_1) ^2)/n1 + ((x_1) ^2)/n1]– T^2/N

= [((48) ^2)/10 + ((46) ^2)/10 + ((46) ^2)/10] – 653.33

= [230.4 + 211.6 + 211.6] – 653.33

=653.6 – 653.33

SSB = 0.27

Step 6: SAW or SSE = SST – SSB

= 6.67– 0.27

= 6.4

Step 7: MSB or MSC = SSB/(K-1)

= 0.27/2

= 0.135

Step 8: MSW or MSE = SSW/(N.K)

= 6.4/27

= 0.237

Step 9: F = MSB/MSW

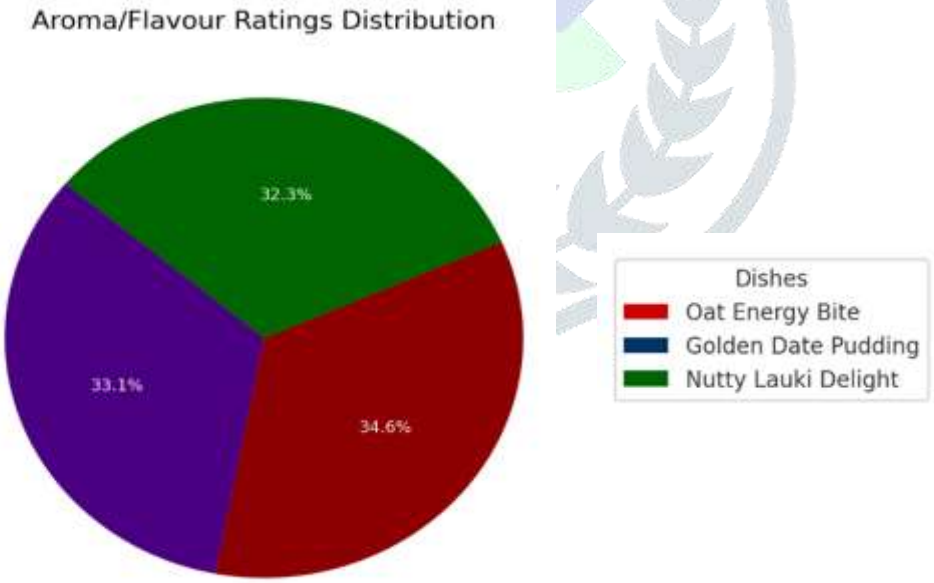
= 0.135/0.237

= 0.569

= 1.756

Conclusion:

Computed value 1.756 is lesser than the critical value (table value) 3.354 at υ 1 = 2 and υ2 =27 at 5% Level of significance (or 95% Level of Confidence). Hence the difference in the mean taste of three varieties is not significant because of randomization. We do not reject the null hypothesis, all three varieties in taste are same.



The result of the test conducted to determine the appearance of 3 new desserts for

Diabetic Patients. As per the result Golden Date Pudding and was more liked by the judges. So, it is inferred that all the judges liked the appearance of Golden Date Pudding as compared to Oat Energy Bite and Nutty Lauki Delight.

Anova Test:

Aroma and Flavour:

OEB		GDP		NLD	
X1	X12	X2	X22	X3	X32
5	25	4	16	5	25
4	25	4	16	5	25
4	25	5	16	4	16

4	25	4	16	4	16
4	25	5	25	5	25
4	16	5	25	4	16
4	25	5	25	5	25
5	25	5	16	4	16
5	16	4	16	5	25
5	25	5	25	5	25
$\sum X_1 = 44$	X12 = 196	$\sum X_2 = 46$	X22 = 214	$\sum X_3 = 43$	X32 = 191

*Performing Test Statistics:

Step 1: T = ∑X1 + ∑X2 + ∑X3

= 44+46 +43

= 133

Step 2: CF = T^2/N

= [[133] ^2/30

= 16.900/30

= 589.63

Step 3: SST = [X12 + X22 + X32] – T^2/N

= [196 + 214 + 191] – 589.63

= 601 - 589.63

= 11.37

Step 4: SSB = [((x_1) ^2)/n1+ ((x_1) ^2)/n1 + ((x_1) ^2)/n1]– T^2/N

= [((44) ^2)/10 + ((456)/10 + ((43) ^2)/10] –589.63

= [193.6 + 211.6 + 184.9] – 589.63

= 590.1 – 589.63

SSB = 0.47

Step 6: SAW or SSE = SST – SSB

= 11.37– 0.47

= 10.9

Step 7: MSB or MSC = SSB/(K-1)

= 0.47/2

= 0.235

Step 8: MSW or MSE = SSW/(N.K)

= 10.9/27

= 0.403

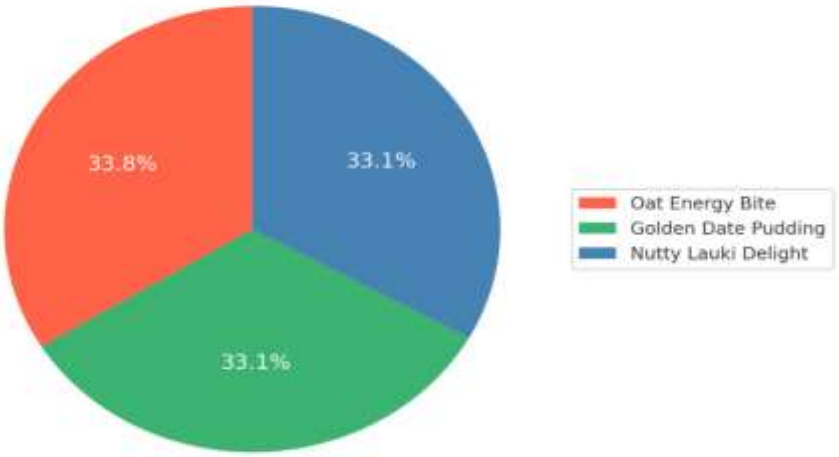
Step 9: F = MSB/MSW

= 0.235/0.403

= 0.583

Conclusion:

Computed value 0.583 is lesser than the critical value (table value) 3.354 at υ 1 = 2 and υ 2 =27 at 5% Level of significance (or 95% Level of Confidence). Hence the difference in the mean Aroma and Flavour of three varieties is not significant because of randomization. We do not reject the null hypothesis, all three varieties in Aroma and Flavour are same.



Pie chart Shows the result of the test conducted to determine the appearance of 3 new desserts for Diabetic Patients. As per the result Oat Energy Bite and was more liked by the judges. So, it is inferred that all the judges liked the appearance of Oat energy Bite as compared to Golden Date Pudding and Nutty Lauki Delight.

Anova Test:

Texture:

OEB		GDP		NLD	
X1	X12	X2	X22	X3	X32
5	25	4	16	4	25
3	9	4	16	5	25
5	25	5	25	4	16
5	25	5	25	5	16
4	16	5	25	4	25
5	25	5	25	5	16

5	25	4	16	4	25
4	16	5	25	5	16
5	25	4	16	5	25
5	25	4	16	4	25
$\sum X_1 = 46$	X12 = 216	$\sum X_2 = 45$	X22 = 205	$\sum X_3 = 45$	X32 = 205

*Performing Test Statistics:

Step 1: T = ∑X1 + ∑X2 + ∑X3

= 46 + 45 + 45

= 136

Step 2: CF = 〖T/N〗^2

= ([136] ^2)/30

= 18496/30

CF =580.8

Step 3: SST = [X12 + X22 + X32] –T^2/N

= [216 + 205 + 205] – 580.8

= 626 – 580.8

SST = 45.2

Step 4: SSB = [((x_1) ^2)/n1+ ((x_1) ^2)/n1 + ((x_1) ^2)/n1]– T^2/N

= [((46) ^2)/10 + ((45) ^2)/10 + ((45) ^2)/10] –580.8

= [211.6 + 202.5 + 202.5] – 580.8

=616.6 – 580.8

SSB = 35.8

Step 6: SAW or SSE = SST – SSB

= 45.2– 35.8

= 9.4

Step 7: MSB or MSC = SSB/(K-1)

= 35.8/2

= 17.9

Step 8: MSW or MSE = SSW/ (N.K)

= 9.4/27

= 0.348

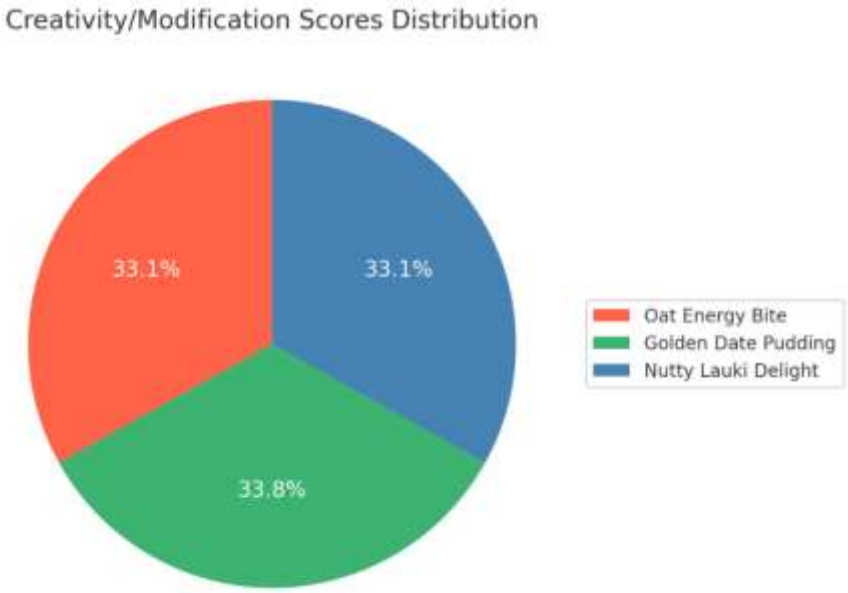
Step 9: F = MSB/MSW

= 17.9/0.348

= 51.44

Conclusion:

Computed value 51.44 is greater than the critical value (table value) 3.354 at υ 1 = 2 and υ 2=27 at 5% Level of significance (or 95% Level of Confidence). Hence the difference in the mean texture of three varieties is significant because of randomization. We reject the null hypothesis, all three varieties in texture are not same.



The above result of the test conducted to determine the appearance of 3 new desserts for Diabetic Patients. As per the result Oat Energy Bite and was more liked by the judges. So, it is inferred that all the judges liked the appearance of Oat energy Bite as compared to Golden Date Pudding and Nutty Lauki Delight.

Anova Test:

Creativity/Modification:

OEB		GDP		NLD	
X1	X12	X2	X22	X3	X32
5	25	5	25	3	9
3	9	4	16	5	25
5	25	5	25	2	4
3	9	4	16	5	25
5	25	5	25	5	25
5	25	4	16	5	25
5	25	5	25	4	16
5	25	5	25	5	25
4	16	4	16	5	25
5	25	5	25	5	25
$\sum X_1 = 45$	X12 = 209	$\sum X_2 = 46$	X22 = 214	$\sum X_3 = 45$	X32 = 209

*Performing Test Statistics:

Step 1: T = ∑X1 + ∑X2 + ∑X3

= 45 + 46 + 45

= 136

Step 2: CF = 〖T/N〗^2

= ([136] ^2)/30

= 18496/30

CF = 616.53

Step 3: SST = [X12 + X22 + X32] –T^2/N

= [209 + 214 + 209] – 616.53

= 632 – 616.53

SST =15.47

Step 4: SSB = [((x_1) ^2)/n1+ ((x_1) ^2)/n1 + ((x_1) ^2)/n1]– T^2/N

= [((45) ^2)/10 + ((46) ^2)/10 + ((45) ^2)/10] –616.53

= [202.5 + 211.6 + 202.5] – 616.53

=616.6 – 616.53

SSB = 0.07

Step 6: SAW or SSE = SST – SSB

= 15.47– 0.07

= 15.4

Step 7: MSB or MSC = SSB/(K-1)

= 0.07/2

= 0.035

Step 8: MSW or MSE = SSW/ (N.K)

= 15.4/27

= 0.570

Step 9: F = MSB/MSW

= 0.035/0.570

= 0.06

Conclusion:

Computed value 0.061 is lesser than the critical value (table value) 3.354 at υ 1 = 2 and υ 2 =27 at 5% Level of significance (or 95% Level of Confidence). Hence the difference in the mean Creativity and Modification of three varieties is not significant because of randomization. We do not reject the null hypothesis, all three varieties in Creativity and Modification are same.

CONCLUSION

This study was carried out to find out how well three newly developed diabetic-friendly desserts would be accepted. The research was done in the form of experimental work at Tirpude Institute of Hospitality Management, Nagpur, where the dishes were prepared in the college's practical lab.

Once the desserts were ready, they were presented to a panel of 10 judges which included experienced chefs, hotel managers, and faculty members from Hotel Management & Catering Technology Colleges in Nagpur. The panellists tested and evaluated the dishes based on various sensory parameters like appearance, taste, aroma, texture, and creativity.

The desserts prepared for the study were Oat Energy Bite, Golden Date Pudding, and Nutty Lauki Delight. According to the feedback from the judges, all three desserts were equally liked in terms of appearance. In terms of taste, Oat Energy Bite was slightly preferred over Golden Date Pudding and Nutty Lauki Delight. For aroma and flavour as well, the Oat Energy Bite received higher appreciation. When it came to texture, Oat Energy Bite again stood out and was liked more compared to the other two. Regarding creativity and innovation, the panel also found Oat Energy Bite to be the most impressive.

Thus, the researcher concludes that Oat Energy Bite was more flavourful and aromatic than Golden Date Pudding and Nutty Lauki Delight. The texture of Oat Energy Bite was also preferred over the other two. Based on other parameters like appearance, taste, and creativity, all three desserts were equally liked by the judges.

Therefore, all the three dishes can be considered successful innovations. They offer something different and can be enjoyed by many people, especially those who are usually unable to eat sweets. These three new recipes could also open new possibilities in diabetic-friendly cooking and offer variety to the food industry. Overall, all three dishes were found to be acceptable by the panel.

SUGGESTIONS OF JUDGES

Oat Energy Bite:

- It was great and the taste was amazing.
- Good try. Laddu is very good.

Golden Date Pudding:

- Its taste was Great.
- The appearance and taste were good.

`Nutty Lauki Delight:

- Lauki Delight is very delicious and will be very beneficial for patient who have more craving for sugar.
- Need some improvement on appearance.
- Please work on lauki halwa.
- Nutty Lauki Delight is too sweet, can be prepared slightly mild.

Overall Feedback:

- Great initiative by the students, it is really the need of the time.
- Good try
- Well done.

Recommendations:

1. For a more diabetes-friendly dessert menu, begin by experimenting with a variety of millets such as finger millet (ragi), pearl millet (bajra), and foxtail millet in your laddus.
2. Each millet brings a distinct, mildly nutty flavour, extra fibre, and a lower glycaemic index than refined flours, helping stabilize post-meal blood sugar.
3. In the Nutty Lauki Delight, swap artificial colours for grated beetroot.
4. The vegetable's natural beta-lain pigments lend a vibrant rose hue while adding antioxidants and a subtle earthy sweetness.
5. To curb overall sugar load, dial back the sweetening level of this dessert; complement the reduction by deepening flavour with roasted nuts and a touch of cardamom so it still feels indulgent.
6. Likewise, cut the ghee by about one-third; lightly dry-roast the lauki (bottle gourd) before adding a smaller amount of warm ghee so the mixture binds without excess saturated fat.
7. Elevate presentation by moulding the dessert into neat cylinders or quenelles, then finishing with a glossy drizzle of reduced-fat milk and a scatter of finely chopped pistachios for colour contrast and crunch.
8. For an even lighter sweetness, incorporate a high-purity Stevie extract: start with small increments (about 1 teaspoon liquid Stevie per cup of traditional sugar) and adjust to taste, because Stevie's sweetness intensifies quickly.
9. Finally, when serving custard, garnish with diabetes-friendly fruits such as kiwi, strawberries, pomegranate arils, or guava cubes; they contribute fibre, vitamins, and a modest fructose load while brightening both the look and nutrition profile of the dish.

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