

Development And Quality Evaluation of Date Seed Powder and Millets in Pizza Base

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Abstract—The present work was aimed to prepare the millet pizza base with date seed flour and to do physico chemical analysis of the product and to check the sensory acceptability of the product. The consumption of millets decreased incidence of diabetes, cancers and obesity which are increasing in an exponential manner. Date seeds are good source of dietary fiber. Enrichment of pizza can mark the nutritional and health benefits of people. In this study pizza base is prepared by mixing (All-purpose flour, Ragi, Foxtail millet and Date seed Powder) named as T1, T2 and T3 in different ratios. Pizza Base prepared from the All purpose flour only served as control (C). The Texture profile analysis of Pizza base was carried out by using Textrometer where the formulation with lower firmness, gumminess, chewiness and elasticity was the most acceptable. The Physico-chemical analysis of product was chemically analyzed by using the AOAC (2005) methods and finally the product was organoleptically evaluated by Nine Point Hedonic Scale and on the basis of sensory evaluation T1 (60:10:20:10) sample was most acceptable with regards to all sensory parameters. The proximate analysis of developed pizza base with Ragi flour, Foxtail millets flour and Date seed powder is rich in Fibre 14.94%, Protein 9.17%, Fat 6.83%, Calcium 23.5mg, Iron 9.4mg. Therefore it can be concluded that the developed Pizza base with millets and date seed Powder is more beneficial than normal Pizza Base.

Index Terms- Pizza base, All-purpose flour, Ragi, Foxtail millets, Date seed powder, sensory acceptability and nutritionally rich.

I. INTRODUCTION

Pizza is a flatbread generally topped with tomato sauce and cheese and baked in an oven. It commonly topped with a selected of meats, vegetables and condiments. Pizza was one of the popular consumer foods. (Preeti and Goyal, 2011). The high calorie and low fibre content of pizza makes it unsuitable for consumption by people suffering from diabetes and cardiovascular disease, therefore incorporation of millet flour and Date seeds powder in the pizza base may enhance its nutritional quality. Maida is made from the endosperm of the grain, while the fibrous bran is removed in the mill. It is high in glycemic index This medium protein flour can be used for all baking purposes It gives crispines and flavorful

crust. (Julie A. Albrecht ,1994). Ragi, commonly known as finger millet, is widely cultivated millet in the world. (Devi PB et al.,2014) In recent decades, ragi has been in focus due to its nutritional strength and high amount of dietary fiber and minerals (calcium, phosphorous and iron), essential amino acids (Subba Rao et al.,2002). Ragi has gained importance because of its slowly digestible and resistant starch and has low glycemic index which makes it suitable for diabetic patients (Saha et al.2011). Finger millet contains about 5–8% protein, 1–2% ether extractives, 65–75% carbohydrates, 15–20% dietary fiber and 2.5–3.5% minerals (Chethan and Malleshi,2007). Foxtail millet is a good source of phosphorous, iron and vitamins like thiamine, riboflavin, folin and niacin (Anon., 2004).It had significantly higher level of crude protein (15.9%), crude fibre (7.51 %), carbohydrates (73.4) and energy value (333 kcal/100g) (T. Veena et al.,2018).The date seeds powder was a source of dietary fibers fraction, minerals such as potassium, sodium, and calcium, and also, a natural antioxidant. Coarsely milled date seeds contained about 80% of dietary fiber while finely milled seeds contained 71% of dietary fiber. It is helpful for certain disorders such as obesity, diabetes, cholesterol, and intestinal complaints (Al-Farsi et al., 2007).

Anu Agrawal and Anisha Verma in 2016. Developed multigrains flour pizza base for value addition. Multigrain flour was prepared by mixing of five flours in four different ratios (finger millets, oat, buck wheat and pearl millets) named as T1, T2, T3 and T4. Pizza Base prepared from the wheat flour only served as control (T0). The product was organoleptically evaluated by Nine Point Hedonic Scale. The nutritional composition of product was chemically analyzed by using the AOAC (2005) methods. It can be concluded that the product of multigrain are more beneficial than normal Pizza Base. Abdillah and Andriani (2012) introduced Turkish caffeinefree coffee with mixing flavor to give healthier coffee low in price, and it was made from date seed to make it tasty. As another option, it was utilized in preparing ‘Cappuccino Choco Float’ where it is mixed with chocolate. For this reason, the

date seeds had contained high amounts of minerals and natural antioxidants to satisfying daily recommended dietary needs. Dorina Isabel Gomes Natal and Maria Inês de Souza Dantas, 2014 set, Fortification of pizza dough's with whole soybean flour of new cultivar 'UFVTN 105AP. Formulations were developed to contain 0%, 30%, 50% and 70% whole soybean flour. The texture analysis indicated that the addition of 50% soybean ($P < 0.05$) firmness, gumminess, springiness and chewiness of pizza dough. The contents of protein, dietary fiber and minerals calcium zinc, magnesium, potassium, copper and phosphorus were higher. Saha *et al.* (2011) stated that biscuits prepared from flour composites containing 60:40 and 70:30 (w/w) finger millet: wheat flour were evaluated for its dough characteristics and biscuit quality. Hardness of biscuit dough measured by textural profile analysis was more in 60:40 combinations than in 70:30 levels. The dough became more adhesive with higher level of wheat flour and it varied across varieties. Wheat composite flour (40 g/100 g) had higher water absorption capacity than in 30 g/100 g composite flour

II. MATERIALS AND METHODS

2.1 Raw Materials: - Ingredients for Pizza Base preparation were purchased from the local market of Telangana. They are All purpose flour, Ragi, Foxtail Millets, Date seed Powder, Water, Oil, Salt, Sugar, Instant Yeast.

2.2 Preparation Of Date Seeds Powder: The seeds were soaked in water for 72 hours to increase their feeding value, washed to get rid of any adhering flesh, Sun-dried for one day and grounded into a coarse powder using a commercial home milling machine to produce fine date seeds powder which was then kept in an airtight container (Barreveld, 1993).

2.3 Development of Pizza base: Measure all ingredients to exact amount (Maida, Ragi flour, Foxtail millets Flour, Date seed flour) and Instant yeast, Sugar, Salt, Oil, water. Mix the flour in different proportions as shown in Table 1 and knead the dough. Leave the dough to prove for about an hour in a warm place. Use a damp cloth to the cover the dough. After an hour, take the dough out and then roll the dough like chapathi .Use a fork to poke the dough after it's on the baking tray to let the air out. Bake the base around 130°C for 20 min. Preheat the oven 10 minutes before baking pizza base. Then

take pizza base out from oven. let it cool and then in pack in LDPE bags (Manay and swamy 2001)

Table 1. It shows the data of value added product Pizza Base and the basic recipe were standardized and served control (C).

Sample	Maida (%)	Foxtail Millet (%)	Ragi (%)	Date Seed Flour (%)
C	100	0	0	0
T ₁	60	10	20	10
T ₂	40	20	30	10
T ₃	20	30	40	10

2.4 Sensory analysis of developed food product: The hedonic rating test is used to measure the consumer acceptability of food products. Prepared products were freshly served to taste panel of 10(ten) members. The samples were presented in random order and panelists were asked to rate their assessment of appearance, texture, flavor, odour, color and overall acceptability on a 9-point hedonic scale (1 =dislike extremely, 2 = dislike very much, 3 = dislike moderately, 4 = dislike slightly, 5 = neither like nor dislike, 6 = like slightly, 7 = like moderately, 8 = like very much, 9 = like extremely). A score of 5 or below was considered a limit of acceptability for all sensory attributes in Table 4.(S.Ranganna Handbook of Analysis and Quality Control for Fruit and Vegetable Products 2nd edition)

2.5 Texture Analysis: Texture Profile Analysis (TPA) The pizza dough formulations were subjected to TPA compression in the Universal Testing Machine Mechanical. A 50mm diameter probe was moved perpendicularly over a disc shaped pizza dough samples with a diameter of 50mm and height 5mm. A crosshead speed of 1.5mm s⁻¹ was used to compress the central area of pizza base samples to 80% of their original height. Each sample was compressed twice in a reciprocating motion to give a two-bite texture profile curve. The force exerted on the samples was automatically recorded and the firmness, chewiness, gumminess, for all sensory attributes in Table 4 .(S. Ranganna Handbook of Analysis and Quality Control for Fruit and Vegetable Products 2nd edition)

2.6 Determination of Moisture Content: The Oven was pre-heated to required temperature and then the samples in petriplate dishes were placed in oven. The weights of the sample were collected at every 30 min until a constant weight was reached atleast for 3hrs.The process was done by taking sample of 10g at a temperature of 105°C.

The moisture content was calculated at each time interval.

$$\text{Moisture content (\%)} = \frac{[(\text{Initial weight} - \text{Final}) / (\text{Initial weight})] \times 100}{100}$$

2.7 Estimation Of Ash (%): Five gram sample was weighed into a previously weighed silica crucible. It was then turned to carbonised form when silica crucible was burn at about 550°C for six hours in the muffle furnace to get complete white colour ash and then allowed it to cool in the furnace. The crucible was transferred to desiccator and weighed as possible to prevent moisture absorption process.

$$\% \text{ Ash content} = \frac{[(\text{weight of ash}) / (\text{Original weight of sample})] \times 100}{100}$$

2.8 Estimation of Fat(%): Fat content in the sample was estimated by Soxhlet extraction method. Moisture free sample was transferred to thimble which was then fixed into a stand and transferred to a pre-weighed Soxhlet beaker. The beaker was filled with petroleum ether. The beaker was then attached to Soxhlet apparatus and the sample was extracted for two hours at 60°C. At the same temperature the ether was evaporated for two hours after extraction. At the end of four hours the ether left was dried in hot oven at 100°C for 30 minutes. The beaker was then cooled in desiccator and weighed. It gave the amount of ether soluble fat present in the sample.

$$\% \text{ Fat content} = \frac{[(\text{weight of fat extract}) / (\text{weight of sample taken})] \times 100}{100}$$

2.9 Estimation of Protein Content: The principle of method involves the estimation of total nitrogen content in food and conversion of nitrogen to protein assuming that all nitrogen in food is present as protein and using a conversion factor based on the percentage of nitrogen in food. Weigh 1gm of sample and place in digestion tube of instrument and add 25ml of conc. sulphuric acid. Then add 10gm of catalyst mixture. Adjust the temperature to 370°C and keep for digestion for 4-6hrs, that is till the solution becomes blue in colour. Remove the tube from the digestion then cool the samples. Place 25ml of standard 0.1N boric acid solution or 0.1N sulphuric acid in the titration receiver flask (250ml conical flask) and place it in the distillation unit. Attach the tube containing digested sample to the distillation unit and press the start button to effect the metered addition of 40% sodium hydroxide solution and to initiate the steam distillation when the receiver platform falls and the distillation stops. Remove the flask and add 5 drops of methyl red

indicator solution and titrate with 0.1N HCl solution to yellow colour end point if boric acid is used or 0.1N NaOH if 0.1N sulphuric acid is used and indicator is phenolphthalein, carry out a blank determination.

$$\% \text{ of Nitrogen} = \frac{(\text{sample titre value} - \text{blank}) \times N \text{ of HCl} \times 14 \times 100}{(\text{weight of sample} \times 1000)}$$

$$\text{Protein \%} = \text{nitrogen\%} \times \text{conversion factor}$$

2.10 Estimation Of Crude Fiber(%) : Fat free samples were used for determination of crude fibre. About 3 g fat free residue was taken and then transferred to the digestion flask. 200 ml boiling sulphuric acid was added and immediately the flask was connected to condenser. Heated the flask and boiled it by frequently rotating for 30 min, maintained the volume with hot water. Then filtered through filter cloth in a fluted funnel. The residue was washed on cloth with hot water or potassium sulphate solution, and returned the residue to digestion flask by washing with hot water, 200 ml boiling sodium hydroxide was added and boiled for 30 min. The volume was adjusted with boiling water, filtered it through the muslin cloth and the residue free of alkali was washed. The residue was transferred into crucible and washed with 15 ml alcohol and the crucible was dried at 130°C for 2 h. The crucible was cooled in desiccator and weighed. The crucible was ignited in the furnace at 600°C for 30 min then cooled and weighed. The loss in weight represented the crude fibre

$$\text{Crude fiber} = \frac{[100 - (\text{moisture} + \text{fat})] \times [\text{weight of fibre}]}{\text{weight of the sample}}$$

Where weight of fibre = $W_e - W_a$

2.11 Atomic Absorption Spectroscopy: To measure how much of a given element is present in a sample, one must first establish a basis for comparison using known quantities of that element to produce a calibration curve. To generate this curve, a specific wavelength is selected, and the detector is set to measure only the energy transmitted at that wavelength. As the concentration of the target atom in the sample increases, the absorption will also increase proportionally. A series of samples containing known concentrations of the compound of interest are analyzed, and the corresponding absorbance, which is the inverse percentage of light transmitted, is recorded. The measured absorption at each concentration is then plotted, so that a straight line can then be drawn between the resulting points. From this line, the concentration of the substance under investigation is extrapolated from the

substance’s absorbance. The use of special light sources and the selection of specific wavelengths allow for the quantitative determination of individual components in a multi element mixture. Typically, the technique makes use of a flame to atomize the sample, but other atomizers, such as a graphite furnace, are also used.

III.RESULTS AND DISCUSSIONS

Nutritive value of Pizza base (per 100 gm.) obtained by chemical analysis is a developed value-added product (Millets and date seed powder pizza base) were richer in Protein, Fat, Fiber, Iron, Calcium. Date seeds are good source of dietary fibre exhibiting 54.68 g/100 g dry matter and noted as in Table 2 and presented in Graph 1. Pizza base prepared from the Maida flour only served as control (C). The nutritional composition of product was chemically analyzed and Minerals were determined using Atomic Absorption Spectroscopy. Acceptance of pizza dough’s was influenced by texture, since the formulation with lower firmness, gumminess, chewiness and elasticity was the most acceptable so the Texture profile analysis of Pizza base was carried out by using Textrometer(see Table 3 and Graph 2) and the product was finally sensory attributed by a Nine Point Hedonic Scale and noted in Table 4 and Garph 3.Fiducial limits of the final Pizza base are given in Table 5.

Table 2: Proximate composition developed pizza base

S.No	Nutrients	C	T ₁	T ₂	T ₃
1	Moisture(%)	10.69	11	11.53	11.94
2	Ash(%)	1.02	0.98	1.06	1.09
3	Fibre(%)	3.32	14.94	16.24	18.94
4	Protein(%)	6.7	9.17	9.97	10.3
5	Fat(%)	4.24	6.83	7.03	7.86
6	Calcium(mg)	13.13	23.50	27.032	29.944
7	Iron(mg)	1.09	9.40	9.46	9.49

Table 3: Texture analysis of developed pizza base using Textrometer

Sam ple	Hardnes s(kg)	Springines s(mm)	Cohesiven ess(%)	Adhesivene ss(mJ)
C	6.455	4.5	0.53	1.8
T ₁	13.47	3.7	0.62	0.5
T ₂	16.37	2.9	0.78	0.5
T ₃	19.105	2.5	0.84	1

Table.4 Sensory quality of millet incorporated pizza base

Sample	C	T ₁	T ₂	T ₃
Taste	9	8	6	4
Color	9	7	7	5
Appearance	9	8	7	4
Texture	9	7	7	2
Flavor	9	7	7	4
Overall Acceptability	9	8	7	5

Table 5: Fiducial Limits

Parameters	Fiducial Limits
Appearance	8.33±0.2
Taste	8.06±1.3
Flavor	8.74±1.6
Texture	8.733±0.5
Color	8.04±1.4
Overall acceptability	9.101±0.30

The fiducial limits (see Table 5) of the controlled sample are:

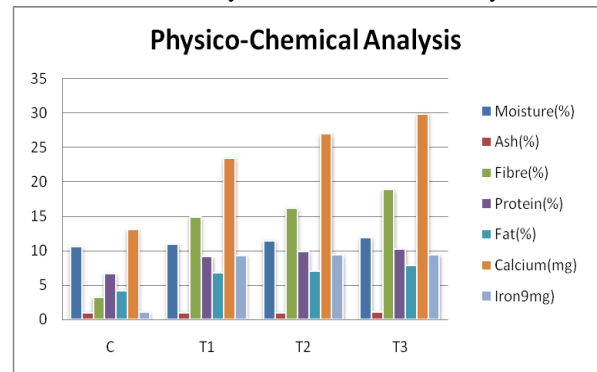
At 5% significance level 9.401 to 8.80

At 1% significance level 8.36 to 7.76.

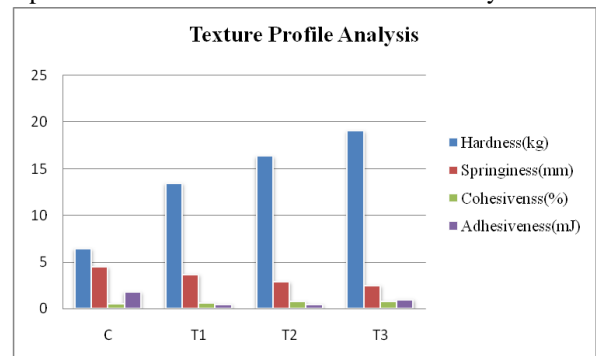
Based on fiducial limits, the sample T₁ was superior than all other samples.

Samples T₂ and T₃ were inferior to the control sample at 5% and 1% level.

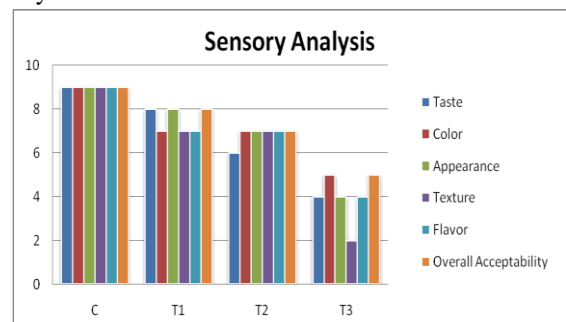
Graph 1: It shows the mean scores of Developed Pizza Base in relation to Physical and chemical analysis



Graph 2: It gives the comparison of different developed samples of Pizza Base in terms of Texture analysis



Graph 3: It shows the comparison of different developed pizza base on overall acceptability in terms of sensory analysis



IV CONCLUSION

The present study concluded that developed value added product (Millets and date seed powder pizza base) were richer in Protein, Fat, Fiber, Iron, Calcium. This is a new processed product if the product has to be commercialized then it should be placed under the proprietary foods category with rules and regulations of FSSAI Act. Acceptability is more for sample T₁ with 60%Maida, 10%Foxtail Millets, 20%Ragi, 10%Date seed powder. Therefore, it will be helpful to improve the nutritional status of the population by including one serving of Pizza base with our routine diet.

V. REFERENCES

- [1] A Sumana and M Aruna, "Formulation and quality evaluation of agathi (*Sesbaniargrandiflora* (L.) Poir) leaves enriched pizza base a healthier substitute for the regular pizza base". International Journal of Home Science, Vol. 3 Issue 2, 2017.
- [2] Abdillah, L.A. & Andriani, M. Friendly alternative healthy drinks through the use of date seeds as coffee powder. International Conference on Economics, Business and Management (ICEBM) Indonesia, pp. 80-87. 2012
- [3] Sharon Lauterbach Julie A. Albrech., "Functions of Baking Ingredients". Foods & Nutrition, University of Nebraska, Institute of Agriculture and Natural Resources, File NF186, A-2c, 1994.
- [4] Al-Farsi, M., Alasalvar, C., Morris, A., Baron, M., & Shahidi, "Compositional and sensory characteristics of three native sun-dried date (*Phoenix dactylifera* L.) varieties grown in Oman.J".Agric. Food Chem. 53:7586– 7591, 2005.
- [5] Anu Agrawal and Anisha Verma, "Development of multigrains flour pizza base for value addition," International journal of advanced research, Vol 10, 2016 DOI:21474/IJAR01/1311.
- [6] Tata McGraw Hill,"AOAC Handbook of analysis and quality control for fruit and vegetable products" edition 2nd, pp 18-22, 2005.
- [7] Barreveld,W.H."Date palm products.FAO Agricultural Services", Bulletin No. 101, 1993.DOI: http://www.fao.org/docrep /t0681e / t0681e00.ht
- [8] Chethan S, Malleshi NG."Finger millet polyphenols: characterization and their nutraceutical potential". American Journal of Food Technology, volume 2, pp582–59, 2007.
- [9] Devi PB, Vijayabharathi R, Sathyabama S, Malleshi NG, Priyadarisini VB. "Health benefits of finger millet (*Eleusine coracana* L.) polyphenols and dietary fiber a review". Journal of Food Science and Technology. vol 51(6): 1021-1040, 2014 DOI: <https://doi.org/10.1007/s13197-011-0584-9>
- [10]Manay Shakuntala and swamy Shadakshara "Glycemic index of oat incorporated with wheat", International Journal of Food Facts and Principles, volume 5, edition 2nd, pp 166-175, 2001.
- [11]Preeti Singh, Goyal GK, "Functionality of pizza ingredients", British Food Journal.2011; DOI:113(11):13221338.
- [12]Saha S, Gupta A, Singh SRK, Bharti N, Singh KP, Mahajan V," Compositional and varietal influence of finger millet flour on rheological properties of dough and quality of biscuit". Food Science and Technology. 2011; 44:616-621.
- [13]Shukla K, Srivastava S, "Evaluation of finger millet incorporated noodles for nutritive value and glycemic index". Journal of Food Science and Technology. 51(3): 527-534, 2014.DOI: <https://doi.org/10.1007/s13197-011-0530-x>.
- [14]Subba Rao MVSSST, Muralikrishna G. "Evaluation of the antioxidant properties of free and bound phenolics acids from native and malted finger millet (Ragi, *Eleusine coracana* Indaf-15)". Journal of Agricultural and Food Chemistry. Vol 50: 889-89, 2002. DOI: <https://doi.org/10.1021/jf011210d>.
- [15]Eman Hassan Ahmed Algarni, "Utilization from date seeds as a by-product low-cost to prepare beverage cappuccino and the latte less caffeine". World Journal of Environmental Biosciences. Food Science and Nutrition Department, College Science, Taif University, Saudi Arabia. Volume 9, Issue 2: 14-20, 2010.
- [16]T. Veena, Udaykumar Nidoni and G. Sudha Devi, "Millet Incorporated Pizza Base". International Journal of Current Microbiology and Applied Sciences ISSN: 2319-7706 Volume 9 Number 10,2020. DOI: <http://www.ijcmas.com>.