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Sensory and Proximate Analysis of Developed Pumpkin Ketchup by Using Different Thickening Agents.

KEYWORDS: Pumpkin, Ketchup, thickeners

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ABSTRACT *Pumpkin is good source of β-Carotene,Vitamin C along with carbohydrates it was used in ketchup . The ketchup being developed by incorporating thickening agents like guar gum, carboxymethylcellulose, xanthum gum, corn flour. It was very important to maintain the viscosity of the ketchup in order to prevent the serum loss. Thus thickening agent was a good binding agent which decreases moisture content of the ketchup and prevent microbial growth. The objective to assess the sensory attribute along with the proximate composition of the developed pumpkin ketchup. In the first phase pumpkin ketchup was developed by making variations with different thickeners (Guargum,xanthumgum, carboxymethylcellulose, corn flour). Sensory evaluation by untrained panelist was conducted in second phase. The sensory evaluation and statistical analysis revealed that sample C (Xanthum gum) was significantly ($p<0.05$) more acceptable with mean overall acceptability score of (79.4±7.37) out of 100 whereas mean score of sample A(standard) was found to be (79.6±10.45). Third phase include proximate composition which revealed that sample C has high energy (238.9kcal) in comparison to sample A which was found to be (151.1 kcal) . The protein content of sample A and sample D(Guar gum) was found to be (3.97gm) and (9.39 gm.) respectively. Thus this study demonstrates that the thickening agents can be incorporated in the ketchup to improve the energy carbohydrate content in the ketchup.*

INTRODUCTION

Pumpkin is an angiosperm belonging to the Cucurbitaceae family, Cucurbita mixta plants are Hardy creepers or soil surface runners, but able to climb where there are supports. The fruits vary in shape, colour and sizes Pumpkin fruits has many nutritional components including pumpkin polysaccharides active proteins, essential amino acids, important antioxidants, carotenoids and minerals. [1]

Ketchup is a vegetable sauce produced from tomato concentrate and sugar, vinegar, salt, and different spices. [2]. Sometimes thickening agent are used in ketchup. Sauces are generally thinner and contain more total solids (minimum 30%) than ketchups (minimum 28%). [3]

From the physical point of view, ketchup is two-phase system in which solid particles of tomato pulp and added spices are dispersed in a colloidal continuous phase that consists of sugars, salts, organic acids, a fraction of soluble pectin, and other compounds of extract dissolved in water. Viscosity of the continuous phase is mostly affected by thickening substances, especially polysaccharide hydrocolloids used to produce a ketchup [4-6].Ketchup is non- Netwonian, shear-thinning fluid, with yield stress. It also shows thixotropy and viscoelastic properties. [7]

Thickening agents are natural or chemically modified carbohydrates that absorb some of the water present in the food, thereby making the food thicker [8]. There are various thickeners in the form of polysaccharides such as starch, gum, xanthum gum, gum arabic, guar gum and carboxy methyl cellulose to improve the consistency and overall acceptability of tomato ketchup [9]. Starch can assume a multifunctional role in a condiment system, providing viscosity at key processing points, as well as helping to maintain consistent suspension.

Starch is added to tomato in industry to achieve good quality of the final product [10].

METHODOLOGY

The present study was done to assess the sensory and proximate analysis of developed pumpkin ketchup by using different thickening agents. In phase I there was development of pumpkin ketchup. All the raw materials were procured from different region. Different types of ingredients were used for the preparation of the ketchup. Different types of thickeners were used i.e. cmc, xanthum gum, guar gum, corn flour. After the standardized recipe of pumpkin ketchup thickeners were added. Thickeners were added after mixing with luke warm water. In the II phase sensory evaluation of the samples were carried out using 10 panelist from manav rachna international university. A nine point hedonic scale one(1) to nine(9) representing "extremely dislike" and "extremely like" respectively was used. The quality assessed include texture, colour, appearance and overall acceptability. Phase III includes proximate analysis that include moisture, ash value, protein, energy and carbohydrate was done by AOAC method. In phase IV statistical analysis of data was done. Mean, standard deviation and Anova were calculated.

RESULT AND DISCUSSION

Table 1: Mean Acceptability Scores of Pumpkin ketchup by HEDONIC SCALE

ATTRIBUTE	Sample A STANDARD	Sample B (CMC)	Sample C (Xanthum -gum)	Sample D (Guar gum)	Sample E (Corn flour)	f value	p value (ANOVA)
Taste	6.4±1.00	5.6±1.47	6.8±1.18	6.63±1.18^{b}	5.46±1.43^{cd}	7.266	.000

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ATTRIBUTE	Sample A STANDARD	Sample B (CMC)	Sample C (Xanthum -gum)	Sample D (Guar gum)	Sample E (Corn flour)	f value	p value (ANOVA)
Colour	6.7±1.5	5.9±1.51	6.8±1.24	6.26±1.15	5.46±1.77^{c}	4.606	.002
Texture	6.66±1.12	5.5±1.13	6.5±1.38	6.0±1.31	4.86±2.04^{ac}	8.097	.000
Flavour	6.30±0.98	5.5±1.3	6.6±1.2	6.1±1.09	5.03±1.47^{ac}	7.714	.000
Appearance	6.83±1.14	5.9±1.44	6.5±1.5	6.4±1.35	4.86±2.08^{acd}	7.602	.000
Consistency	6.96±1.5	6.33±1.12	7.3±1.39	6.36±1.4	4.8±2.00^{abcd}	13.237	.000

SIGNIFICANCE P<0.05

Table 1 shows the mean acceptability scores of attributes between the samples. Out of all samples, sample C was found to have highest mean score value i.e (6.8±1.18) for taste attribute where as mean score value for sample E was found to be (5.46±1.43) respectively. Statistically significant difference was obtained between samples A,B,C,D and E using ANOVA, whereas statistically significant difference was observed between samples B&D, C&E and D&E by using multiple comparison test (Post Hoc).

Result shows that with regard to color, sample C scored(6.8±1.24)whereas sample E scored.(5.46±1.77). Statistically significant (p<0.05) difference was observed among all the samples by using ANOVA, whereas statistically significant difference was only observed in between Sample C and E by multiple comparison test (Post Hoc).

The mean acceptability score with regard to texture was higher for sample A (6.66±1.12) than for sample E (4.86±2.04). There was statistically significant difference (p<0.05)observed between all the samples which show that sample A was more acceptable regarding texture attribute by using ANOVA, whereas significant difference was observed between sample A &E, sample C &E by multiple comparison test (Post Hoc).

In respect to flavour, sample C (6.6±1.2) scored higher mean value in comparison to sample E (5.03±1.47). Statistically significant (p<0.05) difference was observed among all the samples by using ANOVA, whereas significant difference was observed in A&E,C&E by using multiple comparison test (Post Hoc).

Appearance attribute of sample A (6.83±1.14) was found to be higher than sample E (4.86±2.08). Statistically significant difference was observed among all the samples by using ANOVA whereas significant difference was observed between A&E, C&E,D&E by using multiple comparison test (Post Hoc).

Sample C was found to have highest mean value (7.3±1.39) for consistency parameter in comparison with sample E which was found to be have lowest mean value (4.8±2.00) respectively. Statistically significant difference was found between the samples through ANOVA, By using multiple comparison (post hoc test) statistically significant difference was found between sample E with all other samples.

Nutrient	Sample A STANDARD	Sample B (CMC)	Sample C (Xanthum gum)	Sample D (Guar gum)	Sample E (Corn flour)	F value	P value (ANOVA)
Energy(kcal)	151.1±0.70	116.66±88.82	238.9±0.70	242.2±0.70	156.27±0.7	6.34	0.008
Protein(gm.)	3.97±0.69	3.70±0.70	6.90±0.70^{ab}	9.39±0.70^{ab}	4.57±0.70^{d}	35.50	0.00
Carbohydrate(gm.)	33.9±0.70	38.4±0.70^{a}	52.7±0.70^{ab}	50.4±0.7^{ab}	33.7±0.70^{bc}	508.88	0.00
Ash (%)	2.27±0.70	2.26±0.70	1.78±0.70	2.87±0.70	2.49±0.4	0.95	0.42
Moisture (%)	59.84±0.70	56.69±0.7	38.5±0.70^{ab}	36.4±0.7^{ab}	58.3±0.70	793.16	0.00

Table 2.Proximate Analysis Of Developed Pumpkin Ketchup(Amount Per 100 Gm
SIGNIFICANCE P<0.05

Table 2 represents the proximate composition of sample A and the (sample B, C & D) which reveals that the energy content of sample D (156.27±0.7)kcal. was higher than sample B(116.66±88.82) kcal. The protein content of Sample D was (9.39±0.70)mg was higher than sample B(3.70±0.70)mg. The ash value of sample D had got highest mean value(2.87±0.70)%whereas sample C has got lowest mean value(1.78±0.70)%. The ash value of sample D had got highest mean value (2.87±0.70)%whereas sample C has got lowest mean value(1.78±0.70)%. For moisture Sample A had got highest mean value(59.84±0.70)% whereas sample D got lowest mean value (36.4±0.7)%.

Thus there is a statistically significant result was observed between all the samples except energy and ash by using ANOVA whereas sample protein showed statistically significant difference between with sample AC,BC,AD,BD. There was significant difference between AB,AC,BC respective.

CONCLUSION

The present study was conducted to assess the sensory and proximate analysis of developed pumpkin ketchup by using different thickening agents. The pumpkin ketchup was developed by incorporating thickeners in the standardized recipe of ketchup. Sensory evaluation revealed that xanthum gum was significantly (p<0.05) more acceptable with mean overall acceptability score of (79.4±7.37) out of 100 whereas mean score of standard was found to be (79.6±10.45) respectively. The proximate estimation of both the standard and thickening added ketchup

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was conducted. The protein content of standard and Guar gum was found to be (3.97gm) and (9.39 gm). It may be inferred with the present study that ketchup with thickening agent was prove to improve the properties of ketchup. Developed pumpkin ketchup with guar gum was more nutrient enriched. It can be used to maintain the viscosity of the ketchup in order to prevent the serum loss. Thus thickening agent helps in binding the water present in the ketchup and make it unavailable for microbial growth.

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