



DEVELOPMENT OF LYCOPENE RICH RUSK

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Abstract: This study is aimed to develop a common lycopene rich ready to eat snack. So 'Rusk' is selected as a food vehicle and tomato puree is chosen (one of the rich source of lycopene) for fortification into the rusks. Plain Rusks are kept as control. The sensory evaluation is conducted among semi-trained and untrained panel judges. The statistical analysis showed that there is no significant difference between control and lycopred rusks in sensory evaluation among both the panel judges which implied that the researcher product was found to be equally good in par with the control product in terms of its organoleptic properties.

Keywords: Tomato Puree, Lycopene, Rusk.

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Introduction

Tomatoes are important agricultural crop worldwide. Their important pigments - carotenoids like lycopene has much therapeutically used in many ways. Tomatoes and Tomato based foods account for more than 85% of all the dietary sources of lycopene. Several epidemiological report that lycopene-rich diets have beneficial effects on human health. Lycopene is shown to significantly reduce the levels of oxidized LDL (which is the key factor in pathogenesis of atherosclerosis) in subjects regularly consuming processed tomato products and lycopene capsules (Agarwal S and Rao A.V., et al, 1998).

Lycopene, a carotenoid which is responsible for bright red colour in ripe tomato is an effective natural anti-oxidant and a quencher of free radicals that can damage DNA and other fragile cell structures (www.health.harvard.edu/lycopene). Consumption of processed tomato products, containing lycopene, is of significant health benefit and can be attributed to a combination of naturally occurring nutrients in tomatoes. Lycopene, the main tomato carotenoid, contributes to this effect (Basu A and Imrhan V, 2007). In a research study, analysing the anti-mutagenic properties of pure lycopene and tomato puree shows that the tomato puree reveals a much stronger, dose-dependent, anti-mutagenic effect compared with corresponding doses of pure lycopene (Polivkova Z et al, 2010). Many researches shows that lycopene can be absorbed more efficiently by the body after it has been processed into juice, sauce, puree, paste or ketchup. Processing makes the lycopene more available by increasing the surface area available for digestion. More significantly, the chemical form of lycopene is

altered by the temperature changes involved in processing to make it more easily absorbed by the body (Kanwar L, 2011).

Convenience has an immense impact on the food choices of today's consumers. This suggests that food products offering less convenience will be less preferable to consumers. Therefore, adding convenience traits to certain products that are deemed healthy and/or beneficial could increase the consumption of the specific food products (Wales, 2009). Therefore, in this study, 'Rusk' which is one of the common Ready to Eat (RTE) tea time snack is selected as the food vehicle for fortification. Fortification and enrichment is strongly considered by many healthy experts to enhance the nutritive value of the commercial foods.

Materials and Methods

Preparation of Tomato Puree

Ripened red tomatoes are selected for preparation of the puree. Tomatoes are initially cleaned and boiled in medium flame for 10 minutes. The skin is peeled out. The stem part and the seeds are discarded. Blanched tomatoes are pureed in a mixer to a smooth paste without addition of water. Again, the puree is put on flame for other 10 minutes for increasing its concentration with little added salt.

Incorporation of Tomato Puree into Rusk

The fortification of tomato puree into the rusk was done in a local bakery at Ambattur in Chennai, Tamilnadu, India. The baker was asked to blend Maida and puree in the ratio 4:3. About 300g of tomato puree was mixed with 350g of rusks to prepare the dough.

Addition of 86% of tomato Puree was fixed after repeated trials of various ratio. The other ingredients like sugar (60g), Dry Yeast (30g), Salt (10g) were added to the dough. The Baker was insisted furthermore to add olive oil (30g) along with butter (50g) to ensure better lycopene absorption or bioavailability.

The Baking slab was greased and kept ready to which the prepared dough was spread thoroughly. The slab was placed inside the preheated oven and the dough was baked at 180°C for 20-25 minutes. After the initial baking, cake rusk was allowed to cool. Then it was taken out from the mould and made into slices or loaves with the knife. Double baking was the main highlight of rusk preparation. Double baking of the loaves were done at 140°C for half an hour. The other side of the loaves were turned up after 15 minutes to ensure uniform baking respectively. Finally, they were allowed to cool which resulted to give a crispy, porous rusk texture. The formulated rusk was named as '**Lycopred Rusks**'. The researcher obtained about 1000 grams of rusks consisting of 120 numbers.

The Nutrient composition of the formulated rusks (per 100g) contained about 207 kilocalories, 5.4g protein, 4.6 g fat, 36g carbohydrates, 53mg sodium, 25mg of calcium, 1.4mg of iron, 3.6mg of oxalates and 2.91mg of lycopene respectively.

Sensory Evaluation

The sensory evaluation of the Plain and lycopred rusks is carried out by 10am among the fifteen semi-trained panel judges including the Post Graduate Nutrition students and staffs. Whereas fifteen untrained panel judges including the staffs and students of other faculties of Mother Teresa Women's University and IGNOU

(Indira Gandhi National Open University), Chennai. The Sensory evaluation is conducted based upon the attributes in the rating scale adapted from the research study of Ahmad F et al, 2012. The organoleptic properties of rusks are evaluated in terms of Crispiness, Cracking pattern, Surface Hue, Porosity etc.

Results and Discussion

The sensory evaluation conducted among semi-trained and untrained panel judges are statistically analysed. The statistical computation of the mean scores given by both the panel judges as illustrated in the table (1) and table (2) depicted that there were no significant differences between Plain and lycopred rusks which could be indicated from the almost similar mean scores of the two products taken for study respectively. Hence this revealed that formulated rusk was equally good in par with control plain rusk in terms of matching up to its expected quality attributes.

Conclusion

Tomatoes are considered as the treasure of riches due to the unique antioxidant package especially lycopene of special mention. Since, tomatoes especially in their processed forms are the richest sources of lycopene. The incorporation of tomato puree into Ready To Eat (RTE) convenience foods like rusks can serve as one of the suitable food vehicles for improved nutrient intake without compromising in its organoleptic properties. Therefore, this fortified formulated rusk will surely have a better commercial value at an easy reach and at an affordable price.

Table 1: Statistical Evaluation of Sensory Evaluation of Plain Rusks versus Lycopred Rusks among Semi-Trained Judges

S.no.	Products	Mean ± SD	t-value	Level of significance
1.	Plain rusks	85.86 ± 5.28	0.4158	1%
2.	Lycopred rusks	86.6 ± 4.34		

Table 2: Statistical Evaluation of Sensory Evaluation of Plain Rusk versus Experimental Rusk among Untrained Judges

S.no.	Products	Mean ± SD	t-value	Level of significance
1.	Plain rusks	83.87 ± 7.754	1.385	1%
2.	Lycopred rusks	87.2 ± 5.171		

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