



EVALUATION OF SENSORY QUALITY OF EDIBLE COATED PANEER USING CINNAMON OIL

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ABSTRACT

A study has been contemplated to develop protein based edible coating incorporated with Cinnamon oil (essential oil) to assess the sensory quality of paneer. Whey protein edible coating was prepared by using whey protein concentrate (WPC) (6 per cent), glycerol (7 per cent) as plasticizer and plant essential oil (cinnamon oil) as anti microbial agent. Preliminary trials (Control, T1, T2, T3, T4, T5 and T6) were conducted using cinnamon oil (essential oil) each at six different levels (0.2%, 0.4%, 0.6%, 0.8% 1.0 and 1.2 %), WPC and glycerol level fixed based on previous research paper. Based on the sensory evaluation, as the concentration of the above mentioned oil up to a level of 1 per cent incorporation into edible coating recorded significantly higher ($p < 0.05$) scores in all sensory parameters without affecting the overall acceptability.

KEYWORDS: Cinnamon oil, Edible coated paneer, Glycerol, Sensory quality.

INTRODUCTION

Dairy products constitute an important group of foods; they are known to contain energy and nutrients such as protein, fat, carbohydrate, and calcium. They also make an important contribution to vitamin intake (Fox and Cameron, 1989). Paneer has a good market value, but it is not able to find its rightful place in Indian market due to its short shelf life of about a week under refrigeration and one day at room temperature. On the other hand use of edible films on the food products could also be utilized as a protective coating to extend the shelf life. An edible coating/film simply is defined as a thin continuous layer of edible material formed on or placed between food and food components (Torres, 1994). Since the demand for this product is steadily increasing, there is a great need to produce high quality long life products that requires hygienic modern processing, preservation and packaging technologies.

Whey protein based films and coatings are generally flavorless, tasteless and flexible materials, water based and the films vary from transparent to translucent depending on formulation, purity of protein sources and composition. In the preservation of paneer, edible coating with antimicrobial agents could be the best alternative. Because of this, it is successfully applied in some dairy products (e.g. Cheese) and other food products (like fruits, confectionary products, and chocolate etc). The applications of edible films and coatings have improved the physical strength of food products, reduce particle clustering and enhance visual and tactile feature on product surface (Cuq *et al.*, 1995).

MATERIALS & METHODS

Fresh milk containing above 4 per cent fat and 7.9 per cent Solids Not Fat obtained from crossbred cows maintained

at the Instructional Livestock Farm Complex, Veterinary College and Research Institute, Namakkal, Tamil Nadu was used for the study. Whey protein concentrates (containing 82 percent protein) obtained from the Kanishka Flora ChemInida, Chennai, Tamil Nadu was used. Essential oil (EO)Cinnamon oil– certified food grade essential oils were purchased from M/S Akay flavor and aromatics private Limited, Kochi.

Selection of ingredients: In order to prepare paneer (4 litre cow milk), citric acid 1 per cent (1.5ml/lit) were used. Whey protein concentrate (WPC) was used at 6 per cent level, glycerol (G) was used at 7.0 per cent (Reeta and Kumar, 2013) and Essential oil (cinnamon oil) were used at different percentage (0.2 to 1.2 per cent).

Preparation of paneer

Panner was prepared as per the procedure (De, 2004).

Preparation of WPC edible coating material

1. WPC (80% protein)
2. Dissolved in distilled water
3. Heat Treatment (75-100^oC)
4. Cooling to room temperature (32^oC)
5. Addition of glycerol (7 per cent)
6. Conditioning
7. Brought to room temperature
8. Addition of ginger oil (0.2, 0.4, 0.6, 0.8, 1.0 and 1.2 %)
9. Thorough Mixing
10. Edible Coating material

Application of Edible Coating on Paneer

The edible coat material prepared as per previous research paper (Reeta and Kumar, 2013).

Sensory evaluation of paneer Panellists were asked to evaluate paneer quality on a 9-point hedonic scale with their preferences according to the scale [Amerine *et al.*, 1965).

Statistical analysis

The data obtained in all the experiments were analyzed statistically analyzed by ANOVA (Snedecor and Cochran, 1964).

RESULTS & DISSCUSION

Mean \pm SE values of colour and appearance, flavour, body and texture and over all acceptability scores of different concentration of cinnamon oil {0.2 (T1), 0.4(T2), 0.6(T3), 0.8(T4), 1.0(T5), and 1.2(T6), per cent} included in whey protein based edible coat material are presented in Table 1 and Fig 1.

TABLE 1: Sensory evaluation of paneer samples enrobed with whey protein based edible coating incorporated with cinnamon oil

Treatment	Sensory parameters			
	Color and appearance (9)	Body and texture (9)	Flavor (9)	Overall acceptability (9)
Control	7.91 \pm 0.08 ^a	7.58 \pm 0.23 ^a	7.75 \pm 0.17 ^a	8.00 \pm 0.18 ^a
T1	7.33 \pm 0.16 ^b	7.33 \pm 0.16 ^{ab}	7.91 \pm 0.15 ^a	7.25 \pm 0.11 ^b
T2	7.16 \pm 0.16 ^b	7.00 \pm 0.18 ^{abc}	8.08 \pm 0.15 ^a	7.33 \pm 0.16 ^b
T3	6.83 \pm 0.21 ^b	6.75 \pm 0.21 ^{bc}	8.16 \pm 0.16 ^a	7.58 \pm 0.15 ^{ab}
T4	6.16 \pm 0.24 ^c	6.66 \pm 0.27 ^{cd}	7.83 \pm 0.24 ^a	7.66 \pm 0.16 ^{ab}
T5	5.66 \pm 0.24 ^c	6.08 \pm 0.15 ^d	7.91 \pm 0.23 ^a	7.75 \pm 0.21 ^{ab}
T6	3.25 \pm 0.21 ^d	3.50 \pm 0.18 ^e	3.75 \pm 0.11 ^b	3.50 \pm 0.18 ^c

Within a Colum value (Means \pm SE) with different superscript letters are significantly different (p<0.05)

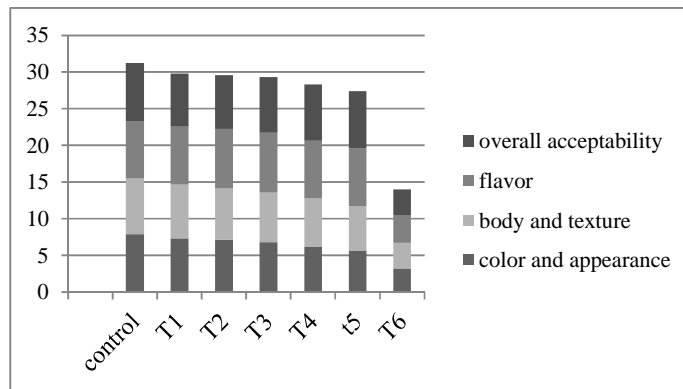


FIGURE 1: Sensory evaluation of whey protein based edible coated paneer samples by 9 point hedonic scale (Cinnamon oil)

Colour and appearance score

Statistical analysis revealed that inclusion of cinnamon oil at all levels except 0.2 percent level significantly (P<0.05) reduced the colour and appearance score of the paneer below control. However, the difference among T2, T3 and T4 were not significant. Similarly, T4 and T5 did not differ significantly. The inclusion of cinnamon oil at 1.2 percent decreased the colour and appearance score significantly (P<0.05) from all other treatments as well as control. On sensory evaluation, the colour and appearance and body and texture, it was revealed that a significant (p 0.05) decrease in edible coated paneer was observed in all the treatments compared to control. This may be attributed to the natural colour of whey protein concentrate and essential oils.

Body and Texture score

Even though there was a marked decrease in body and texture scores of edible film coated paneer, the reduction was not significant for T1, T2, T3 compared to control. But the reduction was significant (P<0.05) for T4, T5, T6 over the control. Addition of 1.2 percent cinnamon oil significantly (P<0.05) reduced the body and texture score over the control and all other treatments. The edible coated paneer showed a significant reduction in body and texture it may be due to addition of glycerol in edible coat material. These results were in accordance with Reeta and

Kumar (2013), who reported that the glycerol added as plasticizer affected the body and texture while the whey protein concentrates had minimal impact on body and texture.

Flavour score

Statistical analysis revealed that inclusion of cinnamon oil at 1.2 percent level in edible coat material significantly (P<0.05) reduced the flavor scores over control and all other treatments. Even though there was marked increase in the flavor score up to 1 percent level of inclusion, the difference were not significant. On the contrary, Naveena and Mendiratta (2004) reported an increase in flavor and overall palatability with samples treated with ginger extract than control. The decrease in flavor score may be attributed to the addition of glycerol which might have masked the flavour.

Overall acceptability score: Inclusion of cinnamon oil at 0.2 and 0.4 percent significantly (P<0.05) reduced the overall acceptability scores of paneer over the control. However, the cinnamon oil inclusion in the edible coating at 1.2 percent significantly (P<0.05) had poor sensory qualities over the control and all other treatments. But, addition of cinnamon oil at 0.6, 0.8 and 1 percent level did not show any significant (P<0.05) effect on overall acceptability scores over control. This was in line with observations of Santoro (1994), who reported an

improvement in the sensory score observed for cheese added with whey protein concentrate at the rate of 10g/l to milk.

CONCLUSION

From the above study it was concluded that there was a higher sensory quality by employing whey protein based edible coating with cinnamon oil up to the level of 1 per cent was recorded significantly higher scores. Thereby we can increase the useful lifespan of paneer for improving the economic and social status of Indian rural masses.

REFERENCES

Amerine, A., Maynard, Pangborn, Marie, R. and Edward, R. (1965) *Principles of sensory evaluation of food*. Academic Press., New York.

Cuq, B., Aymard, C, Cuq, J.L. and Gulibert, S. (1995). Edible packing films based on fish myofibrillar protein formulations and functional properties. *J. Food Sci.*, **60**, 1369-1374.

De, S. (2004) In: *Outlines of Dairy Technology*, 19th edition, Oxford publishing Company, New Delhi.

Fox, B.A. and Cameron, A.G. (1989) *Food Science Nutrition and Health* (5th ed). Great Britain, Clays Ltd. St. wes Plc.

Naveena, B. and Mendiratta, S.K. (2004) The tenderization of buffalo meat using ginger extract, *J. Muscle Foods.*, **15(4)**, 135-244.

Reeta, A. and Kumar (2013) Study of sensory and textural properties of protein based edible coated paneer using Response surface methodology. *Int. J. of Advancements in Res & Technol.*, **2(3)**.

Santoro, M. (1994) Cheese with added whey protein concentrates. I. *Production technology*. Rivista di Scienza dell' Alimentazione, **23(3)**, 347-353.

Snedecor, G.W. and Cochran, W. G. (1994) *Statistical methods*. Eighth edition, IOWA State University Press, USA.

Torres, J.A. (1994) Edible film and coating from protein. *In protein functionality in food system*. pp. 467-507.