



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

**International Journal of
DEVELOPMENT RESEARCH**

International Journal of Development Research
Vol. 5, Issue, 04, pp. 4124-4130, April, 2015

Full Length Research Article

STUDIES ON CARROT INCORPORATED SOYPANEER

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ARTICLE INFO

Article History:

Received 08th January, 2015
Received in revised form
20th February, 2015
Accepted 07th March, 2015
Published online 29th April, 2015

Key words:

Soypaneer,
Carrot Pulp,
Citric Acid,
Paneer.

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ABSTRACT

In the present study of formulation of carrot incorporated Soypaneer, the principle ingredients used were carrot, soybeans, and citric acid (coagulant). Carrot pulp was incorporated in soypaneer in two different ratios of 10% and 20%. A carrot incorporated soypaneer with improved colour, appearance, flavour, texture, and nutritional value was formulated. The product was assessed for its sensory and nutritional properties. The soypaneer incorporated with 20% carrot has almost equal acceptance to the milk paneer in terms of taste, nutritional value and acceptability.

INTRODUCTION

Health is something that has to be built and maintain every day. A balanced diet and a sufficiently active lifestyle help to do this. But food and drink is also about pleasure, and the trick is to reconcile enjoyment with a healthy diet. With the increasing health consciousness among the people, the use of soybean is getting accepted in the form of soy paneer, soy yogurt, textured vegetable protein, Soya fortified wheat flour, soy milk, etc. Soybean is one of the nature's wonderful nutritional gift. It is considered as "Gold" obtained from soil and is thus rightly called today, "Gold Nugget of Nutrition" owing to its nutritional composition. It contains 38-42% protein and 18-20% fat. Soy related food products are becoming popular throughout the world due to their good nutrition values, and medicinal qualities. Soy by itself is not a magic food (Christian Hewis, 2001) but rather it is an example of a complete diet which can have a positive effect on health. The Soya is the bean of the Soya plant, *Glycine max* Soy paneer, commonly called "The Cheese of Asia" a popular dish in the orient, is a fresh, cheese-like product which is off-white

in colour made by coagulating hot soymilk with some food grade chemicals such as calcium chloride, magnesium chloride, calcium sulphate, acetic acid, citric acid. It is a versatile food that can be converted to variety of value added products. Soypaneer has bland taste and unique body and texture resembling paneer obtained from milk. Also, soypaneer contains certain soy isoflavones, which can actually mimic natural human estrogens, leading to certain beneficial effects in human body. The nutritional composition of soypaneer is presented in Table 1.1.

Health Benefits of Soypaneer- the Cheese of Asia

- As a rich source of protein.
- Helps fight against heart disease.
- Beneficial to women
- Promotes energy and Hb production
- Rich source of calcium
- Good source of selenium
- Aids in weight loss
- Good for patients with diabetes related kidney diseases

Carrot

Daucus carota, belonging to family Umbelliferae is an edible root vegetable containing essential vitamins, minerals, fibres

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Table 1.1

Nutrient	Water	Energy	Protein	Total lipid (fat)	Ash	Carbohydrate	Fibre, total dietary	Calcium, ca	Iron, Fe	Phosphorous, p	Selenium, Se
Units	g	kcal	g	g	g	g	g	mg	mg	mg	µg
Nutrient content per 100grams	81.28	91	9.89	5.83	1	2	0.4	175	1.84	136	13

Source: USDA National Nutrient Database for Standard Reference, Release 19(2006)

Table 1.2. Carrot Nutritional fact

Nutrient	Water	Protein	Total lipid (fat)	Ash	Carbohydrate	Fibre, total dietary	Calcium, ca	Iron, Fe	Beta-carotene
Units	g	g	g	G	g	g	mg	mg	µg
Nutrient content per 100 gm	86	0.9	0.2	1.1	10.6	1.2	80	1.03	6460

Source: Nutritive Value of Indian Foods, NIN, Hyderabad, 2007



2.2.1. Fig soya cow equipment

and enzymes which are beneficial to the body. It is a rich source of beta-carotene, a precursor of vitamin A and a potent anti-oxidant. The health benefits of carrot include reduction in cholesterol levels, prevention from heart attacks, warding off certain cancers and many other benefits. Most of the benefits of carrot can be attributed to its beta carotene and fibre content. Carrots are also rich in vitamin A, vitamin C, vitamin K and potassium. The nutritional composition is presented in table 1.2

Health benefits of carrot

- Prevention of heart disease
- Prevention of cancer
- Reduces macular degeneration
- Improves eyesight
- Reduces stroke risk
- Blood glucose regulation in diabetes

Carrots also help in stimulating milk flow during lactation. Believe it or not the carrot is also effective against roundworm and dandruff. Pureed carrots are good for babies with diarrhoea, providing essential nutrients and natural sugars. Carrots have antiseptic qualities and therefore, can be used as a laxative, vermicide and a remedy for liver conditions.

Objective of the Study

- To formulate and standardize carrot incorporate soypaneer.
- To assess the nutritional and sensory quality of the product
- To estimate the quality and quantity of soypaneer obtained from the soymilk.
- To formulate carrot incorporated soypaneer production using different formulations of carrot.
- To study the comparison between paneer obtained from soymilk and from buffalo milk.
- To analyze the nutritional and organoleptic qualities of carrot soypaneer and carrot paneer with different fixed ratios.

MATERIALS AND METHODS

The methodology of the study was categorized into following heads:

- Extraction of soymilk from soy-cow materials
- Preparation of milk paneer and soypaneer
- Preparation of carrot incorporated soypaneer at fixed ratios.
- Evaluation of quality both in terms of nutritive and sensory quality

Material procurement

Soybean- from Bapatla local market at the cost of Rs.50/kg.
 Carrot-from Bapatla local market at cost of Rs. 40/kg.
 Coagulants – Commercial edible grade 2% citric acid.
 Buffalo milk-procured from local market at cost of Rs. 26/lit

Equipment used in the project

- Soy cow equipment: soy cow, manufactured by SSP Pvt Ltd, Faridabad. It is a complete machine to efficiently yield soy milk and soy products efficiently.
- Paneer press: pressing of paneer obtained from buffalo milk
- Vacuum packaging machine: INDVAC semi-automatic vacuum packaging machine was used with the sequence consisting of evaluation, gas flushing, sealing and ventilation.

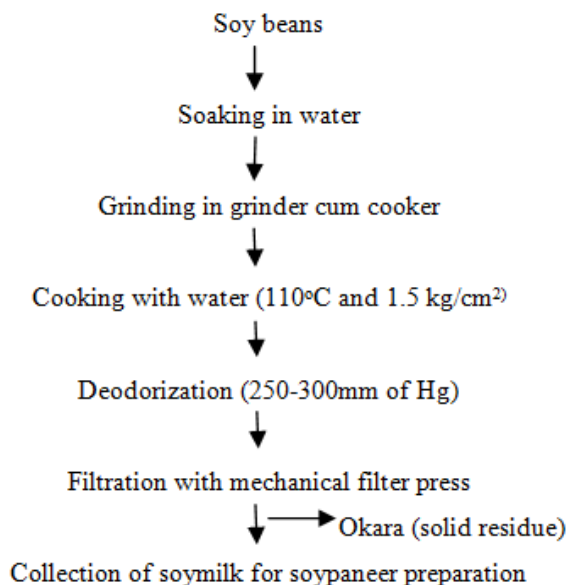
Technical description of Soy cow

The major components of soy cow machine are:

- 1) Grinder cum cooker
- 2) Steam generator (boiler)
- 3) Deodorizer
- 4) Mechanical filter press
- 5) Paneer press

Method of preparation

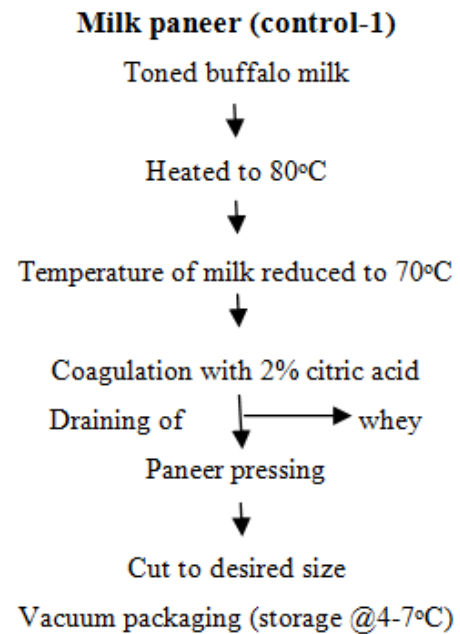
Extraction of soymilk



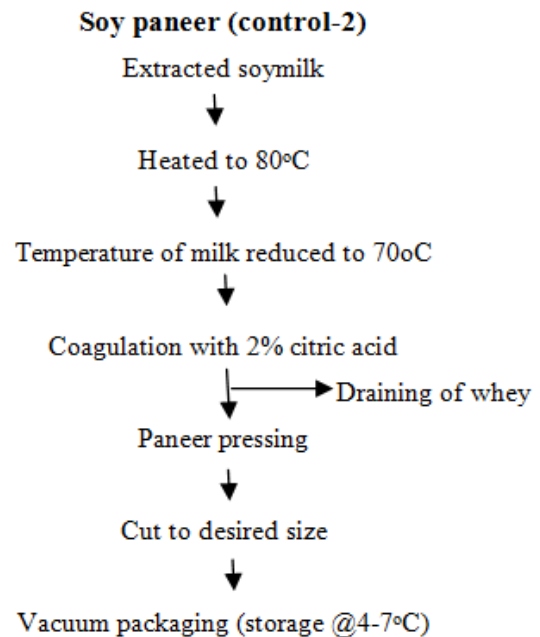
Flow sheet for extraction of soymilk by soy cow machine

Preparation of Milk paneer and soya paneer

Milk paneer and soy paneer are made from cow milk and soymilk respectively. The preparation steps are presented in the following flow sheet.

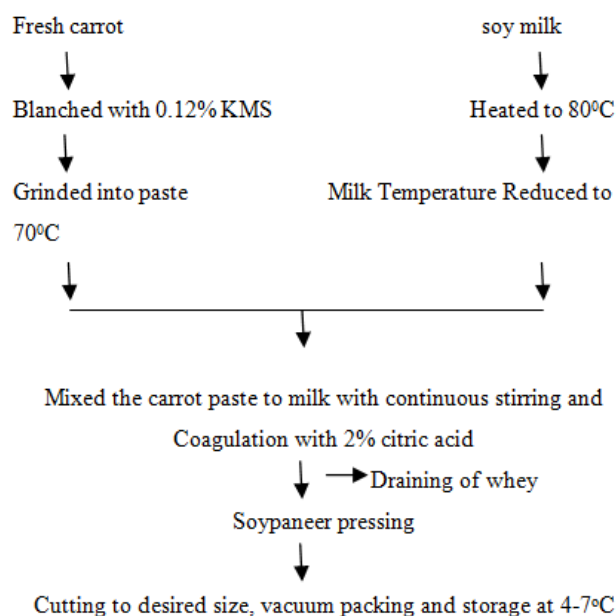


Flow sheet for preparation of paneer from milk



Preparation of Carrot Incorporated Soy paneer

Fresh carrots were washed and blanched with 0.12%KMS, then it was pulped to form a fine soft paste using a mixer. Carrots were incorporated in fixed ratios of 10% and 20% to soymilk. It was mixed well and 2% citric acid was added to it and was properly mixed. The whey formed was drained and the content was then uniformly spread in the paneer pressing box. The screw press arranged on top of the box was tightened to expel water from soypaneer. The carrot incorporated soypaneer were cut into desired sizes and vacuum packed for further refrigeration. The sequence of operation is given in fig 2.3.3 and composition of product variation are given in the table 2.3.3



Flow sheet for preparation of carrot incorporated soy paneer

Evaluation of Quality

The quality evaluation is carried out in two ways:

Organoleptic Evaluation of product

Organoleptic evaluation of carrot incorporated soypaneer was carried out by comparing with control samples. Sensory testing was conducted in the sensory evaluation laboratory, Department of food science and technology. Five trained panel members and fifteen semi trained members were selected for the evaluation by polite solicitation. Panelists were selected solely based on their interest, time availability and lack of allergies to the food ingredients used in the study.

Panelists were provided with evaluation card and coded samples. The order in which participants tasted the samples was not controlled. Sensory evaluation was carried out under ambient conditions, under fluorescent lighting and controlled temperature in the test booths. The appearance, color, texture, flavor, mouth feel, taste and acceptability of the products were evaluated by the sensory panelists according to 9-point Hedonic scale evaluation as described by Karl Ruher (2007).

Proximate Analysis

The product has been examined for the following nutrient composition.

- Moisture content by oven method-I.S 10484-1983 Specification for paneer
- Lipid (Fat) content by SOXHLET Apparatus, AOAC,1990
- Protein by MICRO KJELDHAL method, AOAC,1990
- Total Ash by MUFFLE FURNACE, AOAC,2000
- Carbohydrate by ANTHRONE method, AOAC,1999
- Crude fibre by IGNITION method.
- Beta-Carotene by SPECTROPHOTOMETER
- Calcium by TITRATION method
- Iron by SPECTROPHOTOMETER method
- Phosphorous by SPECTROPHOTOMETER method

RESULTS AND DISCUSSION

Product Development

Soypaneer was prepared from soymilk, extracted from soy beans using soy cow by coagulating it with an acidulant like citric acid. Carrot was incorporated in soypaneer at fixed ratios of 10% and 20%. Buffalo milk paneer was prepared as control-1 and soypaneeras control-2. The product developed is shown in the following plates.



Plate 3.1(a), 3.1(b)- control Products



Plate 3.1(c), 3.1(d)-incorporated products



Fig 3.2.1. Samples for Sensory evaluation

Table 3.2.1. means organoleptic score

ATTRIBUTES	CONTROL-1 PANEER	CONTROL -2 SOYPANEER	SOYPANEER WITH 10% CARROT	SOYPANEER WITH 20% CARROT
COLOR	8.3	8	7.5	8.5
APPEARANCE	8.3	8	8.1	8.5
FLAVOR	8.4	6.5	7	8.3
MOUTHFEEL	8.5	7	7.5	8.4
TASTE	9	6	7.2	8.5
OVERALL ACCEPTABILITY	8.5	7.1	7.5	8.4

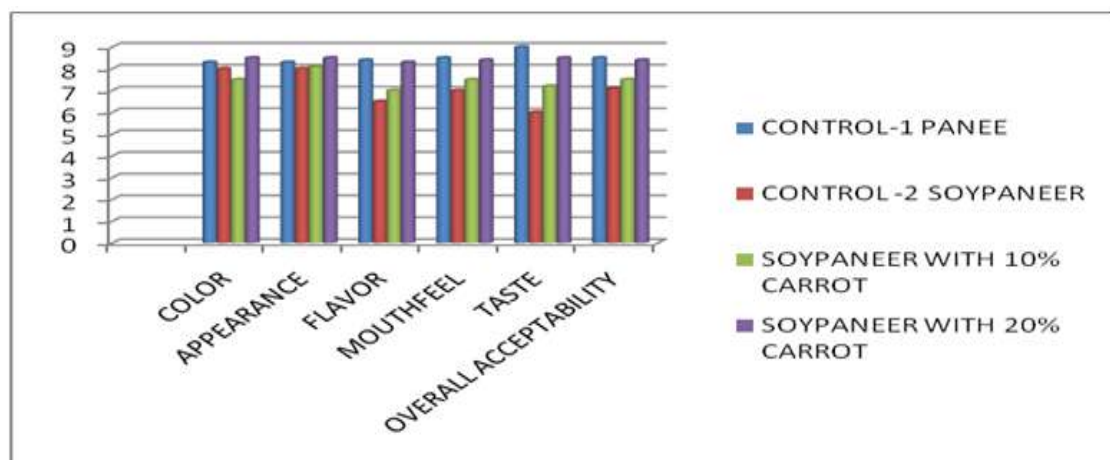


Fig. 3.2.1. Acceptability of different formulations of paneer with respect to different Sensory parameter

Table 3.2.2. Nutritional composition of the formulated product

Nutrient	Paneer (100g)	Soy paneer (100g)	10%carrot incorporated soypaneer (100g)	20%carrot incorporated soypaneer (100g)
Moisture	54.4g	76g	75.6g	74.8g
CHO	6.8g	5.6g	8g	8.3g
Protein	15g	9.4g	9.52g	9.6g
Fat	22g	5.44g	4.9g	4.7g
Ash	2g	1.5g	1.9g	2.3g
Crude Fibre	--	0.6g	1.17g	1.3g
β-carotene	--	--	2.61mg	5.209mg
Iron	--	2.1mg	2.4mg	2.85mg
Calcium	400mg	105mg	148mg	163.4mg
phosphors	250mg	130mg	292mg	435mg

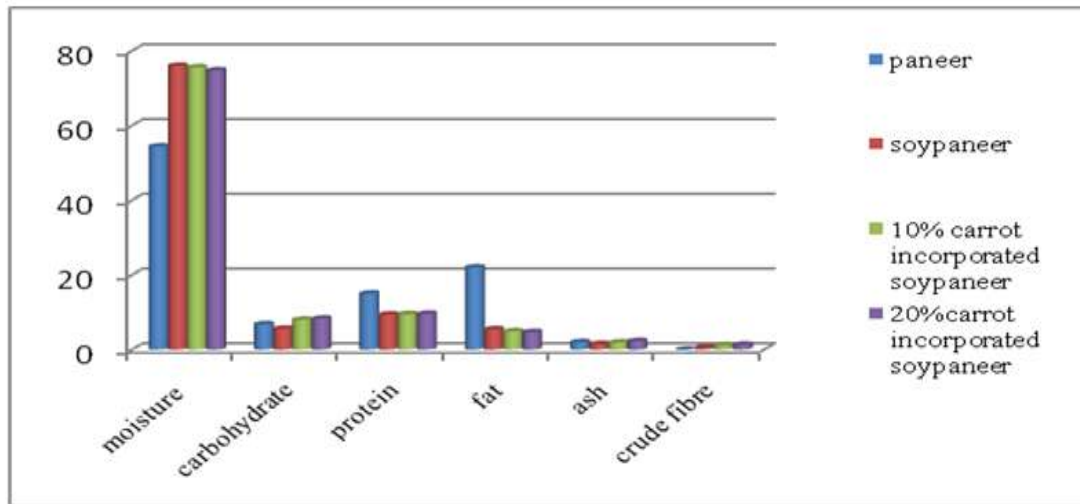


Fig 3.2.2(a). Comparison of nutrient profile of the variants

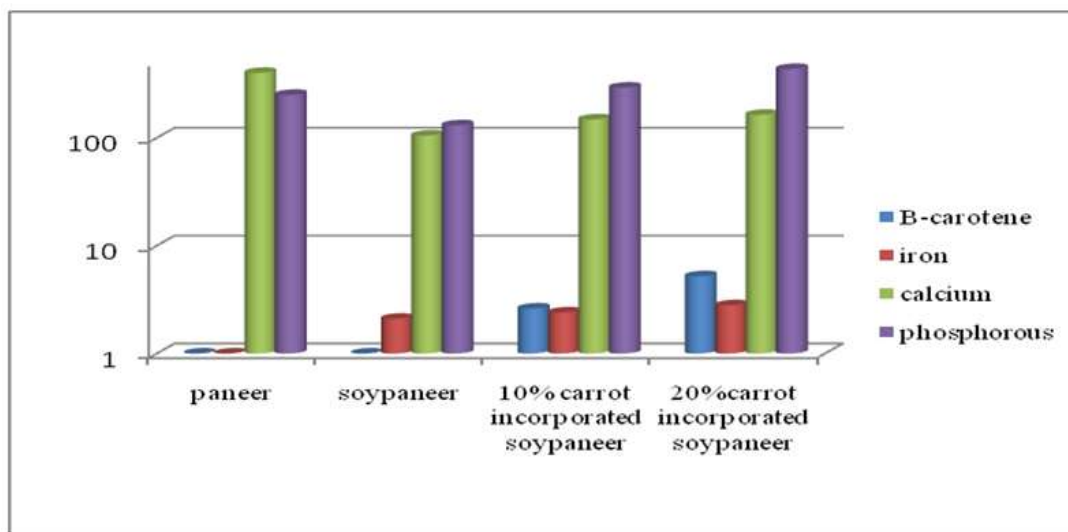


Fig 3.2.2(b). Mineral comparison of the variants

Product evaluation

Sensory evaluation as well as proximate analysis of the product has been done and results were obtained.

Sensory evaluation

Four samples were subjected to organoleptic evaluation using hedonic scale. The mean scores for different attributes are tabulated in the following table 3.2.1 and presented graphically in figure 3.2.1. The samples for sensory evaluation are shown in fig 3.2.1.

Proximate analysis

The results obtained after the proximate analysis of paneer with different carrot incorporation is compiled in table 3.2.2 and the nutritional comparison is presented in fig 3.2.2(a) & (b)

Conclusion

In the present investigation an attempt was made to formulate carrot incorporated soypaneer using carrot at different proportions so as to enhance its color, improve its bland taste

and nutritional aspects in terms of β -carotene, crude fibre, iron, and phosphorous. Further study was conducted to compare the product with traditional milk paneer in terms of nutritional and organoleptic aspects. The sensory quality of developed paneer and traditional paneer obtained from buffalo milk were also compared. The studies are evaluated on the basis of chemical composition and sensory evaluation. The nutritional quality of the product was analysed. Incorporation of carrot in paneer showed an increase in calcium, phosphorous, β -carotene, crude fibre and protein. 10% carrot incorporated in paneer had very dull and non-uniform color and had very unappealing flavour and mouth feel, but 20% incorporation of carrot yielded a uniformly bright orange coloured product with good flavour and texture. Sensory evaluation studies reveal that soypaneer incorporated with carrot has almost equal acceptability to milk paneer in terms of color, flavour, appearance and taste. But the 20% carrot incorporated paneer has the highest acceptability. The increased acceptability and enhanced nutritional and organoleptic qualities of 20% carrot incorporated soypaneer can be attributed to carrot and its goodness. Least acceptability was seen for soypaneer followed by 10% carrot incorporated soypaneer.

REFERENCES

- Akiko, Aoyagi and William shrutleff, 2000. The Book of Tempeh: A cultured Soyfood, TenSpeed press [2004]ISBN:1580083358:173.
- Akubor, 2006. Soybean and nutrition. *J.Food Sci.Technol.* 23(4):562-564.
- Ali, N. 2005. Soy products and their relevance to India, Soy bean Res. 3:52-57.
- AOAC. 1984. *Official methods of analysis 14th edn*, Association of Official Analytical Chemists, Washington DC.
- AOAC.1990. Official Methods of Analysis of the Association of Official Analytical Chemists Vol I.AOAC. Int., Arlington, USA.
- Bayram, M., Kaya and Oner, M.D. 2005. Changes in properties of soybean during sokin. *www.scielo.br/sciel.*
- Beaten, LK. *et al.* 2010. Soy protein isolates of varying isoflavones content do not adversely affect semen quality in health young men. *Fertil Steril*, 94(5):1717-22
- Chauhan, OP. and Chauhan, GS. 2007. Antinutrients in soybeans at different stages of soymilk production. *J.food Sci Technol.*44(4)
- Chen, HL., Su, HJ. and Lee, CC. 2006. Association between tofu intake and serum polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) in the elderly Taiwanese. Vol 3, Issue 12. *Environ Int*, 33(2):265-71.
- Dotzel, M.M. 2000. Food labelling: Health claims; Soy protein and coronary heart disease; final rule. *Federal Register*.64, 57700-57733.
- Elkind-Hirsch, K. 2001. Effect of dietary phytoestrogens on hot flushes: can soy based proteins substitute for traditional estrogen replacement therapy?, *Menopause* 8,154-156.
- Gayer, J. 2002. New heart health claim for soy protein. *Food Aust.* 54,490.
- Hamilton-Reseves, JM. *et al.* 2010. Clinical studies show no effects of soy protiens or isoflavoneson reproductive harmones in men: results of a meta-analysis. *Fertil steril.* 94(3):997-1007.
- Hou Lixia and Yan Jei, 2008. Study on the Technology for the production of the colored Carrot Juice- bearing bean curd.CNKI:SUN:NCJX.0.2009-03-032.
- Kao, FJ., Su, NW. and Lee, MH. 2003. Effect of calcium sulphate concentration in soya milk on the microstructure of firm soypaneer and the protein constitutionin soypaneer whey. *J Agri Food Chem* 51:6211-6216.
- Kotecha, S. and Wilkinson, WH. 2000. Association between beta-carotene and acute myocardial infraction. *J Clin Nutr.* January 2000 vol.71 no. 1 176S-178S.
- Liu, J., Chang, SK. and Wiesenborn, D. 2006. Antioxidant properties of soybean isoflavones extracts and soypaneer in vitro and in vivo. *J Agri Food Chem.*53(6):2333-40
- Ying, M. A. 2008. Study on Carrot Bean Curd, cnki:ISSN: 1007-7561.0.1999-04-005
- Messina, M.J. 2003. soy foods and disease prevention:PartII-osteoporosis, breast cancer,and hot flushes. *Agro food industry-Hitechnol.* 14(6):11-13
- Min, S., Yuy and Martin, SS. 2005. Effect of soya bean varieties and growing locations on the physical and chemical properties of soya milk and aoy paneer. *J Food Sci* 70:C8-C21.
- Neeraj Kumar Reddy, M. and Ch. Vishnu, 2006. Studies on yeild and quality of soypaneer prepared by using different coagulants. CFST college thesis.
- Namratha harjal, 2008. Effect of soy bean varieties on physical-chemical, textural and sensory properties of soypaneer. *Jfood sci technol*, 2008, 32(3) 211-214.
- Shinde, V.N. and P.S Kadam, 2001. Studies on effect of pre-treatments on quality of soypaneer. *J Food Sci Technol.*,2001. Vol.38.121-126.
- Pan and Tangratanvalee, 2003. Soaking process of soybean can change the textural characteristics of the bean and faciliteis in greater extraction of soy protein.
- Renaud, S., De Lorgeril, M. and Delaye, J. 2003. The Alpha-Tocopherol, Beta Carotene Cancer pervention study. *www.ajcn.org/content/75/6/1124.*
- Setchell, K.D.R. and cassady, A. 2002. Dietary isoflavones: Biological efects and relevance to human health. *J. Nutr.*129,758S-767S.
- Shi, Z., Hu, X. *et al.*, 2006. Strong negative association between intake of soypaneer and anemia among Chinese adults in Jiangsu. *China journal* 17(1):57-64
- Shimazu, T., Inoue, M. *et al.*, 2010. Isoflavone intake and risk of lung cancer: a prospective cohort study in japan. *Am J Clin Nutr*, 91(3):722-8
- Synder and Kwon, 2001. Soybean and its products contain higher quantity of protein and are abundantly rich in essential amino acid lysine.
- Tariq Masud, 2002. Effect of coagulation temperatures and strength of coagulation used on the composition of paneer. *Ind. J. Nutr. Dietet.* Vol:39 pp 548-550.
- Tomohiko Adachi, Shin Nakatani *et al.*, 2006. US patent Documents, Patent no. US 7. 005,156 B2.
- Trock, BJ. and Hilakivi-Clarke, L. 2006. Meta-analysis of soy intake and breast cancer risk stated that soy intake may be associated with a small reduction in breast cancer risk. Department of Urology, *Johns Hopkins school of medicine, Baltimore, MD 21287, USA Natl cancer Inst* 98(7): 459-71.
- Wiseman, H., O'Reilly, *et al.*, 2001. Isoflavone phytoestrogens consumed in soy decrease F-2-isoprostane concentrations and increase resistance of low-density lipoprotein to oxidation in human. *Am.J.Clin.Nutr.* 72, 395-400.
- Yadav, DN., Chauhan, GS. and Kumbhar, BK. 2008. Optimization of processing variables for the preparation of soy-fortified curd. *Jfood sci technol*,45(2),127-132.
- Yamaguchi, M., Gao, YH. and Ma, ZJ. 2000. Synergistic effect of genestein and zinc on bone components in the femoral-metaphyseal tissues of tissues of female rats. *J Bone Miner Metab.* 2000;18:77-83.[PMID:10701162]
- Zeiger, Wu., Ah, Rg., Nomura, Amg and West, 2003. Soy intake and risk of breast cancer in Asians and Asian American. *Am. J Clin Nutr* 68(suppl):1437S-14435S.
