DEVELOPMENT OF LOW COST TEA BAG FOR COUGH AND CONGESTION

Dissertation Report

Submitted by

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CERTIFICATE

This is to certify that Miss. Pratishtha Bassi has personally completed M.Sc. dissertation entitled, "**Development of low cost tea bags for cough and congestion**" under my guidance and supervision. To the best of my knowledge, the present work is the result of her original investigation and study. No part of dissertation has ever been submitted for any other purpose in any University.

The project report is appropriate for the submission and the partial fulfilment of the conditions for the evaluation leading to the award of Master of Nutrition and Dietetics.

Signature of Supervisor

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DECLARATION

I hereby declare that the work presented in the dissertation report entitled "***DEVELOPMENT OF LOW COST TEA BAGSFOR COUGH AND CONGESTION***" is my own and original.

The work has been carried out by me at the School of Agriculture, Lovely Professional University, Phagwara, Punjab, India under the guidance of **Dr. Vikas Chopra,** Assistant Professor (Food Technology) of School of Agriculture, Lovely Professional University, Phagwara, Punjab, India, for the award of the degree of Master of Science in Nutrition and Dietetics.

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I certify that the above statement made by the student is correct to the best of my knowledge and belief.

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INTRODUCTION

Use of tea bags are increasing now a days because of changes in urbanization, globalization, increased purchasing power of the people. Different types of tea bags are available in the market of different brands which may be herbal based or non herbal based. There are several advantages of the tea bags as they are easy to handle, prepare and dispose off and hence are more convenient if we compare to the loose tea. Although, as they have benefits, on the other hand they have certain disadvantages like MCPD's are being used in the tea bag paper which are carcinogenic. Also it is said that the low quality tea leaves are used by the industries which are usually dust and fannings. Consumer now a days wants to satisfy the hunger as well as want to get some additional health benefit from the market products. Hence, different types of herbal tea bags to cure and treat specific ailments like diabetes, obesity, weight loss are gaining more popularity.

In this research we are going to develop a tea bag for cough and congestion which will be low cost and helps in relieving from the symptoms of cough related ailments. Also it will provide some antioxidants and will promote the overall health.

PROBLEM BACKGROUND

Tea bags are very common worldwide. Different type of tea bags like green tea, black tea, white tea, oolong tea are there in the market. Along with the normal teas, herbal teas which contains herbs are also present in the market like ginger tea, mixed teas, chamomile teas hibiscus tea in the tea bags. Each herbal tea is designed for particular ailment and therapeutic use. General health benefits achieved by consuming herbal teas are like it relaxes the mind and body, supports the health of the heart, helps in digestion, detoxification of the body, nourishes the nervous system, relieves the stress, builts the immunity, fight against infection and promotes the overall health. But if we see the price of such tea bags they are quite high and hence in this research we are going to develop a low cost herbal tea bag for cough and congestion made from indigeneous products so that it is easily affordable to every section of the population. Also the tea bag paper used is if inferior quality abd the tea leaves are of inferior quality. Also according to the American study conducted by Hicks in 1996 claimed that the caffeine content of bagged tea is more than that of loose tea. Also there is a loss of nutrients during storage, manufacturing and production of the tea bags. Therefore, the prime objective of this research is to develop a herbal tea bag that has functional properties and is beneficial for promoting the health of consumers.

RESEARCH OBJECTIVES

1. To conduct a survey to determine the trend of consumption of tea in tea bags at University level by developing a questionnaire.
2. Development of tea bag using different factors.

a) Tea (Black tea, Green tea, Herbal tea) + Blending with herbs
b) Compare with the standard tea in the market

3. Shelf life estimation of the developed product.

4. Application and evaluation of the product.

REVIEW OF LITERATURE

Introduction

There has been a lot of changes seen in the lifestyle of the people now a days due to increased purchasing power, urbanization, globalization and economic development as a result of sedentary lifestyle, diseases such as diabetes, cardiovascular diseases, stroke, cancer has been increased. So now the consumers as well as industries are moving towards the products which do not only satisfy hunger but also provide additional health benefits. Examples of such products are gluten free products, multigrain flour, diet drinks and herbal tea bags. According to the WHO, Health is a complete state of physical, mental and social well being and not merely the absence of disease and infirmity. Hence after keeping the current scenario of health problems, current demand of population, cost we are going to develop a low cost tea bags for cough and congestion. A tea bag is a polypropylene mesh bag, with dimensions approximately 15x20mm which is filled with resin beads, sealed and then labeled for later identification (Houghten,1985). Although tea is a beverage used worldwide but consumer preferences vary for the degree of fermentation, taste and color (Balentine et al,1997). Everyday million cups of teas are consumed everyday worldwide and mostly they are in the form of tea bags (Jagnyi and Ndlovu ,2001). Tea bags are mostly preferred by Australians, being followed by Saudi Arabia and Egypt. From the reports, in UK and USA the use of gtea bags increased from 5% in 1960 to 96% in 2007 (anonymous,2017). A very popular tea blend originated in US and UK, "Earl grey tea" is a blend of three black teas. It's characteristic taste and flavor comes from added bergamot (Citrus bregamia)- a citrus fruit which yields a characteristic essence (Hicks 2001). According to the tea grading and sorting, small broken varieties of tea leaves are used in tea bags or fannings which are very small particles of tea leftover from the large variety of teas are used in the manufacturing of tea bags. Dusts which are the smallest particles of tea leftover after the production of above varieties with very harsh brews as the surface area of particles is greater which leads to complete diffusion of tea into the water.

In recent times , infusion of dry plant parts of other higher plant taxonomy they were also given the same generic name 'tea'. According to the reports from India alternative sources of the tea leaves from 5 mangrove species namely Bruguirea cylindrical (L), Ceriops decandra (Griff), Ding Hou, Rhizopora apiculata Blame, R., lamarckii Montrand R. mucuonata Lam (Kathiresan, 1965). Earlier workers from Europe has formulated tea from leaves of different plants including Fragaria vesca, Sorbus aucupuria , Filipendula ulmaria, Epilobium anguistifolium and Robus idaeus (Julkenen-Tito et al., 1988) with many

different constituents showing therapeutic effects in man. More accurate term used for these infusions of other plants is 'HERB TEA' or 'TISANE'. For example the people of Ghana used Cinnamon (Cinnamomum zeylanicum Blume) leaves, Citronella (Cymbopogon nardus) leaves , Roselle(Hibiscus sabdariffa) calices and other native herbs for the making of herbal tea (Owusu and Odamtten,1999).

Different tea bags have been prepared and evaluated in the market for various diseases, similarly for various ailments like cough we will prepare a herbal tree to relieve from its symptoms and to eradicate this problem. Cough is a very common problem being faced by people. Cough is a natural reflex expulsive defence mechanism of the body to clear excess secretions or mucous or inhaled irritants or toxins or foreign substances in the respiratory tract. It is very important to note that cough usually takes place in common cold , but it may be the indication of serious illness such as pulmonary hypertension, pneumonia, tuberculosis or asthma. It can be stimulated in various situations like inflammation in the respiratory tract or neoplasia (Schroeder,K. et al., 2002).

Need for tea bags

Tea bags have wide applications in the beverage industry as they are convenient, easy to use and dispose off. Consumers also prefer more tea bags then loose tea as they are easy to prepare and handle. Different type of tea bags come in the market which may be herbal or non- herbal tea bags and hence their significance is of utmost important.

Sr no.	Reasons for need of tea bags	Use	References
1.	Loose tea versus tea bags	In Asian countries tea leaves are brewed 3-4 times whereas in western countries tea bags is used once and discarded.	Monicks B hicks et al., 1996
		In mixed herbal tea, correct amount of herbs (with similar particle size) are added in the tea bag and people do not have to scoop out as compared to the loose tea.	Witchl,1994

		Loose tea requires more preparation time, effort and energy as compared to tea bags.	Rusen Metin yildirim et al, November 30, 2015
2.	Demand for herbal products	Plant species can be used to obtain herbal remedies in tea industries for herbal infusions / tea or mixes.	Tucakov, 1986
		Tea and herbal infusions act as a major source of polyphenols in the diet.	Shahidi,2000
		Organic tea market is increasing now a a days because of promising effect both in exports and more consumption by the people.	Indian Tea Association,2016
		Herbal tea bags have several benefits as they contain bioactive compounds which decreases risk of chronic diseases like headaches, anxiety, intestinal disorders.and lifestyle related disorders thereby providing anticarcinogenic, anti oxidant , chemopreventive effect.	Craig 1999 & Si et al 2000
2.	Blending in one small pack	It is easier to handle tea particles.	Astill et al. 2001
3.	Convinience to dispose off	It is easier to dispose of the remaining infused tea	Astill et al. 2001 ., chin et al. 2013.

		granules	
4.	Easy to prepare	In majority of the countries, the most popular method to prepare a cup of tea is to infuse a tea contained in tea bag in boiled water.	Chin et al. 2013
		The infusion time is <3 minutes and hence can be prepared easily.	Conrad Astill et al, 2001
5.	Health aspect	Herbs used in infusions or tea bags have mild medicinal or digestive properties.	Evans,2002
		Tea infusions also contain flavonols i.e quercitin such as rutin, phenolic acids and other organic acids in it.	Lin et al.,1998 Ding et al,1997
		Black tea infusions are rich in certain nutrients specially minerals.	Powell et al.,1998
6.	Profit to the tea industries	The consumption of tea in any forms whether it is black tea, green tea, tea bags etc will strengthen the market and will lead to the profit to the producers.	Prof. Harsha Jariwala V.M Patel Institute of Management, December 2014
		Sri Lanka has a good machinery for the tea bags and has made two global brands entrenched in the market for tea.	Prof. Harsha Jariwala V.M Patel Institute of Management, December 2014

7.	Consumer preference	Everyday million cups of teas are consumed everyday worldwide and mostly they are in the form of tea bags.	Jagnyi and Ndlovu ,2001
		In India, the demand is shifting towards tea bags because of high purchasing power.	V.N Asopa, July 2007 Indian Institute of Management, Ahemdabad
		Western countries prefer more black tea infused in a tea bag by dipping the tea bag in a boiling water in a cup or a mug.	Anonymous, 2008 Wilatsana posri , HAL Macfie, february6,2008
		63% of UK population is dependent on tea bag market.	Arruda et al,2009
		Mate tea present in tea bags is a famous drink consumed in brazil.	
		British people prefer 3g teabag and 235 ml while Americans use 2.25g tea bags and 240ml in milk.	Lakenbrink et al.,2000 Simrany 2003
8.	Strategies for advancement and new techniques	Among different products, cosumer loyalty as well as	Choudhary et al.,1997

		low cost of product is important.	
9.	Tea bags as a dosage form for patients	Correct amount (dosage) is properly put in the tea bag which provides dual purpose that is safety from over and under dose and convienence to the patient.	Witchl,1994

Market status of different tea brands

Currently, tea bags are knotted or stapled. According to the industrial estimates, the contribution of tea bag segment is 3-4% by value of total tea sales but this is one of the most growing segments at the rate of 50-60% by year.According to FSSAI, the manufacturers have to stop stapled tea bags by January 1, 2018. FSSAI orders also said that food safety commissioners should take preventive measures if unsafe packaging materials are used by the companies and takes serious actions against such companies. In tea dominating markets, black tea bags are getting more prevelance among the regular drinkers, specially in emerging countries .In non tea markets, fruit and other herbal teas are getting more prevelance in order to avoid caffeine and have health benefits. Source (fssai.org)

	Lipton tea bags	Brooke bond taj mahal	Brooke bond red label	Society tea bags	Wagh bakri tea bags	Tetley tea bags
History	Lipton brand was invented by Thomas Sir in 1890. He sent samples of tea bags to their customers placed in a	Brooke bond taj mahal tea bags were introduced in 1987 in India according to the changing lifestyle.	Since 1869, Brooke bond has made perfect tea taste experience with	Society tea bags provide quality tea leaves and advanced technology	The tea baron, Sir Narandas Desai started this company in ahemdabed	Tetley is the British tea manufacturer and is the largest company of tea in UK and Canada.

	small silk bag and the customers presumed that whole bag must be immersed in water and hence tea bag was invented. Also lipton was the first tea brand which gave information of brewing on tea bag packs. Source-lipton.com	Also in 21st century this company bought certain new flavours in green and black tea from British classics like English breakfast and Earl Grey with Indian spices combination like cinnamon and ginger. Wikipedia-life11.org broke bond taj mahal.	best leaves used. In 1903, brooke bond launched red label. Brooke bond red label tea uses the blends of CTC tea with best quality leaves. Undue it, red label natural and red label dust categories also comes.	under supervision of skilled proffesionals. It's features include freshness, airtight packaging and are unadulterated. They provide lemon flavored colored tea bags. Source-society tea.in	and used the information which he learnt while owing the tea estate in South Africa. They have different flavours like CTC leaf, masala, ginger, darjeeling, organic amd instant tea bags. Source-	Their manufacturing and distribution is spread over 40 countries. In India it is under tata tea beverages which is the largest manufacturer of tea after Unilever. Tetley was the 1st company to sell tea bags in UK.

			Source - brooke bond red label.html		linked.in	
Cost	25 pieces/ Rs.140	100 pieces/ Rs.136	25 pieces for Rs. 213	Rs. 50 per box	100 pieces for Rs. 380	Rs. 127 -152 per pack
Silent features	It is available in different pack sizes and the tea bag is double chambered. Source- www.winc.com	The new range of brooke bond taj mahal is available in the form of lemon, ginger,masala, Darjeeling, English breakfast and earl grey. It also blends with the unique superlative aroma, along with flavors which offers tea drinkers with unique taste. Source-	Red label natural care has 5 ayurvedic ingredients like tulsi, ashwagandha, mulethi, ginger and cardamom which is climically proven to provide immunity and decreases chances of infection. Also, red label dust provides	Socity tea bags provide premium quality tea leaves and advanced technology under supervision of trained proffesionals. Also, these tea bags are appreciated in the market for their freshness and purity. These tea	Different types of tea bags such as masala tea, assam tea bags. Masala tea bags has authentic Indian spices. Also assam tea premium) which is rich in antioxidants and are double chambered. Similarly	Tetley red bush has a natural sweet taste, moreover it is as hydratimg as water and full of antioxidants and is caffeine free. Tetley decaf has a unique flavor and anti-oxidants and is free of caffeine. Similarly, peppermint and chamomile

		www.hul.co.in	strength, rich color and refreshing taste and also gives good quality. Source- broke bond red label .html	bags are tested by trained proffesionals on various parameters to maintain the quality. Source- www.societytea.in	elaichi tea bags and ginger tea bags provides refreshing aroma, hypnotic color and natural flavor which are double chambered making tea drinking enticing and have a good experience. Source- wakhbakritea.com	infusions are there which also don,t have cafeeine. Source- www.tetley-bd.com

Prior considerations to be taken care while designing of the tea bag

Factors	Results	Referances
Tea bag paper shape	Different types of shapes and sizesof tea bag are available in the market with aim of attracting the consumers.	Jaganyi and Ndlovu, 2001.
	Traditional squares and rectangular shapes are very common. Also, round and pyramidal shaped tea bags are seen in the market. The paper may be bleached with oxygen or may be further processed to form a tea bag paper.	Schoeller and Hoesch,2005
	Fibre used in the tea bag may be processed with synthetic polymers to form papers that are heat sealable.	Schoeller and Hoesch, 2005
	Double chambered tea bags shows highest swelling and infusion as compared to the other shapes of the tea bag as it has least clogging of tea particles.	Yadav et al.,2017
Tea bag paper material	They are made from non-woven fibres which are based on cellulose obtained from the seeds of jute or abaca trees or cotton or stem fibres of hemp.	Anonymous,2006b

	Replacement of a polypropelene tea bag filter paper with the cellulosic tea bag filter paper is also done. Cellulosic tea bag filter paper has high tensile strength and is highly porous that provides high durability and protective layer for any adsorbent. Air permeability is high, has hydrophilic nature and fast water absorption ie 2 seconds which decreases the longer extraction time and poor wettability of the polypropylene filter paper. Also cellulosic tea bag filter paper is cheap and non toxic.	TSHERING PELDEN etal,2014
Tea bag paper size	Size of the tea bag may lead to the hindrance to the swelling of tea leaf and it affects rate of infusion of the constituents.	Jaganyi and Mdletche,2000
	t has been seen that there is increase in the extraction rate with the increase in the tea bag size as from 16 to 36 cm2 area , 25% increase was seen and less extraction rate was seen in tea bags larger then 36 – 64 cm2 area.	Jaganyi & Ndlovu,2001
Effect of temperature and dipping cdrequency on tea bag	Infusion of tea particles is dependent upon brewing temperature f the tea bag.	Geeta U Yadav et al, (2017)
Infusion time for tea bag	< 30 seconds to 2 minutes is observed.	Geeta U Yadav et al, (2017)

	According to the literature when tea bag is infused in water, tea leaf gets swelled by factor of about 4.25.	Spiro and price,1985
	Tea bag material slows down the infusion rate by 29% as compared to loose bag.	Jaganyi and Mdletshi (2000)
Effect of tea bag material on infusion process of caffeine	Studies show that tea bag materials slows down the infusion process. Hence they both studied the rate of infusion of caffeine by varying shapes and size of tea bag.	Jaganyi and Mdletshi (2000)
Tea bag paper strength	The strength of the tea bag paper must be high at sealing joints, paper should have good cut ability and high wet strength during steeping of tea bag.	Schoeller and Hoesch,2005
Diffusion of tea from tea bag by Computational Fluid Dyanmics (CFD) model	It was revealed that external agitation resulted in a forced fluid flow via tea bag which was greater then the force given by natural driven convection. Even the packing porosity of the tea bag motivates the recirculation pattern of the fluid which also effects the rate of infusion.	Lian and Astill (2002)
Tea leaf used for tea bag	Smaller tea leaves infuse faster as compared to big leaves as surface area is increased as compared to larged size loose tea leaf.	Spiro and Jaganyi, 1994
Hindrance to brewed tea in a tea bag	It is explained by Nernst diffusion layers.	Jaganyi & Ndlovu,2001

	According to this theory any motion that reduces the thickness of inner and outer Nernst layers parallel to the the tea bag paper membrane, it increases the rate of brewing and that is why moving the tea bag up and down and jiggling the tea bag enhances the brewing of the tea.	Spiro & Jaganyi,2000
Double chambered tea bag vs single chambered tea bag	Double chambered tea bags show its highest swelling frequency (30%) while single chambered showed lowest kinetics.	Geeta U Yadav .,et al(2017)

Comparison of loose tea versus bagged tea on the basis of nutrient composition

Component	Green tea (%age) per dry leaf	Black tea (%age) per dry weight	White tea (%age) per dry weight	Oolong tea (%age) per dry weight	Tea bag (%age) per dry weight
Total Polyphenols	39%	101.2 %	0.13	135.37	16.0
Carbohydrates	10-15%	10-15%			
Caffeine	3.5%	7.6%	3.3	2.9	3.1-3.7
Protein	1-2%	0.96%			27-37
Amino acids	1-4%	3%	1.17-1.11	0.29-0.28	1.76
Lipids	2%	2-8%			
Catechin	16-30%	3-10%	30-42	8-20	21.3-22.7
Epi-gallocatechin gallate	48-55%	4.6%	19.63-0	34.1	0.076
Epi-gallocatechin	9-12%	1.1%	3.25	7.5	0.114
Epi-catechin gallate	9-12%	3.9%	3.095	6.3	0.089
Epi-catechin	5-7%	1.2%	0.71	2.5	0.027

Flavonol glycosides	0.64%	Trace	0.61		0.86
Bisflavonols	0.01-0.11%	Trace			
Theaflavins	ND	2.6%		0.1	1.54
Theaflavic acid		Trace			
Thearubigins	1.31%	35.9%		0	11.09
Theobromine	6%	0.7%	1.98	2.8	0.21
Theophylline	0.8%	0.3%	.34	0.4	
Gallic acid	0.09%	1.2%	0.203	0.04	0.63
Pectin	3-4%	3-4%			
Polysaccharides		4.2%		0.2-2	
Peptides		6.0%			
L-Theanine	1.62-3.37%	0.49-4.12%	5.3-33.57	0.49-4.12	
Other amino acids	3%	3.0%	1-2		
Volatiles	0.01%	0.01%			

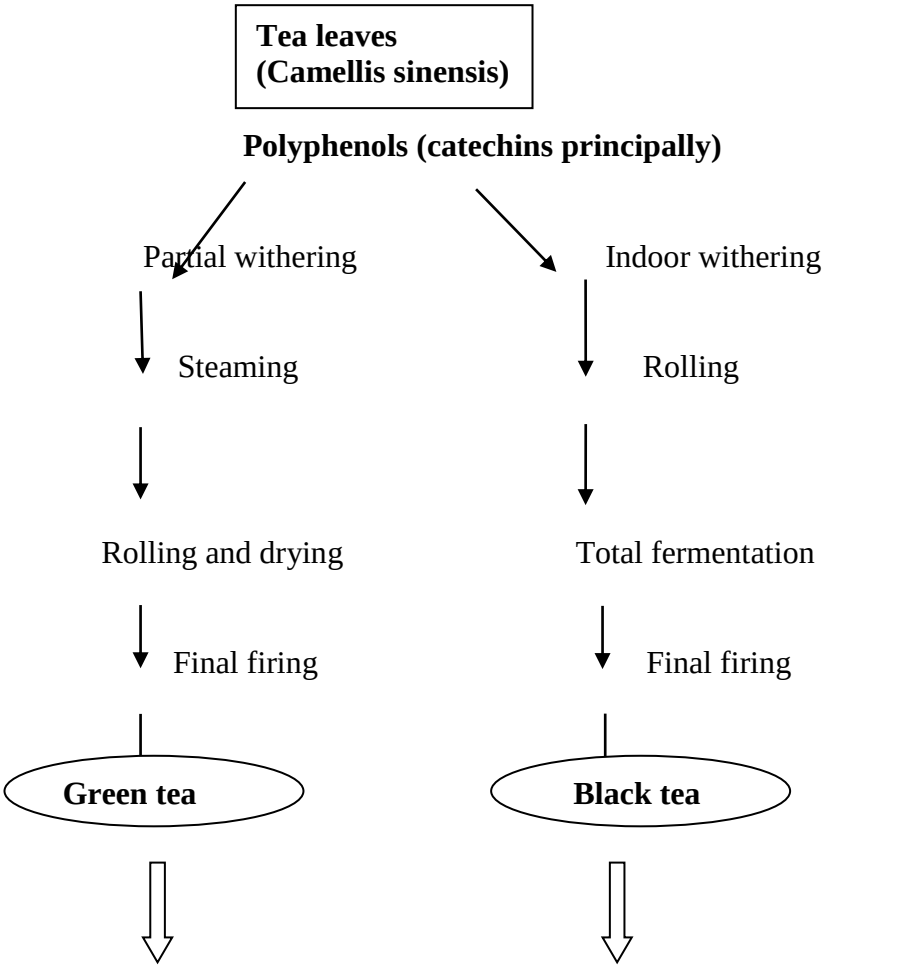
Source: Yuegang zuo et al., g. Santana Rios et al, teixera et al, Y.Hilal amd U.Engelhardt (27 september 2007), Singlet and Rosi,1965 , Conard Astill, Mark R birch, Shahidi 2000, Alexander Ya Yashin (March 11,2015), Chen et al, Monique B Hicks et al., Muhammad Andan et al, Yang Zao et al, Drazenka Komez et al, S.Khokhar, Balentine et al, J Peterson et al, Zhen 2002b

Steps for infusion of tea in tea bags

Diffusion of actives from pores of tea granules to surface and then diffusion through swelled granules and clogged tea bed and then diffusion takes from tea bag paper and at last external mass transfer in water affected by turbulent water. Source (Astill C, Birch MR, Dacombe C,Humphrey PG, Martin PT(2001). Miyagwa et al 1995, measured the green tea swelling in water with the help of twin conductive calorimeter and concluded that heat of swelling of green tea was because of hydrophilic components and endothermic reactions which occur at the same time.

Processing of tea

During it's processing , plant materials generally go under some level of fermentation. Kirk and Sawyer (1997) said that mainly there are 3 types of teas : green tea, black tea and oolong tea. Little or no fermentation is involved in green tea and the tea leaf remains green only. However, oolong tea undergoes partial fermentation whereas black tea undergoes complete fermentation (Taylor and McDowell,1993;Rinzler,2001).



(Source Cabrera et al., 2006)

Laws and regulations for tea source (fssai.org)

According to FSSAI,2005 (New Delhi) Under the tea marketing control order (2003) defines a tea bag as a packet containing tea made of filter paper, nylon paper or any other acceptable material which confirms to international norms and standards.

- Two types tea bags available are –
- Knotted tea bags
- Stappled tea bags (banned by FSSAI)

BEVERAGES (other than diary and fruits and vegetables based), tea comes under this category. The tea product should confirm to the following requirements and these all figures are on the basis of material oven dried at 103+_2degreesC. Source (fssai.gov.in)

1.	Total ash	<4% - >8%
2.	Water soluble ash	<45% of total ash
3.	Alkalinity of water soluble ash expressed as KOH (m/m)	<1% - >3%
4.	Acid-insoluble ash(m/m)	>1%
5.	Water extract(m/m)	>32%
6.	Crude fiber(m/m)	<16.5%

Also the flavored tea can have added vanillin, upto maximum concentration of 5% and others flavor of maximum up to as given below-

	Table
Flavors	Percent by weight (Max.)
Cardamom	2.8
Ginger	1.0
Bergamot	2.0
Lemon	1.6
Cinnamon	2.0
Mixture of above flavor with each other	The level of each ingredient should not exceed the quantity given above.

According to the rules and regulations, tea is considered under the beverages category and has three sub-types black tea, Kangra tea, green tea. The product should not contain any harmful substances and other extraneous matter. The tea must contain natural flavoring colors and substances which are fit for human consumption only if they are obtained by the physical processes from plant origin, either in natural state or after processing for human consumption packaged tea only. Tea used in manufacturing of flavored tea must meet the standards of tea. Also, if it contains added flavors they should have proper labeling as provided in the declaration. If a person is manufacturing flavored tea then that product must be registered with the tea board before it's marketing. Regulation 7.3.11- kangra tea shall only be sold if it meets the standards of the Agricultural produce (Grading and Marketing) Act, 1937 and the regulations made under it. Regulation 7.3.12- flavored tea shall only be sold by the manufacturer if it is registered with the tea board. The label must contain registration number. The tea produced by the manufacturer should be packed and labeled in accordance with the FSSAI regulations. Hence the manufacturer should fulfill all the requirements or otherwise he/she will be liable for penalities under the FSSAI (Packaging and Labeling) regulation,2011. The nutritional information may not be necessary in case of raw agricultural commodity or non nutritive products like tea, coffee etc that is made of a single ingredient. Best before and date of manufacturing must be there. Tea containing added favor should have following label ie 'FLAVOURED TEA' food standards and safet**y.**

According to codex alimentarious source Low levels of 3-MCPD's should be present that migrate from food and beverages from packaging material as they are carcinogenic(International Agency on Cancer Research). The source of 3-MCPD's is epichlorohydrin based wet strength resins used in papers. (for example- in tea bags, coffee filters etc)

According to FDA source(fda.gov.in) Paper which is used to make tea bags which is regulated under title 21 Code of Federal Regulations (CFR) section 176.17 , which outlays a provision of FDA's food additive requirement that gives description about the components of paper and paperboards which comes in contact with aqueous and fatty foods that paper must be manufactured with substances listed in section 176.170. Also, as with any food packaging material, paper and paperboard intended to contact food must comply with FDA's good manufacturing practices (GMP) regulation, 21 CFR section 174.5 (general provisions applicable to indirect food additives).

RESEARCH METHODOLOGY

Experiment 1- To conduct a survey to determine the trend of consumption of herbal tea bags at University level by developing a questionnaire.

Development of questionnaire

A questionnaire was prepared (Annexure 1) consisting of 27 questions including the general or personal information of the respondents.

Conductance of survey

The questionnaire was developed on 'Zoho survey' and a link was generated to access the survey online. The link so obtained was circulated among the respondents particularly belonging to the age group of 18-27 years. Offline survey was also conducted by visiting Lovely Professional University gym as well some nearby gyms in the different regions of Punjab. Questionnaires were filled by the respondents to obtain the information regarding the various aspects. A total number of 174 randomly chosen respondents gave their consent to participate in the study and completed the form.

Questionnaire to study the trend of herbal tea bags consumption

1) Name -
2) Age -
3) Sex/ Gender –
4) City/Town/State-
5) Email address-
6) Phone no.-
7) Body weight -
8) Height -
9) BMI -
10) Food habits-
11) Income (from all sources) -

12) Do you consume other nutritional beverages or supplements? Yes/ No

13) Do you consume tea? Yes/ No

14) What do you prefer loose tea or tea bag?

a) Cost

b) composition

c) adulteration

d) availability

e) not aware

f) misconception

15) How frequently do you consume herbal tea?

a) Everyday

b) Few times a week

c) Once a week

d) Once a month

e) Never

14) What type of bagged tea you consume or the brand name?

15) How much amount or quantity of tea do you consume in one go?

16) At what time of the day do you usually consume tea?

a) Morning

b) Evening

c) Free time

d) Before or after exercise

17) What motivates you to consume herbal tea?

a) Experiment/ trial

b) Flavour/ taste

c) After effects

d) Packaging

e) Advertisements

f) Peer pressure

g) Fashion

h) Availability

18) Are you aware of the composition of herbal tea bags? Yes/ No

19) In which situations do you usually consume herbal tea?

a) Insufficient sleep

b) Need energy

c) Studying or major project

d) Driving for longer period of time

e) Mixed with alcohol while partying

f) Treat hangover

g) Mental alertness

20) How do you feel after consuming an herbal tea?

a) Normal

b) Good

c) Bad

d) Overexcited

e) Tired

f) Discomfort/ Indigestion

g) Insomniac

h) Haven't noticed

21) Have you experienced any of the side effects out of the following soon after the consumption of bagged teas?

a) Anxiety
b) Insomnia
c) Frequent urination
d) Dehydration
e) Heart palpitations
f) Diarrhoea/ constipation

22) On what basis do you select a particular brand of bagged teas for consumption?

a) Price
b) Amount
c) Availability
d) Flavour
e) Nutrient composition
f) After effects

MATERIALS

Procurement of raw materials

The raw material to be use is-

- Orthodox tea
- Green tea
- Pipalli
- Ginger

- Mint
- Basil leaves
- Cinnamon
- Mulethi
- Sweet fennel
- Inula racemosa
- Clove
- Thyme
- Lemon grass
- Saffron
- bromelin

EXPERIMENTAL SETUP

EXPECTED OUTCOMES

The herb based tea bag that is made from various blends of tea extract (Green tea, black tea and herbal tea) along with addition of herbs will be rich in anti-oxidants and has properties to cure cough and congestion. The products made from blend of tea extract have properties to boost up the energy and provide protective health benefits to the consumers. As blend of tea extract possesses medicinal properties, thus the product made out with its incorporation will have both functional and nutraceutical properties and will be beneficial in enhancing the health of a consumer. It will have good amount of antioxidants and thus play a vital role in prevention of cold, cough and flu. It would be low cost and also the quality of tea bag paper would be improved.

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