



## International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 2 Number 12 (December-2014) pp. 130-135

[www.ijcrar.com](http://www.ijcrar.com)



### Quality Considerations in Manufacturing of Tea: A study in selected Estate Owned Tea Factories of Assam, India

Rashida Tahira Noorain\*

Assistant Professor, Assam Rajiv Gandhi University of Co-operative Management, 2nd Floor, SBI Main Branch Building, Barua Complex, Near Kakoty Garage, A T Road, Sivasagar, Assam. Pin- 785 640, India

\*Corresponding author

#### KEYWORDS

Manufacturing,  
Plucking,  
Estate Owned  
Tea Factory,  
Quality

#### A B S T R A C T

Tea is the most sought after non-alcoholic beverage in the world. Yet for India, tea is a culture. India is the largest producer, consumer and exporter of tea volume wise. Assam contributes to half of the total tea exports of India. Tea forms an integral part of the line-line of India in general and Assam in particular. The present study is an attempt to explore the procedures following during processing of tea in the factories. The primary focus in understanding the procedures in the factories have been through the quality considerations during processing at the factories. The study has been conducted in the five districts of the Upper Brahmaputra valley in Assam. The study has brought into light varied aspects demanding immediate attention of the Tea regulatory bodies of the industry and the masses as well.

#### Introduction

Tea is the most popular non alcoholic beverage drank all around the globe. Tea, as defined by the Tea Act<sup>i</sup>, 1953 refers to the plant *Camellia Sinensis* (L) O. Kuntze It includes all varieties of the product known commercially as tea made from the leaves of the plant *Camellia Sinesis* (L) O. Kuntze. The leaves of the said plant are processed, the marketed form of which is most popularly known as 'Tea'.

Tea contains several vitamins and minerals necessary for normal functioning of the human body<sup>ii</sup>. Asopa (2007)<sup>iii</sup> suggests the

benefits of tea in improving bone mineral density and thereby contributing negatively to osteoporosis. Minerals like potassium, zinc, and manganese present in tea boost vitamin C retention. Tea aids in digestions and lowers cholesterol levels. It reduces cancers of skin, lung, stomach and bone.

Chow and Krammer(1990)<sup>iv</sup> refers to the discovery of tea by Shen Nong. Shen Nong is termed as one of the three mystical early sovereigns. There are references as well of an Indian monk, Dharuma, who used to demonstrate the benefits of meditation,

meditated for nine years staring at a single wall. Once he fell asleep. In order to ensure that his eyelids do not droop again, he cut them off and threw away. A plant grew at the place where his eyelids fell; the leaves of which when boiled and drank, drove away sleep. Thus was born the magical plant of tea.

There are four major tea producing states in India viz. Assam, West Bengal, Tamil Nadu and Kerala. CTC tea constitutes two-thirds of the Indian tea production. Assam produces around 500 million kg of tea annually, which constitute 53% of the total Indian tea production. During 2007, tea produced in Assam had been 511.89 million kg<sup>v</sup>. Of this around 70 million kg is being exported. There are 780 registered big tea estates, 153 bought leaf factories, 1 cooperative factory and 2927 registered Small Tea Growers (STG), though the total number small tea growers are more than 43,000. Assam tea is known for its strong liquor, and rich taste and colour.

### **Quality**

Quality is not a new management philosophy. It is as old as the Scientific Management of Taylor. References to quality may be found in Taylor's (1910) advocacy of attaining performance by coaching the workers<sup>vi</sup>. Taylorism was more of importance to the stakeholders, may be considered as the perspective of customers. According to Frederick W. Taylor, "The principal object of management should be to secure the maximum prosperity for the employer, coupled with maximum prosperity for the employee" (Taylor, F.,W, 1947)<sup>vii</sup>.

As has been viewed by many a Quality guru, the indicators of quality is customer satisfaction, fitness for use or conformance to specifications. Costs of quality refer to the

costs of poor quality. Gryna et al. (2007) defines this as, "the annual monetary loss of products and processes that are not achieving their quality objectives".

### **Review of Existing Literature**

- a) Okinado Owuor(2006)<sup>viii</sup> suggested total theaflavin level and Black tea aroma quality and Plain Black tea aroma quality parameter as determinants of tea quality.
- b) Bhattacharya et al.<sup>ix</sup> refers to flavor, aroma, color, and strength as the major quality attributes of tea .
- c) A study was conducted by Bhuyan et.al.,(2009)<sup>x</sup> to identify the biochemical data for quality assessment of CTC tea where it was observed that the tea in the Brahmaputra valley had highest theaflavin (TF), thearubigin (TR), brightness (BR) and total colour (TC) and low crude fibre content (CFC) and total polyphenol (TPP) followed by Dooars region and Barak valley.
- d) According to Kamunya et.al.,(2009)<sup>xi</sup> the type of tea quality is depended on the tea cultivar which the raw material for manufacture.
- e) Jayaganesh and Venkatesan (2010)<sup>xii</sup> have found a positive correlation of use of magnesium in the soil and theaflavins in tea leading to increase in tea quality.
- f) Sood, Jaggi, Kumar, Ravindranath & Shankar (2004)<sup>xiii</sup> has found CTC to have more pesticide than Green tea possibly because of being subjected to initial heat treatment and more water loss (dehydration) due to higher temperature of air (60–75 °C) than withering in black tea.
- g) HACCP has been established as a benchmark in international food trade<sup>xiv</sup>. HACCP is a risk

management system that identifies and evaluates and controls hazards related to food safety along the food supply chain. HACCP is now a part of ISO 22000 standard.

- h) According to Roberts (1962), and Biswas et. al., (1971), theaflavins are critical in determining the cup quality and brightness of black tea and according to Takeo (1974), theaflavin content and quality are related (cited in Banerjee1993)<sup>xv</sup>.
- i) Emdadi et al<sup>xvi</sup>, has identified the usage of response surface technology in optimizing withering and fermentation times in the manufacture of tea.
- j) In spite of the quality tea produced, India is losing its presence in the export scene. S. Patra attributes this to the export of substandard tea from India. Compliance with HACCP or ISO 3720 may well help in sorting this as conformance to such norms which are accepted worldwide and protect the image of “Brand India”<sup>xvii</sup>.

### **Objectives of the study**

- a) To study the operating process of the Estate Owned Tea Factories.
- b) To understand the awareness on quality awareness in the Estate Owned Tea Factories during the process of manufacturing of tea.
- c) To explore the processes employed for checking degradation of quality in the factory

### **Hypotheses of the study**

The proposed study is expected to test the following hypotheses:

**H<sub>01</sub>:** The quality of tea in Assam is influenced by the quality standards of the Estate Owned Tea Factories.

**H<sub>02</sub>:** The Estate Owned Tea Factories Bought Leaf Factories perform requisite measures for maintaining the quality of tea produced therein.

### **Methodology of the study**

- a. Sampling Unit – Estate Owned tea factories in Golaghat, Jorhat, Sivasagar, Dibrugarh, and Tinsukia<sup>xviii</sup> districts.
- b. Source List – The population includes only those factories registered with the Tea Board of Assam.
- c. Sample Size- 10 Estate Owned Factories; since the study would not be exhaustive without personally visiting the factories by the Researcher.
- d. Sampling Procedure – convenience sampling.
- e. Sources of data
- f. Primary- Primary data have been collected from the employees of the tea factories.
- g. Secondary – Journals and Research Papers dealing with pertinent topics in course of the study.
- h. Data Collection-Schedules and Unstructured, uncontrolled, and non-participant observation. No enumerators have been used in the study.

### **Analysis and Findings**

- a) Leaf count specifications of 70 % are religiously adhered to in the Garden Owned Factories. Extensive plantation management policies are followed to ensure weekly plucking rounds, the type of the harvest and that the harvest reach the factory with minimal of damage.

- b) Estate Owned Factories were conscious on hygiene, MLR contents on the tea. Most had been certified with HACCP and some with ISO-22000.
- c) When the leaf count followed by the same factory followed the 70 % and above norm, the leaf count for the leaves sourced from small tea growers had a different figure; in most of the cases it was 40-55 %. In the attempts of exploring the reasons for such discriminating values, it was revealed that it was done so to make optimum utilization of capacity which otherwise would remain idle in the factory.
- d) The estate factories made proper arrangements to ensure that both the leaves do not mix anywhere during processing. It was also revealed that when it comes to leaves from own estates quality was given priority while for bought leaves quantity was given importance. One reason for adhering to quantity for Bought Leaf may be higher prices of the leaves from small growers compared to the leaves from the estates. Hence bought leaves were not sent back from the factories. Bought leaves after processing were packaged in bags usually jute bags and on occasions when were branded differently than the estates' own leaves.
- e) The estate factories sufficiently gave importance to the leaf quality from the estates. The Plantations were constantly under careful supervision lest there be any degradation of leaves used in the factory. Plucking norms were almost religiously followed. Such was actually possible as the control authority of the factory and the estates were same. Skilled manpower employed on the estates was an added advantage.
- f) The Quality Upgradation and Product Diversification Scheme initiated by the Tea Board of India aims at helping the Tea Factories in investing modernizing technologies for quality upgradation of made tea. This scheme gives priority to the Bought Leaf Tea Factories in this initiative. However no guidelines regarding standardized norms for processing are available from the Tea Board. This provides ample opportunity for mushrooming of such factories without proper operating procedures.
- g) The target outlook of Estate Owned Factories is towards export and such factories bent on producing quality teas in any case.
- h) Moisture level during packaging of tea is maintained at 3%. This moisture level is appropriate for preventing microbial growth.
- i) The Estate Owned Factories gave sufficient importance to the leaf quality from the estates. The plantations are constantly under careful supervision lest there be any degradation of leaves used in the factory. Plucking norms are religiously followed. This has been possible as the control authority of the factory and the estates has been same.
- j) In the Garden Owned Factories, the layouts do not allow easy view of the processes from different positions only because dry and wet zones are segregated from one another unlike the Bought Leaf Tea Factories which have all modern layouts mostly U and Line type, facilitating easy visibility of the entire processing from various angles.

- k) Tea is sold in plain poly-bags as produces of some famous estates and thereby fetching a heavier price. People are lured to buy such teas. Yet those packets bear no label or name of the estates they come of. This tea does not stand the quality of the estates it is supposed to belong. Tea is blended with substandard varieties and tarnishes the image of the estate. This indeed needs to be stopped. Tea which comes in unnamed packs should not be sold. The Board must ensure that tea is sold in proper packs bearing all details of specifications like MLR, moisture content on packaging. This can bring in radical changes in the domestic consumption which itself is a huge base.
- l) Estate Factories when they process leaves from Small Growers must not discriminate with the leaf count. Factories must strictly adhere to the same leaf count which they follow for own leaves. Also such factories should inform such growers of their desired leaf specifications. So that a uniformity is set for processing irrespective of the source of leaves. This will build a compulsive pressure on the growers in being quality conscious and also form an initiative in eliminating the differences in processing leaves from different sources

#### Limitations of the Study

- a) The study has been conducted for a limited number of samples owing to constraints of access to the factories and difficulties in collecting data from the appropriate officials.
- b) The study is limited to the estate owned factories selected in the Upper Brahmaputra valley; samples

from other districts would have had a different story.

- c) The specifications of the machinery employed, power consumptions, etc. could not be studied for the factories, since such data were not provided. The study would have otherwise enabled analyses for the machinery as well and the deviations, if any, from the standard operating procedures.
- d) The study did not include the Bought leaf factories whose number almost exceeds the estate owned factories in the region.

---

<sup>i</sup> Tea Board manual, 2001 retrieved on July 10, 2010 from <http://www.teaboardofindia.org>

<sup>ii</sup> India Tea document. retrieved on 10 July, 2010 from <http://www.indiatea.org>

<sup>iii</sup> Asopa, V.N. (2007). *Competitiveness of Global Tea Trade*. New Delhi.: Oxford and IBH Publishing Company Pvt. Ltd.

<sup>iv</sup> Chow, K.B & Krammer, L.(1990). *All the tea in China*, China.:r4China Books and periodicals Inc

<sup>v</sup> Tea Board of India. retrieved on July 10, 2010 from <http://www.teaboard.gov.in/pdf/stat/Production07.pdf>

<sup>vi</sup> Dalrymple, J. F. From F Winslow Taylor to W Edwards Deming - Over a Century of Progress?. retrieved on May 12, 2010, from [www.mams.rmit.edu.au/35zkk9ztt0qn.pdf](http://www.mams.rmit.edu.au/35zkk9ztt0qn.pdf)

<sup>vii</sup> Taylor, F.W.(1910). *Scientific Management*. New York and London.: Harper and Brothers Publishers.

<sup>viii</sup> Okinda Owuor, P., Advances in the development of Reliable Black Tea quality parameters and use in selection superior quality plants, retrieved from

- <http://www.napreca.net/publications/11symposium/pdf/F-45-55-Owuor.pdf> on 30 August, 2009
- ix Bhattacharyya, N. Bandyopadhyay, R. Bhuyan, M. Tudu, B. Ghosh, D. Jana, A. Centre for the Dev. of Adv. Comput., Kolkata, Electronic Nose for Black Tea Classification and Correlation of Measurements With “Tea Taster” Marks.
- x Lakshi P Bhuyan, Assma Hussain, Pradip Tamuly, Ramen C Gogoi, Prasanna K Bordoloi, Mridul Hazarika, Chemical characterisation of CTC black tea of northeast India: correlation of quality parameters with tea tasters' evaluation, *Journal of the Science of Food and Agriculture*, Volume 89, Issue 9. retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/jsfa.3614/pdf> on 30 August, 2009
- xi Kamunya, S. M, Wachira F N., Pathak, R S, Muoki, R C, Wanyoko, J. K, Ronno, W K, Sharma, R.K, Quantitative Genetic parameters in tea: combining abilities for yield, drought tolerance and quality traits., *African Journal of Plant Science*, Vol 3(5)2009
- xii Jayaganesh, S. and S. Venkatesan, 2010. Impact of magnesium sulphate on biochemical and quality constituents of black tea. *American Journal of Food Technology*, 5: 31-39. DOI: 10.3923/ajft.2010.31.39, retrieved from <http://scialert.net/abstract/?doi=ajft.2010.31.39> on 30 August 2010
- xiii Sood, C., Jaggi, S., Kumar, V., Ravindranath, S.D., & Shanker, A. (2004). How manufacturing processes affect the level of pesticide residues in tea, *Journal of the Science of Food and Agriculture, J Sci Food Agric* 84:2123–2127 retrieved on May 15, 2010 from <http://www.biriz.biz/cay/articles/pesticideTea.pdf>
- xiv [http://www.apo-tokyo.org/00e-books/AG-14\\_HACCP/AG-14\\_HACCP.pdf](http://www.apo-tokyo.org/00e-books/AG-14_HACCP/AG-14_HACCP.pdf)
- xv Banerjee. B., 1993, *Tea Production and Processing*, Oxford & IBH Publishing Co. Pvt. Ltd : New Delhi.
- xvi L. Emdadi, B. Nasernajad, ST. Shokrgozar, M. Mehranian, F. Vahabzadeh, Optimization of withering time and fermentation conditions during black tea manufacture using response surface methodology
- xvii Page 238, the Hindu Survey of Indian Industry 2010
- xviii Assam has been divided into six agro climatic zones viz., The North bank Plains( comprising of Lakhimpur, Dhemaji, Sonitpur and Darrang), The Upper Brahmaputra Valley( comprising districts Golaghat, Jorhat, Sivasagar, Dibrugarh and Tinsukia, The Central Brahmaputra Valley( Nagaon and Morigaon), The Lower Brahmaputra Valley( Dhubri, Bongaigaon, Kokrajhar, Goalpara, Barpeta, Nalbari and Kamrup ), The Barak Valley ( Karimganj, Cachar and Hailakandi) and The Hill districts( Karbianglong and North Cachar)

Source: [http://agriassam.org/at\\_aGlance/05-basicinfo.pdf](http://agriassam.org/at_aGlance/05-basicinfo.pdf)