Consumer preference of the mix of purple and ordinary green tea in Kenya

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ABSTRACT

Tea is the most widely consumed beverage in the world after water. Processed tea is manufactured from young tender leaves of tea plant (*Camellia sinensis*). Black tea has mainly been processed from green coloured leaf tea cultivars. The Tea Research Foundation of Kenya (TRFK) released a purple (anthocyanin pigmented) tea variety, TRFK 306/1, in 2011. During the processing, the purple tea leaf is mixed with the ordinary green tea leaf resulting in a new product. The study aimed at assessing the consumers' preference of the new tea product manufactured from a mixture of both green and purple tea leaves as compared to tea manufactured from purple leaf and green leaf separately. The study employed both descriptive survey and experimental research designs. Tea tasters were used to rank i) tea from green leaf, ii) tea from purple tea and iii) tea from the mix of purple and green leafs. Tea consumers were also asked to rank the three varieties of tea. The target population comprised of 30 respondents drawn from Kangaita Tea Factory region within Kirinyaga County. Tea tasters were drawn from factories in Kirinyaga County. Simple random sampling was employed for both tea tasters and consumers. Data was collected using questionnaires and analyzed using the Spearman Rank coefficient of correlation. The study found out that consumers would prefer the tea mix of purple and green. The study recommends extensive marketing and value addition strategies such as packaging, branding and blending in order to create awareness to potential consumers and maximize returns to the smallholder tea farmers. In addition, the study recommends that further research be done in order to outline health benefits of this tea product.

Key words: Consumer preference, Marketing, Mixed purple, green leaf tea product, Purple tea.

INTRODUCTION

Tea is an evergreen plant native to China and one of the most widely consumed plant-based beverage in the world (Cabrera *et al.*, 2003). It is classified according to method of processing, as green tea, black tea or oolong tea. Green tea does not undergo aeration during processing while black tea is fully aerated. Oolong tea undergoes partial aeration (Kilel *et al.*, 2012).

China is the largest producer of tea in the world accounting for 35% of the total global production followed by India (25%). Kenya is the third accounting for over 8% of the global tea production (ITC, 2010). Other world tea largest producers include Sri Lanka (7%), Turkey (4%), Vietnam, Iran and Indonesia. Regionally, countries such as Malawi, Uganda, Tanzania, Rwanda, Mozambique and Zimbabwe were among the top 20 tea producers in the world in 2012 (in that order).

Black tea is a good option to form one's part of diet because of its several health benefits which include cardiovascular benefits, cancer prevention and oral health. Tea also stimulates

the brain and nervous system. Tea clonal planting materials are developed through scientific innovations by TRFK. The developed clones are subjected to environmental response tests at various representative sites. About 50 varieties have been developed so far. One of the most recent varieties is the purple tea variety, coded TRFK 306, which was released for commercial utilization in 2011 targeting a unique tea product-anthocyanin-rich tea. This clone has been under development for the last 25 years and further works on the composition and antioxidant value of anthocyanins in it are still in progress. Anthocyanin supplements (proanthocyanins) are widely marketed for their health enhancing and preservatives properties especially in the food industry. This study sought to answer the question: **If ordinary green tea leaf was mixed with purple tea leaf, how would it affect the consumer preference?**

Statement of the problem

There are over 500,000 small-scale tea farmers who deliver their tea leaf to the 66 tea factories under Kenya Tea Development Agency (KTDA). The farmers deliver their tea leaf to these factories for manufacture of black tea. Data from TRFK Kangaita station, the key source of tea planting materials, indicate that the demand for purple tea planting materials increased from 198,927 in 2011 to 713,841 in 2013. This means that farmers have adopted the purple tea cultivars which have unique biochemical components. Before volumes build up to make it possible to manufacture pure purple tea, the purple tea leaf is currently mixed with the ordinary green tea leaf and processed as a mixture in most of the factories under KTDA management. The product is neither normal black tea nor pure purple tea but a mixture of the two. The consumer preference of this mixed tea product is not known thereby this research was undertaken to fill this gap in order to enable an appropriate marketing strategy to be developed.

Research objectives

The broad objective of this research was to evaluate the consumer preference of a mix of purple and ordinary black tea product in Kenya.

Specific objectives

The specific objectives of the study were:

   i.   To determine whether the perceived health benefits of purple have effect on consumer preference of the mix of purple and ordinary black tea.

   ii. To determine the tea tasters' and consumer's preference of the ordinary black tea, purple tea and a mix of purple and ordinary black tea.

   iii. To determine the correlation between ranking by professional tea tasters and ordinary consumers of ordinary black tea, purple tea and a mix of purple and ordinary black tea.

LITERATURE REVIEW

Tea is the most widely consumed beverage in the world, second only to water (Tea Association of the USA, 2011b). In explaining the history of tea, Legend says a Chinese Emperor discovered tea quite accidently when a leaf from a tea tree blew into his boiling water pot. He drank the liquid, felt refreshed and ordered that the trees be planted in his garden, thus the first cultivation of the tea plant began (Lam and Lam, 2002). All pure tea come from the *Camellia sinensis* plant, produced from the leaves and leaf buds of various cultivars and sub-varieties. The many different kinds of tea produced throughout the world depend on the variety of the plant, the curing and processing of the leaves, and the grade of the leaves (Pratt, 2005). Increasing contact between China and Europe in the 16th and 17th centuries brought tea to Europe and eventually to England in the late 1650s.

Tea was brought to the USA in 1650 by the Dutch. When the British took control of New Amsterdam in 1674 and renamed it New York they found tea drinking was already well established and was as important here as it was in Europe (Pettigrew and Richardson, 2008). For quite a few years following World War II, traditional tea drinking rituals fell by the wayside. In the early 1980s, the first evidence of a tea renaissance became apparent in the USA, United Kingdom, Japan and all over Europe (Pettigrew, 2004).

All varieties of tea contain healthful and beneficial polyphenols. Polyphenols are antioxidants that fight free radicals which cause cell damage. The purple tea variety, TRFK 306/1, is not an exception since it targets a unique tea product-anthocyanin-rich tea. Anthocyanins are powerful antioxidants and have health enhancing properties (Kamunya, 2009). According to Lelgo *et al.* (2011), the levels of biochemical components in tea varieties are useful quality and health indicators and would serve as potent tools for bargaining for premium prices irrespective of the type of end product.

The appreciation of tea liquor is determined by tasting. Tea tasting is the process in which a trained taster determines the quality of a particular tea (Wrightman, 1994). This is when most of the liquoring properties of tea are examined. Tea tasters refer to the brewed tea as the liquor. Tea tasting is a sensory evaluation technique of tea. Sensory evaluation adopts a unique approach to identification of the attributes that matter most to the end consumer. It interprets the psychological responses of the five senses – sight, hearing, smell, taste and touch – to physical stimuli (Hashmi, 2007).

Due to climatic conditions, topography, manufacturing process and different clones of tea, the final product may have vastly differing flavours and appearance. These differences can be tasted by a trained taster in order to ascertain the quality prior to sale or blending of tea (Wrightman, 1994). Tea tasting is a sensory evaluation technique which adopts a unique approach to identification of the attributes that matter most to the end consumer. It employs trained panellists to provide right guidance to the food manufacturers on what perceived attributes need to be incorporated into their products for their marketing success (Hashmi, 2007). Consumers will pay the most attention to attributes that deliver the sought-after benefits.

METHODOLOGY

Research design

The study used both descriptive survey and experimental research designs. Tea tasters were used to rank tea from green leaf, tea from purple tea and tea from the mix of purple and green leafs. Tea consumers were also asked to rank the three varieties of tea according to the levels of preference. A set of three types of tea was used, viz., Sample A for ordinary black tea produced from green tea leaf; Sample B for the tea produced from the mix of purple and green leaves; and, Sample C for purple tea produced from purple tea leaf. Sample B is the subject of the study while Sample A and Sample C act as controls. Sample A, black tea, represents what is commonly available for the general consumers and is sold at the factory gate through the Factory Door Sales (FDS) outlet.

Study locale, sampling procedure and participants

The study was carried out in Kirinyaga County. Kangaita is located on the southern slopes of Mount Kenya, at a relatively high altitude of 2036 m above sea level approximately ½⁰ south of Equator and 37.3⁰ East. The area has deep well drained soils suitable for tea growing. It is within the Mount Kenya tea growing region. The TRFK's Kangaita Station, where research and development of tea clones is carried out, is within the area. When a new tea clone is released at the research station, it is propagated at the KTDA estate which has a large tea nursery from where tea farmers across the country collect the planting materials. Purple tea was first planted

here long before it was officially released for commercialization, hence availability of purple leaf for both tea tasters and the consumers.

Data collection procedures and analysis

Data was collected using questionnaires administered to ten professional tea tasters and 20 consumers of tea. The collected data was carefully coded and studied extensively in order to develop themes. Tea tasters were used to rank the tea from green leaf, tea from purple leaf and tea from the mix of purple and green leaves. Tea consumers were also asked to rank the three types of Tea. This data was analyzed using the Spearman Rank coefficient of correlation.

RESULTS AND FINDINGS

Personal information

The study findings were drawn from 24 respondents out of which 79% were male and 20% were female. 50% of the respondents lay under the age bracket of 31 − 40 years, 25% were in the 20 − 30 years age bracket, while 41 − 50 age brackets made up 25% of the respondents. 21% of the respondents said they took tea at least two times in a day while the same percentage took tea at least three times a day. Sixteen per cent said they consume tea four times while 8% consume six times a day. Those who consumed tea daily and those who consumed frequently were 4.2%.
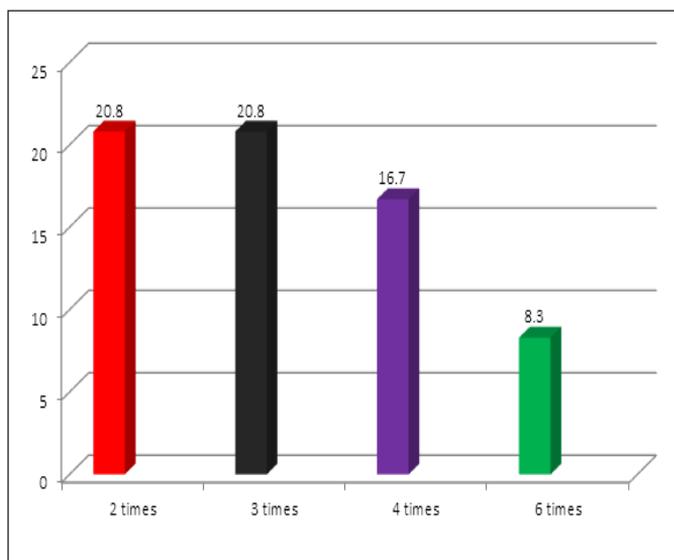
Figure 1: Respondents' frequency of tea consumption.

When asked why they take tea; 58.3% of the respondents said it was because of relaxation, 12.5% because of taste, 12.5% for comfort, 12.5 for soothing, and 4.2% as norm.
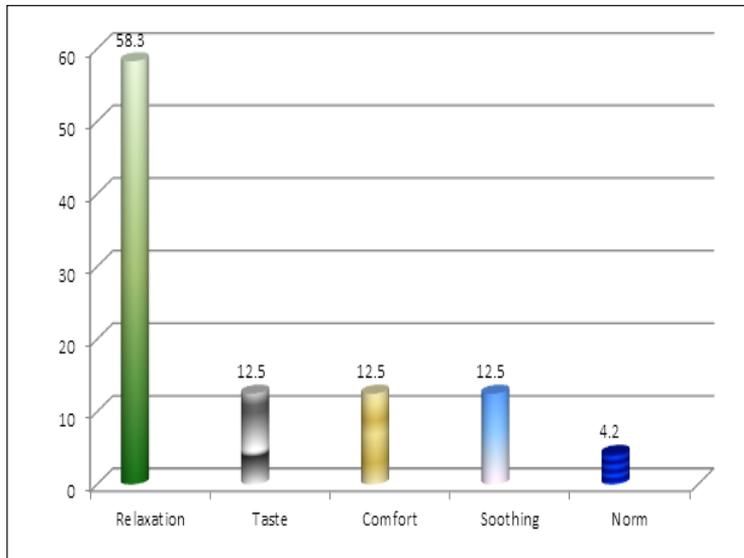
Figure 2: Why respondents drink tea.

Health benefits of purple tea

The researchers sought to establish the level of knowledge on purple tea the respondents had; if they were aware of the health benefits associated with purple tea and what the effect of a premium price would be on their consumption of purple tea. The researchers went further to investigate the effect of mixing black and purple tea and the respondents' preference. Out of the sampled respondents, 79.2% had tasted purple tea while only 20.8% had not tasted purple tea. The impression the respondents had after tasting purple tea the first time is represented in Figure 3.
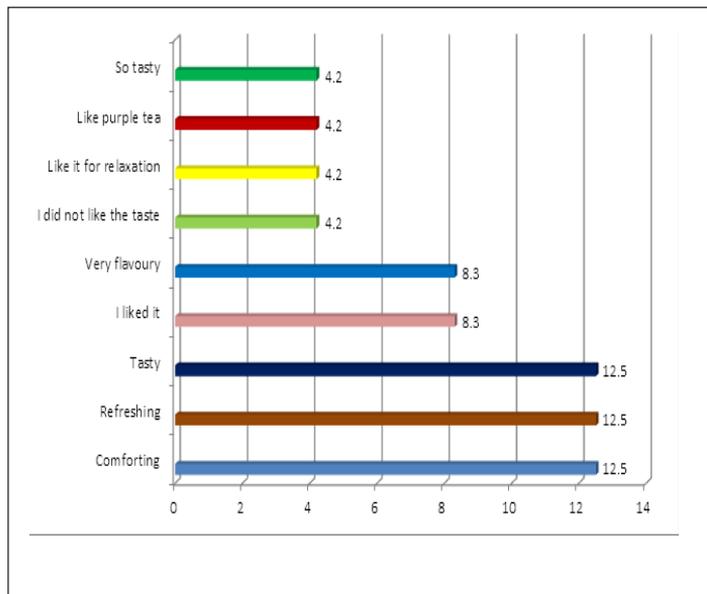

Figure 3: Respondents' impression after tasting purple tea for the first time.

Majority of respondents were knowledgeable of health benefits associated with purple tea; 87.5% responded positively while only 8.3% were not aware of the benefits (Figure 4). Among

the health benefits raised, those who mentioned of presence of antioxidants that fight body radicals were 50%, minimization of high blood pressure 25%, improving immunity 8.3%, while reduction of bone joint problems scored 4.2% (Figure 5).
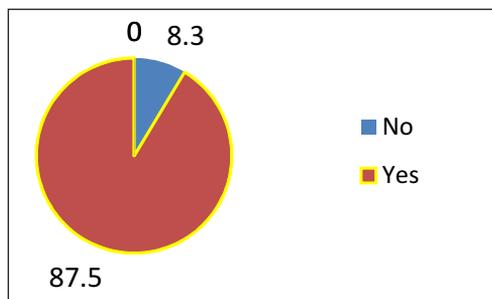
**Figure 4: Knowledge that purple tea has health benefits.**
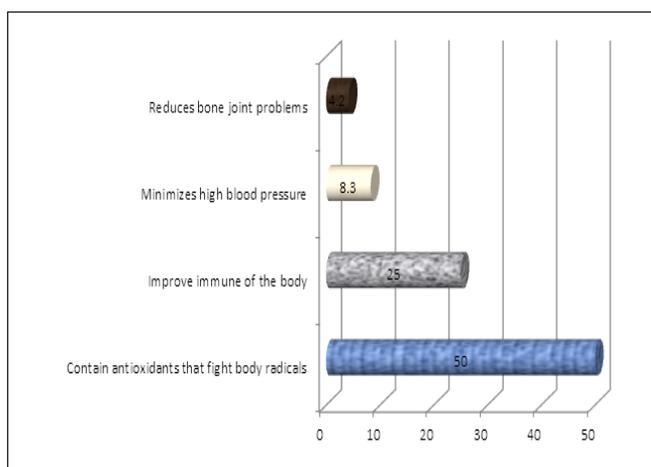
Figure 5: Perceived health benefits mentioned by respondents.

Out of the sampled respondents, 45% said that the extent to which they would consider taking purple tea was very high, 33% high extent, while 17% indicated that the extent would be average.

Given that a kilogram of processed purple tea is currently retailing at Ksh 2,600 while the normal black tea is retailing at Ksh 360, a very high percentage of the respondents, 91.7%, indicated they would be willing to pay the premium while only 4.1% would not be willing.

Mix of purple and black tea

The main objective of this study was to investigate the customer's preference of a mix of purple and black tea given that currently many factories are not able to process purple tea separately largely because of small quantities of purple leaf and that the market for the processed purple tea is yet to be established. The respondents were, therefore, asked if they had ever tasted the tea mix; 70.8% responded positively and 25.5% negatively. When asked why they would consider taking the mix of purple and black tea, the following factors were raised: health benefits, taste reasons, blood cleansing, and enjoying a mixture of both ingredients.
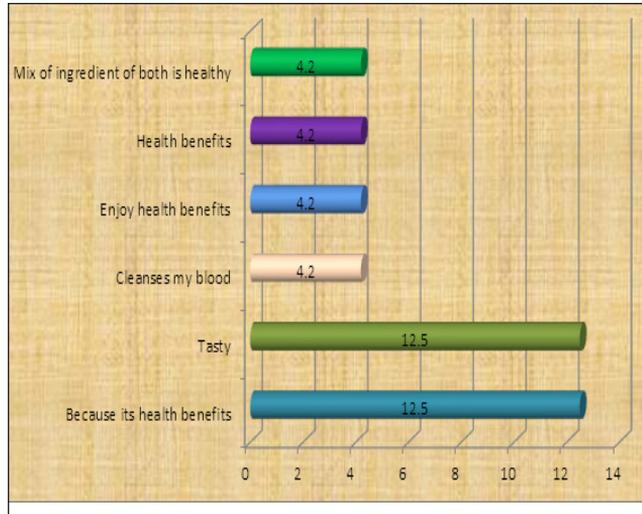
**Figure 6: Respondents' reasons for taking a mix of purple and black tea.**

Tea taster score and consumer preference

In order to rank the three different samples of tea (Sample A, black tea; Sample B, mix of purple tea and black tea; and, Sample C, purple tea) the samples were prepared and professional tasters tasted and scored the level of the desired attributes in the tea liquors. Ranking was done based on the scores, the highest being ranked as the best. The attributes considered were colour, body and strength of the liquor. The study established that 87.5% of the tea tasters ranked Sample A number one, while 50% ranked Sample B number two and 50% ranked Sample C number three. 25% of the tea tasters ranked sample B as number one, hence a combined 75% ranked Sample B number one and number two. 12.5% and 37.5% of the tea tasters ranked Sample C number one and number two respectively, giving a combined 50%. This means that a considerable number of tea tasters would prefer the mix tea over pure purple.
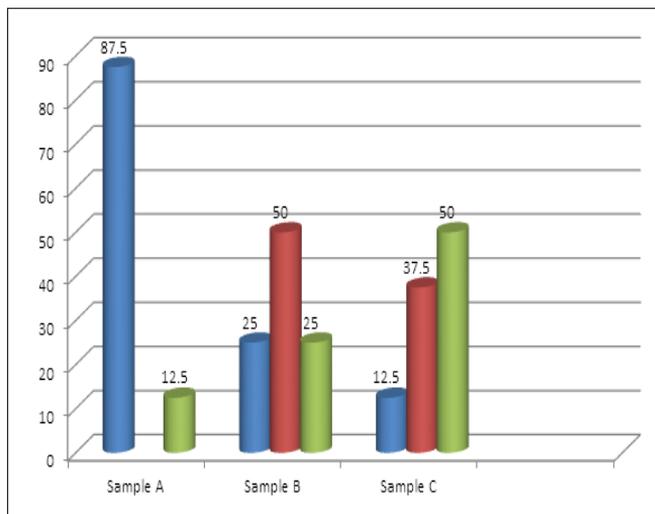

Figure 7: Ranking for the samples.

Ranking for the samples showed that 58.3% of all respondents like very much Sample A, 37.5% and 33.3% like moderately Sample B and Sample C respectively. This implies there is more preference for Sample B, the tea mix, than for Sample C, the pure purple.
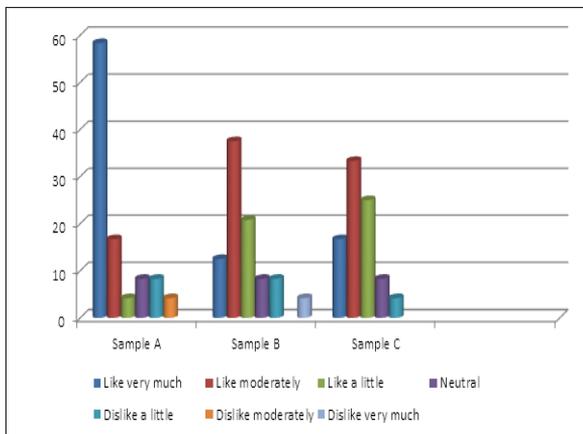
Figure 8: How much respondents like or dislike the Tea.

On the likelihood that respondents would consider taking the mix of purple and black tea, 37.5% said they would most likely consider, 62.5% fairly likely, 12.5% not sure, and 12.5% would not consider at all.
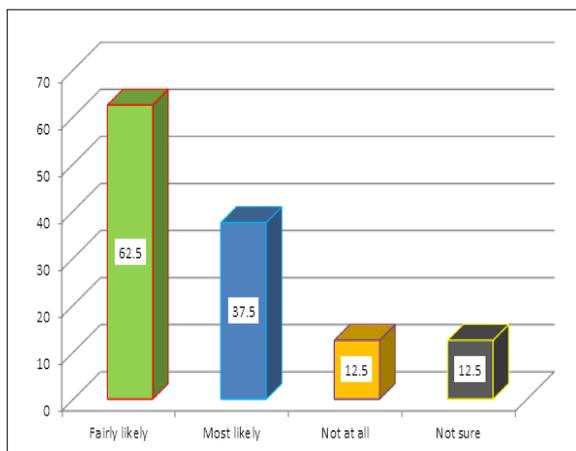
Figure 9: Likelihood that a respondent would consider consuming the tea mix.

Seventy-five per cent of the respondents indicated that the perceived health benefits of purple tea would influence their consumption of a mix of the purple and black tea and 16.7% would not be influenced.

Correlation between ranking by professional tea tasters and ranking by ordinary consumers

Ranking for the three samples by professional tea tasters and ranking by ordinary consumers was as tabulated in the here below:

i) Tea tasters

Table 1: Ranking by tea tasters.

Sample/Tea Taster	1	2	3	4	5	6	7	8	Total	Rank
A	1	1	1	3	1	1	1	1	10	1
B	2	3	2	1	3	2	2	2	17	2
C	3	2	3	1	2	3	3	3	20	3

ii) Consumers

Table 2: Ranking by consumers.

Eight out of the 16 questionnaires filled by consumers were randomly selected.

Sample/Consumer	1	2	3	4	5	6	7	8	Total	Rank
A	1	1	1	1	3	1	2	1	11	1
B	3	3	3	3	1	3	1	2	19	3
C	2	2	2	2	2	2	3	3	18	2

iii) Tabulation of the ranking

Table 3: Tabulation of the ranking.

Sample	Ranking by Tea Tasters	Ranking by Consumers
A	1	1
B	2	3
C	3	2

Computing the Spearman Coefficient of Rank Correlation

Spearman Rank correlation is coefficient is defined as:

$$R = 1 - \frac{(6 \times \sum D^2)}{(N^3 - N)}$$

$$R = 1 - \frac{(6 \times 2)}{(3^3 - 3)}$$

$$R = 1 - \frac{12}{24}$$

$$R = 0.5$$

Table 4: Computing the Spearman Coefficient of Rank Correlation.

Sample	Ranking by Tea Tasters R_1	Ranking by Consumers R_2	$(R_1 - R_2)^2 = D^2$
A	1	1	0
B	2	3	1
C	3	2	1
$N = 3$			$\Sigma D^2 = 2$

Thus, there is a moderate degree of positive correlation in the ranks assigned by tea tasters and tea consumers.

CONCLUSION

Black tea is significantly the preferred tea by the consumers. The tea produced from a mix of purple leaf and green leaf would be more preferable to pure purple. Perceived health benefits would significantly influence the consumption of the tea mix. There is some awareness of the health benefits associated with consuming purple tea, but the consumers are not sure of the specific health benefits. There is positive correlation in the ranks assigned by tea tasters and tea consumers.

RECOMMENDATIONS

There is need for extensive awareness to tea brokers, tea buyers and general tea consumers so that factories that are not able to process purple leaf separately can still mix process and avail it in the market separately. The awareness is necessary so that such tea is not devalued. They should develop additional terms and criteria for sensory evaluation of purple tea and mix of purple and black tea. Market research should be done extensively. Producers should develop value addition strategies such as packaging, branding and blending for the mix of purple and black tea. Further research needs to be done to outline the health benefits of this tea.

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