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Studies on formulation and sensory evaluation of turmeric based orange RTS beverage

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Abstract

The study was conducted to develop formulations of orange RTS beverage by mixing it with fresh turmeric rhizome juice with various proportions such as (90:10), (80:20) and (70:30) were used for T1, T2 and T3 respectively and evaluated with reference to orange RTS beverage alone (100:0) T0. T1 was found to be the most preferred variant with respect to the sensory quality such as colour, flavour, after taste and overall acceptability. Overall, it can be concluded that turmeric juice upto 20% in preparation of orange RTS beverage with good sensory attributes and nutritional value can be prepared.

Keywords: turmeric, curcuma longa, curcumin, fresh rhizome, orange, RTS

Introduction

Turmeric (*Curcuma longa*) is the rhizome or underground stem of ginger like plant. Turmeric is a rhizomatous herbaceous perennial plant of the ginger family, *Zingiberaceae* (Chan *et al.* 2009) [5]. Turmeric is a spice native to India. Historically, turmeric has been used throughout India, China and Indonesia as a spice and medicinal agent. Turmeric is a mild spice that enhances the flavour of other spices and foods and is the base of most Indian curries. In the Ayurvedic tradition, turmeric, or "haldi" as it is known in Hindi. Its main action being to reduce mucus from the system (De Jager *et al.* 2010) [6].

The functional properties and therapeutic benefits of *turmeric* are known worldwide due to its nutraceutical component curcumin. Curcumin has antioxidant, anti-inflammatory, antiviral and antifungal actions. Studies have shown that curcumin is not toxic to humans. (Akram *et al.* 2010) [1]. Curcumin has been traditionally used as a good source of colouring matter for foods and as a medicinal ingredient in formulations of the several medicines for ailments from jaundice, other liver disorder, ulcers, parasitic infections, various skin diseases, sprains, inflammation of the joints, cold and flu. It possesses anti-inflammatory, hepatoprotective, antimicrobial, anticancer, antitumor, blood purifying, stomachic, antiseptic and anti-viral activities (Ghani, 2003) [10]. Curcumin also possesses the remarkable activities of preventing or treating alzheimer disease, immune modulation and correcting cystic fibrosis defects (Balasubramanian, 2006) [3].

Every fruit have specific nutritional value, colour, taste and flavour. Fruits are important source of vitamins, minerals, fibre and carbohydrates etc. Orange specially, the sweet orange (*Citrus sinensis* L.) is a deciduous tree belongs to family *Rutaceae*. Sweet orange is the most commonly grown fruit in the world and widely cultivated in tropical and sub-tropical climates for the delicious sweet fruit which is peeled or cut (to avoid the bitter rind) and eaten whole, or processed to extract orange juice, ready-to-serve (RTS) beverages, cordial, nectar etc. Sweet orange originated from south East Asia but is consumed all over the world as an excellent source of vitamin C, a powerful natural antioxidant that builds the body immune system. Important phytochemicals like limonoids, synephrine, hesperidin flavonoid, polyphenols, pectin, and sufficient amount of folacin, calcium, potassium, thiamine, niacin and magnesium are also present. These biologically active compounds prevent arteriosclerosis, cancer, kidney stones, stomach ulcers and reduction in cholesterol level and high blood which promote human health. (Etebu and Nwuzoma 2014) [9]. The utilization of these fruits for preparation of various processed product become limited, despite their high nutritional qualities. The blending of two or more fruit juices with spices extract for preparation of nutritive RTS beverages is thought to be a convenient and economic alternative for utilization of these fruits. (Langhasa, 1999) [11], (Deka, 2000) [7], (Deka and Sethi 2001) [8] reported that two or more fruits juice/pulp may be blended in various proportions for the preparation of nectar, RTS beverages etc. the blending of juice may also improve aroma, taste and nutrients of beverages Looking to the demand of natural beverages, there is great scope for the preparation of juices and other fruit-based beverages. RTS is a type of fruit beverage containing at least fruit juice

(10%), total soluble solids (10%) and acidity (0.3%). Therefore, the present study was carried out to evaluate the organoleptic qualities of turmeric based orange ready-to-serve (RTS) beverages.

Materials and Methods

Materials

The fresh turmeric rhizomes and oranges were obtained from local village market, Parbhani. The proposed research was carried out in Department of Food Engineering, College of Food Technology, VNMKV, Parbhani.

Methods

Preparation of fresh turmeric rhizome juice and orange juice

Freshly harvested turmeric rhizomes were washed and cleaned by removing all the dirt and impurities. Then peeling was carried out for obtaining clear turmeric juice. After removing the peel, the rhizomes were cut into small pieces for the extraction of juice through juice extractor. The obtained juice then filtered through muslin cloth to obtain clear juice.

Organoleptic evaluation of turmeric based orange RTS beverage

Organoleptic evaluation of turmeric based orange RTS beverage for colour and appearance, flavour, after taste and overall acceptability was carried out by using standard method of (Amerine *et al.* 1965)^[2]. For these 10 semi-trained judges were used and 1 to 9-point hedonic scale was used for rating the quality of the turmeric-based orange RTS beverage. The mean of ten judges was considered for evaluating the quality.

Preparation of Turmeric based Orange RTS Beverage (Source: Nitu *et al.* 2010)^[13]

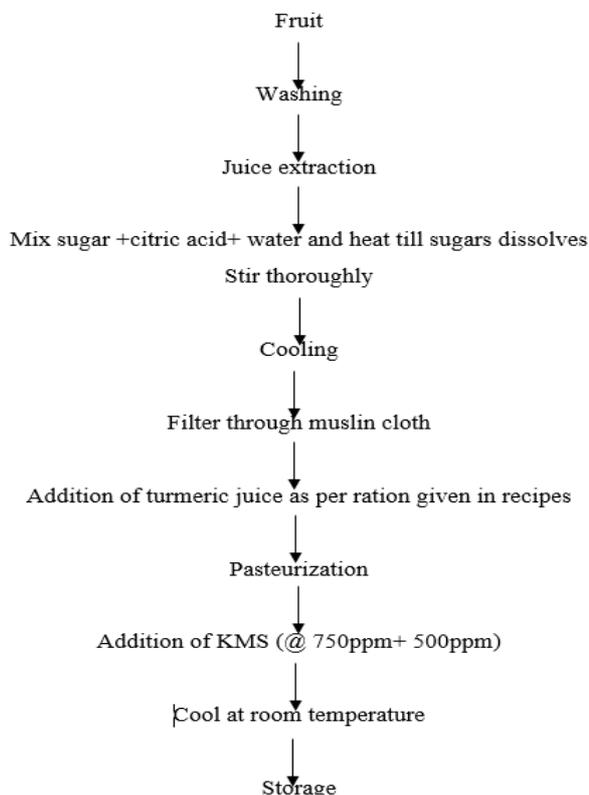


Fig 1: Process flowchart for preparation of turmeric based orange RTS beverage

After extraction of juice from all the fruits its total soluble solids (TSS) and acidity were measured. Then according to different recipe treatment, the quantity of juice, sugar, citric acid, preservative (KMS) and water were calculated. For the preparation of turmeric based orange RTS beverage of different recipe, syrup of sugar, water and citric acid was prepared. The prepared turmeric-based orange RTS beverage filled in clean sterilized plastics bottle of 200 ml capacity. Prepared orange based blended RTS beverage bottle were stored in dries place at ambient temperature.

Results and Discussions

Sensory evaluation of turmeric based orange RTS beverage

Data pertaining to sensory evaluation of turmeric based orange RTS beverage with respect to appearance, colour, flavour, after taste and overall acceptability were carried out. Accordingly, results obtained are depicted in table. 1.

Table 1: Mean sensory score values for the turmeric-based orange RTS beverage.

Samples	Appearance	Colour	Flavour	After Taste	Mouth feel	Overall Acceptability
T0 (100:00)	8.7	9	8.5	9	9	8.8
T1 (90:10)	8.5	8.7	8.5	9	8.5	8.6
T2 (80:20)	7.5	8.0	8.0	8.5	8.5	8.1
T3 (70:30)	7.0	7.0	7.5	7.5	8.0	7.4
SE ±	0.154	0.152	0.179	0.114	0.218	0.114
CD at 5%	0.453	0.446	0.525	0.336	0.642	0.336

Data indicated in above Table 1. showed that turmeric based orange RTS beverage with 90:10 orange to turmeric received highest sensory score (i.e., 8.6) in case of all sensory attributes followed by RTS having 95:5 scored (i.e., 8.1) compared to rest of the samples. Statistically, sample T1 was varied significantly over rest of treatments whereas T0 and T1 was statistically at par with each other.

The colour value of RTS was significantly affected by different recipe and treatment combinations. The present results are supported by (Bezman *et al.* 2001)^[4], (Singh, 2002)^[14] and (Murtaza *et al.* 2004)^[12].

Conclusion

In present investigation efforts were made to develop turmeric based orange RTS beverage with various proportions of added fresh turmeric rhizome juice. The study revealed that the organoleptic characteristics of turmeric based orange RTS beverage viz., colour, taste, flavor and overall acceptability were significantly influenced by different recipe treatments. It can be finally concluded that turmeric based orange RTS beverage with 90:10 (T1) orange to turmeric received highest sensory score (i.e., 8.6) in case of all sensory attributes.

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