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# Standardization of base material for preparation of turmeric and jaggery based lozenges

**S Deepthi, B Tanuja Priya, V Sudha Vani, K Giridhar and K Sireesha**

**Abstract**
The present investigation entitled "Standardization of base material for preparation of turmeric and jaggery based lozenges". was conducted at Post Harvest Technology, College of Horticulture, Dr. Y.S.R Horticultural University, AP. In this study, turmeric lozenges in various quantities made using turmeric powder, jaggery, lemon juice and pepper were designed, prepared and tested for organoleptic quality. Formulas with different ratios have textures that varied in terms of hardness, stickiness, smoothness, grittiness, and spreadability. Additionally, compared to other combinations, lozenges made with 3g of turmeric powder, 2g of pepper, 70° Brix of jaggery, and 5ml of lemon juice had the highest and widest consumer preferences. Consequently, an improved formulation of turmeric lozenges with jaggery is offered as a substitute for their flavour and mouth feel in order to increase the immunity.

**Keywords:** Lozenges, turmeric, jaggery, pepper, lemon juice

## Introduction
One of the most significant herbs in the Ayurvedic system is turmeric. Turmeric has been used medicinally for more than 5000 years. Having primary and secondary rhizomes that can range in shape from spherical to slightly conical, hemispherical, and cylindrical, turmeric is a rhizomatous perennial herb. The spice turmeric is indigenous to India. Turmeric has a long history of use as a spice and medicine in Indonesia, China, and India. Most Indian curries start with turmeric, a mild spice that brings out the flavours of other spices and foods. Turmeric, also known as "Haldi" in Hindi, is used in Ayurvedic medicine and its major effect is to reduce mucus in the body (De Jager and Prashanti, 2010) [3]. Turmeric has been given "Generally Recognized as Safe" (GRAS) certification by the FDA in the United States. Nearly all human diseases have historically been treated with turmeric, and many of these traditional uses have been supported by modern scientific research. In addition to being utilised in religious rituals, turmeric (*Curcuma longa*) is also used as a condiment, colour, medicine, and cosmetics.
India is the world's top producer and exporter of turmeric. Several significant states cultivate turmeric, including Andhra Pradesh, Telangana, Tamil Nadu, Orissa, Karnataka, West Bengal, Gujarat, Meghalaya, Maharashtra, and Assam. Of these, Andhra Pradesh alone accounts for 38.0% of the total area and 58.5% of production. Since ancient times, turmeric has been used in traditional meals, as well as preventive and curative medical treatments. It is a significant cash spice crop grown in India. Turmeric has many medical benefits, including anti-protozoal, anti-viral, and anticarcinogenic activity. It is also high in natural antioxidants. (Tuba *et al.*, 2008) [8]. Turmeric's potent therapeutic qualities are due to the phenolics and terpenes it contains. Although processing turmeric causes significant quality and therapeutic value losses, it is necessary to improve both its usability and storage life. For enhanced quality retention, turmeric has undergone extensive processing.
Its main products are dried rhizomes and turmeric powder, which are used as flavourings and colorings in curry powders, spice premixes, and pastes. The two highly value-added products derived from turmeric are oleoresin and essential oil. Oleoresin, a reddish-orange viscous liquid produced by solvent extraction of turmeric powder, is typically employed as a colouring agent in dairy products like cheese and ice cream. Essential oil from turmeric is obtained by steam distillation of powdered turmeric. Curcumin (diferuloylmethane), the main yellow bioactive component of turmeric has been shown to have a wide spectrum of biological actions. Intake of turmeric products improve immunity levels for human beings. However, the people do not prefer turmeric products as it tastes bitter on addition of turmeric powder. Therefore, there is an urgent need to develop a turmeric-based products.

In view of this, a study on standardization of base material for preparation of turmeric lozenges was initiated. Turmeric lozenges using turmeric powder, sugar/jaggery, lemon juice and pepper at various proportions were designed, prepared and subjected to organoleptic evaluation under this study

## Material and Methods

The present investigation entitled "Standardization of base material for preparation of turmeric and jaggery based lozenges" was carried out at Post Harvest Laboratory, College of Horticulture, Dr. Y.S.R Horticultural University, Venkataramannagudem.

**Procurement of raw material:** Raw material such as turmeric powder was procured from the Horticulture Research Station, LAM, (Guntur), Different ingredients like Jaggery, black pepper and lemon juice used for conducting study were procured from local market.

**Standardization of formulation for the preparation of turmeric and jaggery based lozenges:** For standardization of formula, various combination presented in Table 1 were tried and acceptable product were selected for further utilization. Jaggery were added with turmeric, pepper, water and lemon juice and prepare hard crack consistency. All other ingredients were kept constant throughout treatments.

**Table 1:** Standardization of formula for preparation of turmeric and jaggery based lozenges

| Treatments | Jaggery (°Brix) | Turmeric (g) | Pepper (g) | Lemon Juice (ml) |
|---|---|---|---|---|
| T1 | 100 | 3 | 2 | 5 |
| T2 | 80 | 3 | 2 | 5 |
| T3 | 50 | 3 | 2 | 5 |
| T4 | 40 | 3 | 2 | 5 |
| T5 | 70 | 3 | 2 | 5 |

**Preparation of turmeric and jaggery based lozenges**

Different concentrations of jaggery were used to make lozenges in order to add value and enhance quality. The overall process for making lozenges comprised heating the water and jaggery, cooking the base of the lozenges until the jaggery melted and then checking the °brix of melted jaggery, the soluble solid content was 70º Brix, as determined by a digital hand refractometer. The lemon juice, turmeric powder and pepper powder were added, boiled and constantly stirred and brought the mixture to 160 °C for 15-20 minutes. It took roughly 10-15 minutes to achieve thick consistency. The end point was assessed by drop test method. Removed from heat as soon as it reached a thick consistency and poured into silicone or butter paper moulds. Then dusted with powdered sugar to prevent from sticking together and allowed to set for 15-20 min. The formulation consisted of 3% turmeric powder, 2% black pepper and 5 ml lemon juice.

**Organoleptic evaluation of lozenges:** Organoleptic evaluation of lozenges for color, flavor, taste, texture, mouth feel and overall acceptability was carried out. For this, 10 trained panellist were involved and evaluated using 1 to 9 point hedonic scale for rating the quality of turmeric based lozenges.

## Results and Discussion

The sensory evaluation was carried out on turmeric and jaggery based lozenges with respect to colour, flavour, taste, texture, mouth feel and overall acceptability and the same are depicted in Table 2.

**Table 2:** Organoleptic evaluation of turmeric and jaggery based lozenges with various concentration of Jaggery

| Treatments | Color | Flavour | Taste | Texture | Mouth feel | Overall acceptability |
|---|---|---|---|---|---|---|
| $T_1$ | 8.5 | 8.4 | 8.6 | 8.5 | 8.2 | 8.44 |
| $T_2$ | 8.9 | 8.6 | 8.4 | 8.7 | 8.8 | 8.68 |
| $T_3$ | 8.6 | 8.4 | 8.2 | 8.5 | 8.3 | 8.40 |
| $T_4$ | 8.9 | 8.7 | 8.8 | 8.7 | 8.4 | 8.70 |
| $T_5$ | 9.4 | 9.2 | 9.3 | 9.1 | 9.5 | 9.30 |
| SE(m) | | | | | | 0.076 |
| C.D. @ 5% | | | | | | 0.226 |

The data presented in above Table 2 showed that turmeric and jaggery based lozenges T5 (70° Brix jaggery + 3% turmeric + 2% pepper + 5 ml lemon juice) received highest sensory score (9.3) in case of all sensory attributes compared to the test of other samples and lowest in T3 (50° Brix jaggery + 3% turmeric + 2% pepper + 5 ml lemon juice) with a score of 8.40. Further, the highest sensory scores for colour (9.4), flavour (9.2), taste (9.3), texture (9.1), and mouth feel (9.5) were also recorded in T5 (Fig. 1)

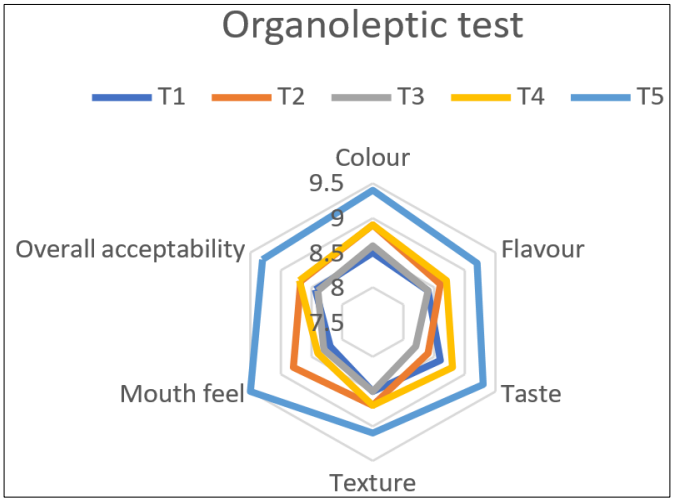


**Fig 1:** Graphical representation of sensory evaluation

Lozenges represent a new era in the successful development of a controlled release formulation with a number of attributes to offer an effective method of medication administration. To prevent chemical incompatibilities between API by physical separation and to enable the development of various drug release profiles, turmeric-based lozenges can be a major alternative as reported by Sreya and Suja (2020) [6] in curcumin bi-layered tablet. Similarly, the sucrose-free compressed lozenges containing 300 mg of curcumin (turmeric) was created and made employing mannitol as the basis and several excipients. The improved formulation was recommended as an alternative to commercial ginger throat lozenges for use in typical cold and cough symptoms with diabetics (Achhra *et al.* 2015) [1]

Similar results were reported by Nimse and More (2018) [4] in Aonla ginger high boiled sweets, Suman *et al.* (2021) [7] in standardization of formulation for the preparation of ginger supplemented jelly candies and Rahman *et al.* (2019) [5] in low-cost home-made turmeric (hydro) gel.

## Conclusion

Results revealed that the preparation of turmeric and jaggery based formulations was observed effective in treatment combination T5 (70% Jaggery + 3% Turmeric + 2% pepper + 5 ml lemon juice). Thus, optimized formulation of turmeric lozenges with jaggery presented as an alternative for good taste and mouth feel to boost immunity.

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