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## Studies on standardization of Nannari (*Decalepis Hamiltonii* Wight & Arn.) ready to serve drink of Nannari syrup with different flavours

**Surnida Akash, M Padma, K Venkata Laxmi and P Gouthami**

### Abstract

The experiment was conducted with 100 g Nannari root powder per liter of water + cane sugar in refrigerated and RTS of Nannari beverage was prepared in Completely Randomize Design (CRD) with 9 treatments T<sub>1</sub>- Nannari syrup+ lime, T<sub>2</sub>-Nannari syrup +basil seed, T<sub>3</sub>-Nannari syrup +Mint, T<sub>4</sub> Nannari syrup + lime +basil, T<sub>5</sub>- Nannari syrup +lime +soda (carbonated water), T<sub>6</sub>-Nannari syrup +basil seed + soda (carbonated water), T<sub>7</sub>-Nannari syrup +lime+ basil seed + soda (carbonated water), T<sub>8</sub>-Nannari syrup + mint + soda (carbonated water) and T<sub>9</sub>-Nannari syrup + cold water. From the results of experiment highest TSS (22.60 °Brix), pH (2.79), ascorbic acid (14.40 mg/100g), reducing (12.02 %), non-reducing (14.84 %) and total sugars (26.78 %) were reported in T<sub>4</sub> (Nannari syrup + lime +basil seed). Highest titrable acidity (0.5%) recorded in T<sub>8</sub> (Nannari syrup +mint + soda (carbonated water)). Highest sensory scores for colour (8.60), flavour (8.32), texture (8.09), taste (8.00) and overall acceptability (8.20) were reported in treatment T<sub>4</sub> (Nannari syrup + lime +basil seed). The overall results indicated that, among different treatments, T<sub>4</sub> (Nannari syrup + lime +basil flavour) was found to be more acceptable as compared to other treatments.

**Keywords:** Nannari root, RTS and Nannari syrup

### Introduction

Nannari (*Decalepis hamiltonii* Wight & Arn.) is a monotypic, glabrous, woody climbing shrub belonging to the family Asclepiadaceae. It is popularly called as Maredu Kommulu, Nannari Kommulu, Madina Kommulu, Barre Sugandhi and Maredu Gaddalu in local Telugu language, as swallow root in English. It is an endemic and endangered medicinal plant and prefers to grow along rocky slopes, big rock boulders and rocky crevices and small mounds where there is thick vegetation in moist deciduous forests of Karnataka (Hassan, Mysore, Bellary, Tumkur & Kolar), Andhra Pradesh, Chittoor, Nellore, Anantapur & Cuddapah districts) and in Tamil Nadu (Chengalpattu, Coimbatore, Dharampuri & Nilgiri) at an altitude from 300-1200 meters. Milky latex is present in the entire plant. Each root is 5-10 cm in diameter and 4-10 roots arise from the rootstock. A 2-3 years old plant produces 15-20kg of roots and one year old plant produces 1-2 kg of roots. Roots are harvested during summer months mostly by the yanadi tribes of Chittoor district and it is the main source of income to them until the agricultural works resume.

Morphologically as well as chemically the plant resembles African Liane called *Mondia whitei* (Hook F.) Skeels. Both have similar ethanobotanical uses and presence of 2-hydroxy-4-methoxybenzaldehyde an isomer of vanillin is reported from the plants (Thornell *et al.*, 2000)<sup>[3]</sup>. The roots are little bitter and it is characteristic with a familiar lingering after taste and smell of vanillin, the substance that is in *Vanilla plantifolia* Andran orchid used in ice creams, chocolates, drinks, etc. The drink prepared from roots is locally called nannari or sugandhapala or sarsaparilla. If available, along with these roots *Hemidesmus indicus* (L.) R.Br. (Indian Sarsaparilla) roots are also mixed to get cooling effect. The drink is medicinal, which cools the system, gives good appetite and act as blood purifier.

This is poor man's drink of the states of Andhra Pradesh and Telangana. Chutney and pickle using lemon juice are prepared from the roots by the rural people and it taste like ginger pickle and consumed by the Yanadis along with food for indigestion, constipation and gas troubles. The yanadis are generally robust and never complain about gastric and intestinal disorders. The use of the root may be one of the factors for the absence of such disorders.

The roots are being used in Ayurveda, the ancient Indian system of medicine to stimulate appetite, relieve flatulence and as a general tonic. The roots are used as a substitute for Indian sarsaparilla (*Hemidesm us indicus*) in ayurvedic preparations because of the similar aromatic properties. It is also used as demulcent, diaphoretic, diuretic, and anticonvulsant, antidiabetic, antiatherosclerosis and in the treatment of epilepsy and central nervous system disorders.

It is useful in the treatment for loss of appetite, fever, skin disease, diarrhea, bronchial asthma, intrinsic hemorrhage, kushtha, poisoning, pediatric rejuvenative rasayana and in nutrition disorders. Even though it has great pharmaceutical and economic importance, the plant has restricted distribution, that is, endemic to southern states of India. The tribal people collect the roots regularly to sell in the market (Chandrasekhara and Ram Murthy, 2013) [2]. It was observed that there is a huge demand for the roots of Nannari because of its several medicinal properties. Many tribal families have chosen the root collection activity as a livelihood throughout the year. There is a great demand for the Nannari drink, especially during summer months due to its cooling effect.

## Material and Methods

The present investigation entitled "Standardization of Nannari (*Decalepis hamiltonii* Wight & Arn.) Ready to serve drink of Nannari syrup with different flavour." Was carried out at PG Laboratory, College of Horticulture, Rajendranagar, Hyderabad during January 2020 to April 2020. Nannari roots were obtained from farmer of Kurnool, Andhra Pradesh, to carry out the research work Nannari roots of fully matured, high quality, fully sun dried and healthy roots were used for making the syrup. The experiment was conducted with 100 g Nannari root powder per liter of water + cane sugar in refrigerated and RTS of nannari beverage was prepared in Completely Randomize Design (CRD) with 9 treatments T<sub>1</sub>-Nannari syrup+ lime, T<sub>2</sub>- Nannari syrup +basil seed, T<sub>3</sub>-Nannari syrup +Mint, T<sub>4</sub> Nannari syrup + lime +basil, T<sub>5</sub>-Nannari syrup +lime +soda (carbonated water), T<sub>6</sub>-Nannari syrup +basil seed + soda (carbonated water), T<sub>7</sub>-Nannari syrup +lime+ basil seed + soda (carbonated water), T<sub>8</sub>-Nannari syrup + mint + soda (carbonated water) and T<sub>9</sub>-Nannari syrup + cold water. The Nannari syrup is analysed to find out their physico-chemical analysis i.e., The total soluble solids, titrable acidity, pH, ascorbic acid; nutrient composition of reducing sugars, non-reducing sugars and total sugars and organoleptic evaluation for assessing the samples were conducted by a panel of Ten judges and the samples were rated on a 9-point Hedonic Rating Scale (Amerine *et al.*, 1965) [1] were determined and recorded. Under each treatment. Data were recorded immediately after preparation and at every 15 days interval during storage.

## Results and discussion

### I) Physico-Chemical Parameters

#### Total soluble solids (°Brix)

Among the 9 treatments tested, significantly highest TSS (22.60°Brix) was reported in T<sub>4</sub> (Nannari syrup + lime +Basil seed) which was on par with T<sub>9</sub> (Nannari syrup + lime + cold water) (21.53 °Brix), followed by T<sub>3</sub> (Nannari syrup +Mint) and T<sub>1</sub> (Nannari syrup+ lime) which recorded 21.00, 20.80 °Brix, respectively. The lowest TSS (19.57°Brix) was reported in Nannari syrup +Basil seed + Soda (carbonated water) (T<sub>6</sub>) (Table 1).

#### pH

Among the 9 treatments tested, significantly highest pH (2.79) was reported in T<sub>4</sub> (Nannari syrup + lime +Basil seed) which was on par with T<sub>9</sub> (Nannari syrup + cold water) (2.62), T<sub>3</sub> (Nannari syrup +Mint) (2.60) and followed by T<sub>1</sub> (Nannari syrup+ lime), T<sub>2</sub> (Nannari syrup +Basil seed) which recorded 2.53, 2.52 respectively. The lowest pH (2.42) was reported in Nannari syrup +Lime+ Basil seed + Soda (carbonated water) (T<sub>7</sub>).

#### Titration acidity (%)

Among the 9 treatments tested, significantly highest titration acidity (0.50%) was reported in T<sub>6</sub> (Nannari syrup +Basil seed + soda) which was on par with T<sub>3</sub> (Nannari syrup+ mint) (0.47%), T<sub>8</sub> (Nannari syrup +Mint + soda) (0.47%) and followed by T<sub>5</sub> (Nannari syrup+ lime +soda) and T<sub>9</sub> (Nannari syrup +cold water) which recorded 0.40%. The lowest titration acidity (0.33) was reported in Nannari syrup + Lime+ Basil seed (T<sub>4</sub>) (Table 1).

#### Ascorbic Acid (mg/100g)

Among the 9 treatments tested, significantly highest ascorbic acid (14.40 mg/100g) was reported in T<sub>4</sub> (Nannari syrup + lime +Basil seed) which was on par with T<sub>5</sub> (Nannari syrup +lime +soda) (14.30 mg/100g) (Table 1), followed by T<sub>7</sub> (Nannari syrup +Lime+ Basil seed + Soda (carbonated water)) and T<sub>1</sub> (Nannari syrup+ lime) which recorded 14.17, 13.00 mg/100g respectively. The lowest ascorbic acid (9.00 mg/100g) was reported in Nannari syrup +mint (T<sub>3</sub>).

## II) Proximate Nutrient Composition

### Reducing sugars (%)

Among the 9 treatments tested, significantly highest reducing sugars (12.02%) was reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (11.69%), followed by T<sub>1</sub> (Nannari syrup+ lime), T<sub>3</sub> (Nannari syrup +mint) and T<sub>8</sub> (Nannari syrup + Mint + soda (carbonated water)) which recorded 11.51, 11.42, 11.44% respectively (Table 2). The lowest reducing sugars (11.02%) was reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>).

### Non-reducing sugars (%)

Among the 9 treatments tested, significantly highest non-reducing sugars (14.84%) was reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (14.62%), followed by T<sub>1</sub> (Nannari syrup+ lime), and T<sub>8</sub> (Nannari syrup + mint + soda (carbonated water)) which recorded 14.48, 14.33% respectively (Table 2). The lowest non- reducing sugars (13.32%) was reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>).

### Total sugars (%)

Among the 9 treatments tested, significantly highest total sugars (26.78%) were reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (26.44%), followed by T<sub>1</sub> (Nannari syrup+ lime), and T<sub>8</sub> (Nannari syrup + mint + soda (carbonated water)) which recorded 26.30, 25.74% respectively. The lowest total sugars (24.33%) were reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>) (Table 2).

### III) Organoleptic Evaluation

#### Colour

Among the 9 treatments tested, significantly highest colour score (8.60) was reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (8.40), followed by T<sub>1</sub> (Nannari syrup+ lime), and T<sub>8</sub> (Nannari syrup + mint + soda (carbonated water)) which recorded 8.21, 8.09 respectively (Table 3). The lowest colour (7.42) was reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>).

#### Flavour

Among the 9 treatments tested, significantly highest organoleptic score for flavour (8.32) was reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (8.19), followed by T<sub>1</sub> (Nannari syrup+ lime), and T<sub>8</sub> (Nannari syrup + mint + soda (carbonated water)) which recorded 7.91, 7.70 respectively. The lowest flavour (6.93) was reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>) (Table 3).

#### Texture

Among the 9 treatments tested, significantly highest organoleptic score for texture (8.09) was reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (8.03), followed by T<sub>1</sub> (Nannari syrup+ lime), and T<sub>8</sub> (Nannari syrup + mint + soda (carbonated water)) which recorded 7.92, 7.76 respectively.

The lowest organoleptic score for texture (7.10) was reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>) (Table 3).

#### Taste

Among the 9 treatments tested, significantly highest organoleptic score for taste (8.00) was reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (7.93), followed by T<sub>1</sub> (Nannari syrup+ lime), and T<sub>8</sub> (Nannari syrup + Mint + soda (carbonated water)) which recorded 7.72, 7.51 respectively. The lowest organoleptic score for taste (6.77) was reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>) (Table 3).

### IV) Overall acceptability

Among the 9 treatments tested, significantly highest organoleptic score for overall acceptability (8.20) was reported in T<sub>4</sub> (Nannari syrup + lime +basil seed) which was on par with T<sub>2</sub> (Nannari syrup +basil seed) (8.03), followed by T<sub>1</sub> (Nannari syrup+ lime) and T<sub>8</sub> (Nannari syrup + mint + soda (carbonated water)) which recorded 7.92, 7.73 respectively. The lowest organoleptic score for overall acceptability (7.03) was reported in Nannari syrup +basil seed + soda (carbonated water) (T<sub>6</sub>).

Nannari syrup, lime and basil seed combination was found to be superior among all the treatments based on organoleptic scores.

**Table 1:** Standardization of Nannari ready to serve drink of Nannari syrup with different flavours on TSS (°Brix), pH, Titrable acidity (%) and Ascorbic acid (mg/100g)

Treatments	TSS (°Brix)	pH	Titration Acidity (%)	Ascorbic Acid (mg/100g)
T <sub>1</sub> - Nannari syrup+ lime	20.80	2.53	0.30	13.00
T <sub>2</sub> - Nannari syrup +Basil seed	20.23	2.52	0.27	9.67
T <sub>3</sub> - Nannari syrup +Mint	21.00	2.60	0.47	9.00
T <sub>4</sub> - Nannari syrup + lime +Basil	22.60	2.79	0.33	14.40
T <sub>5</sub> - Nannari syrup +lime +Soda (carbonated water)	19.93	2.63	0.40	14.30
T <sub>6</sub> - Nannari syrup +Basil seed + Soda (carbonated water)	19.57	2.61	0.47	10.67
T <sub>7</sub> - Nannari syrup +Lime+ Basil seed + Soda (carbonated water)	20.07	2.42	0.47	14.17
T <sub>8</sub> - Nannari syrup + Mint + soda (carbonated water)	20.20	2.52	0.50	11.67
T <sub>9</sub> - Nannari syrup + cold water	21.53	2.62	0.40	9.67
S.E.M±	0.32	0.03	0.05	0.47
CD at 5%	0.83	0.08	0.13	0.12

**Table 2:** Standardization of Nannari Ready to Serve Drink of Nannari Syrup with different Flavours on Reducing sugars (g), Non- reducing sugars (g) and Total sugars (g)

Treatments	Reducing Sugars (g)	Non- reducing Sugars (g)	Total Sugars(g)
T <sub>1</sub> - Nannari syrup+ lime	11.51	14.48	26.30
T <sub>2</sub> - Nannari syrup +Basil seed	11.69	14.62	26.44
T <sub>3</sub> - Nannari syrup +Mint	11.42	13.91	25.42
T <sub>4</sub> - Nannari syrup + lime +Basil	12.02	14.84	26.78
T <sub>5</sub> - Nannari syrup +lime +Soda (carbonated water)	11.10	13.40	24.47
T <sub>6</sub> - Nannari syrup +Basil seed + Soda (carbonated water)	11.02	13.32	24.33
T <sub>7</sub> - Nannari syrup +Lime+ Basil seed + Soda (carbonated water)	11.19	13.70	24.90
T <sub>8</sub> - Nannari syrup + Mint + soda (carbonated water)	11.44	14.33	25.74
T <sub>9</sub> - Nannari syrup + cold water	11.30	13.57	24.99
S.E.M±	0.07	0.06	0.05
CD at 5%	0.17	0.15	0.10

**Table 3:** Standardization of Nannari ready to serve drink of Nannari syrup with different flavours on organoleptic evaluation (Score)

Treatments	Colour	Flavour	Texture	Taste	Overall acceptability
T <sub>1</sub> - Nannari syrup+ lime	8.21	7.91	7.92	7.72	7.92
T <sub>2</sub> - Nannari syrup +Basil seed	8.40	8.19	8.03	7.93	8.03
T <sub>3</sub> - Nannari syrup +Mint	7.89	7.51	7.70	7.39	7.61
T <sub>4</sub> - Nannari syrup + lime +Basil	8.60	8.32	8.09	8.00	8.20
T <sub>5</sub> - Nannari syrup +lime +Soda (carbonated water)	7.49	6.99	7.18	7.01	7.09
T <sub>6</sub> - Nannari syrup +Basil seed + Soda (carbonated water)	7.42	6.93	7.10	6.77	7.03
T <sub>7</sub> - Nannari syrup +Lime+ Basil seed + Soda (carbonated water)	7.73	7.18	7.41	7.14	7.21
T <sub>8</sub> - Nannari syrup + Mint + soda (carbonated water)	8.09	7.70	7.76	7.51	7.73
T <sub>9</sub> - Nannari syrup + cold water	7.80	7.31	7.61	7.17	7.42
S.E.M±	0.05	0.06	0.07	0.05	0.06
CD at 5%	0.14	0.18	0.18	0.13	0.14

### Conclusion

From the investigation conducted RTS beverage prepared from Nannari Syrup treatment T<sub>4</sub> (Nannari syrup +lime +Basil seed) showed the highest TSS, pH, acidity, ascorbic acid, sugars, colour, flavour, texture, taste and overall acceptability. Health experts do not favour consumption of soft drinks because of many side effects causing tooth decay, weakening of bones, and a combination of the symptoms such as high blood pressure, obesity, high cholesterol and insulin resistance. Thus, it can be concluded that RTS prepared from Nannari syrup with good medicinal value and organoleptic scores in “Like very much “range can serve as healthy alternative drink for soft drinks.

### Future Scope

Storage studies of Nannari Syrup can be conducted for one year. Syrup with combination of Nannari and other fruits can be worked out to impart medicinal benefits of Nannari. Comparative studies of Nannari syrup with commercial products shall be carried out for popularization of Nannari syrup.

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