

RESEARCH ARTICLE

Dietary Soups to Avert and Recuperate from Dengue Fever

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ABSTRACT:

Dengue is viral infected fever, untreated can even lead to lose patient's life so requires treatment with heavy dosage medicines. The therapeutic food consumed plays a vital role to fight and recover from the infection. The purpose of the study was to develop healing dietary soups with nutritive ingredients to fight effectively and recover from the infection. The recipes of all time consumable soups with functional food ingredients are formulated and developed. Nutritive value and organoleptic quality preferences among the panel members were screened. 50 panellist members constituting students and staffs were randomly selected for the study with no specific criteria than their own interest in food tasting and evaluating. Screening for organoleptic qualities exhibits the soups are more preferable by the panel members. The formulated recipes of soups were highly nutritive in nature with an effective composition of micro nutrients to protect and recover from dengue.

KEYWORDS: Dengue fever; Therapeutic; soup; recipes and Recuperate.

INTRODUCTION:

Dengue is an excruciating mosquito borne disease being spread by the Aedes mosquitoes infected with dengue virus. Every year, for the most part in tropical regions of the world about 390 millions of people were infected by this disease.¹ Dengue causes a high fever resulting with skin rashes, severe headache, muscles and joint pains, hair fall and vitamin deficiencies.^{2,3}

Dengue fever highly destructs the health as it directly infects the blood stream. A high dosage of medicine is required to convalesce from the disease as it creates many direct and indirect effects to human body. Universally doctors and experts claims that a healthy food either from plant or animal source acts as a natural remedy⁴ to protect and recover from these infection with no side effects.⁵

Improvising of blood platelets will help to overcome the adverse effect of dengue fever. The treatment for improving blood platelet count is highly priced and need the patients to be hospitalized. Providentially consumption of many food ingredients being easily available and comparatively low cost⁶, with high protein⁷, fibre rich grains, leafy vegetables consisting of micro nutrients like vitamins and minerals like zinc, chromium, and iron helps to improve the blood platelets.⁸

Diet for the dengue affected patients must be simple digestible fluids⁹ juices and soups.¹⁰ Soups always take the prime position in diet for the patients as it is easy to consume with no regard to ages and nutritious causing no metabolic disturbances.

As the soups serve as a well-known complimentary diet for dengue patients this study, was aimed at developing dietary soups with ingredients possessing nutritive values to protect and recover from dengue fever.

MATERIALS AND METHODS:

The studies entail an exploration for ingredients, preparation of herbal vegetable stock and formulation of four healthy recipes of soup that prominently acts as a natural remedy for dengue fever.

Exploration of Ingredients:

The micro nutrients required for the body to fight and recover against dengue fever are evaluated and following this as criteria all ingredients like vegetables, spices, garnishes for both stock and soups are selected.

All ingredients are bought from the organic stores and markets at Pallavaram Chennai. Medicinal herbs like tulsi, mint leaves, papaya leaves, are collected fresh from organic house gardens.

Mise-en-place:

The mise-en-place is done upon the requirement as greens are blanched, vegetables are chopped for soups diced for stock, and raw papaya was peeled, washed thoroughly, diced and cooked separately, minced in a blender with coconut milk and used as the thickening agent for the soups.

Preparation of Stock:

A stock is flavoured liquid¹¹ being named after the main ingredient used in preparation; the stock prepared for the study here constitutes herbal leaves, medicinal spices and fresh vegetables. The ingredients used for the stock are medicinally valued as Papaya leaves fights against the dengue virus,¹² pepper corn and basil leaves helps to reduce fever¹³ besides, the vegetables carrot, raw papaya, turnip, are rich in micro nutrients that helps to recover from dengue fever.¹⁴

Method:

In a stock pot sauté the spices in butter add the diced vegetables for few minutes add water and bring it to boil. Simmer the stock for thirty minutes remove the stock from heat and finally add the herbal leaves basil leaves and papaya leaves being the major constituent in promoting blood platelets,¹⁵ close the stock with lid. The temperate of stock is enough to cook these leaves as over cooking reduce the micro nutrients present in them.

Table 1 Ingredients Used to Prepare Stock Water

S. No	Ingredient	Quantity	Micro-Nutrients Present
1.	Onion	15g	Potassium, Vitamin C and Calcium
2.	Carrot	25g	Vitamin A, Vitamin C, Folate, Vitamin K and Calcium
3.	Celery Stalk	15g	Vitamin K, Potassium, Calcium
4.	Leeks	10g	Omega-3 Fatty acid, Calcium, Vitamin K and Folate
5.	Bay Leaves	5g	Omega 3 and Omega 6 Fatty acids
6.	Pepper	20g	Potassium, Calcium, Vitamin

			K and Vitamin C
7.	Cloves	5g	Vitamin C, Calcium, sodium, Zinc
8.	Parsley	15g	Vitamin K, Iron, Zinc
9.	Papaya Leaves	10g	Vitamin C, Vitamin E and Omega-3 fatty acid
10.	Tulsi Leaves	5g	Vitamin A, Vitamin K, Omega-3 fatty acid
11.	Raw Papaya	15g	Vitamin E, Vitamin C
12.	Turnip	20g	Omega-3 fatty acid, Vitamin C and potassium

Preparation of Thickening Agent:

The thickening agent enriches the soups, makes it tastier and good mouth-feel.¹⁶ Here the thickening agent is prepared with papaya a good constituent of omega 3 fatty acid (Self Nutrition Data) that helps to improve blood platelets¹⁷ and plays a tradition role in curing dengue fever.¹⁸

Method:

Peel and dice fully matured raw papaya wash it thoroughly as the gum in it may spoil the taste. Boil the papaya and mince it in a blender, add coconut milk to improve the nutritious value and taste.

Table 2. Ingredients Used to Prepare Thickening Agent:

S. No	Ingredients	Quantity
1	Boiled Raw Papaya	60 g
2	Coconut Milk	20 ml
3	Water	As required

Preparation and Coding of Soups:

Four different soups are formulated with the stock water, thickening agents (if required) and other healthy and herbal ingredients. Soups are coded as Soup Code 1, Soup Code 2, Soup Code 3, and Soup Code 4. Table 2 illustrate a brief picture about the ingredients used for the preparation.

Table 3. Soups Name with code

S. No	Code	Name of Soup
1	Soup Code 1	Chicken Manathakkali soup
2	Soup Code 2	Nandu Kollu soup
3	Soup Code 3	Milagu Murungai Keerai soup
4	Soup Code 4	Nellikai Kara Rasam

Sensory Evaluation and Nutritive Analysis of Soups:

The soups are prepared, coded and served to the panellist member without revealing their name and ingredients used the sensory evaluation is done.¹⁹ As the best time to serve soup is before meal²⁰ hereby the soups are served before lunch and the hedonic score card is distributed to the panellist member and requested to mark their ratings. The scaling point ranges as 1 – for Dislike very much to 5- like very much

Table 4. Ingredients Used in Soup Preparation

Ingredient	Soup Code 1	Soup Code 2	Soup Code 3	SOUP CODE 4
Chicken	100g	—	—	—
Back Night Shade	50g	—	—	—
Stock Water	800ml	800ml	800ml	800ml
Salt	10g	10g	10g	10g
Pepper	15g	15g	15g	15g
Carrot	10g	—	—	—
Crab	—	100g	—	—
Horse Gram	—	30g	—	—
Shallots	—	15g	60g	—
Oil	—	10ml	10ml	20ml
Ginger	—	5g	10g	5g
Garlic	—	5g	10g	5g
Drumstick Leaves	—	—	150g	—
Jeera	—	—	10g	10g
Amla	—	—	—	50g
Corriander	—	—	—	10g
Urad Dall	—	—	—	10g
Green Chilli	—	—	—	10g
Turmeric Powder	—	—	—	5g
Mustard Seeds	—	—	—	10g
Dried Red Chillies	—	—	—	10g
Curry Leaves	—	—	—	15g

Table 5 Sample Hedonic Score Card Rating

Sample - Hedonic Score Card Rating						
	Date:	Panelist name:				
	Soup code:	Panelist no:				
Please taste the given coded soups and mark (✓) how much you like or dislike it on the point in the scale which best describes your opinion.						
S. No	Hedonic Score	Organoleptic Qualities				
		Appearance	Aroma	Consistency	Taste	Acceptance
1	Dislike Very Much					
2	Dislike					
3	Neither Like Nor Dislike					
4	Like					
5	Like Very Much					

Table 6 Questionnaire - Attributes of the formulated soup

APPEARANCE		AROMA		CONSISTENCY		TASTE	
A) Clear	<input type="checkbox"/>	A) Exotic	<input type="checkbox"/>	A) Perfect	<input type="checkbox"/>	A) Appropriate	<input type="checkbox"/>
B) Cloudy	<input type="checkbox"/>	B) Inadequate	<input type="checkbox"/>	B) Thin	<input type="checkbox"/>	B) Well Seasoned	<input type="checkbox"/>
C) Oily	<input type="checkbox"/>	C) Average	<input type="checkbox"/>	C) Creamy	<input type="checkbox"/>	C) Authentic Taste	<input type="checkbox"/>
D) Colourful	<input type="checkbox"/>	D) No Aroma	<input type="checkbox"/>	D) thick	<input type="checkbox"/>	D) Inappropriate	<input type="checkbox"/>

Questionnaire:

Beside, few questions with regard to soup consuming habit of panellist members, a questionnaire Table 6 is framed and distributed with the hedonic scale was distributed to the panellist to bring out the attributes or qualities of the soups served.

Nutritive Values of Soup:

The nutritive values of the stock, thickening agents and soups are calculated with the reference of the book “Nutritive value of Indian Foods” published by National Institute of Nutrition and internet sources.

Statistical Analysis:

Data collected with hedonic scale score card from the panellist members are sorted and fed in SPSS (21.0) statistical tool. Data are analysed with t- test, Friedman’s test, star diagram representation²¹ are done, to exhibit their significant difference in the organoleptic qualities among each coded soup.

RESULTS AND DISCUSSION:

The study observes the sights of panellist member’s attitude with regard to soup consumption. Among the panellist 87% were having an habit of consuming soup at home, 71% of panellist are interested to have their home-made soups. Upon the factors that induces their soup consuming habit the nutritive value (81%) and availability (63%) is considered the prime factors.

Nutritive Value of coded soups:

The micro nutrients present in formulated four soup recipes, stock and thickening agent used in preparation are estimated. Table 7 exhibits the actual nutritive composition of the preparations. The table also show the constituents of Vitamin C²², Vitamin K²³, and Vitamin E²⁴ being the main activates to improve blood platelets²³ that protects and recovers from dengue.

Table 7. Nutritive value of Stock, Thickening agent and Coded Soups.

Recipe	Protein (g)	Fat (g)	Calcium (mg)	Phosphorus (mg)	Iron (mg)	Vitamins (mg)		
						C	K	E
Stock	29.21	19.57	210.3	48.24	5.91	14.57	6.95	11.64
Thickeing Agent	61.07	87.61	12.89	7.29	7.44	18.01	33.62	19.41
Soup Code 1	8.76	1.54	173.3	70	21.213	72.9	14.1	6.9
Soup Code 2	18.41	20.05	1701.64	472.3	23.45	44.81	51.08	20.3
Soup Code 3	4.22	14.23	8.05	211.1	4.955	11.01	109.12	7.19
Soup Code 4	8.83	26.87	281.5	283.6	13.46	132.88	144.09	6.34

Manathakkali Chicken Soup (Soup Code 1):

The Soup is highly nutritive with blended black night shade (manathakkali keerai) (*Solanum Nigrum*) as the main ingredient, this helps to fight against the skin rashes due to dengue mosquito bites.²⁵ Black night shade also helps to cure and recover from stomach and mouth ulcer caused due to over dosage of medicines during the treatment.²⁶ The soup is nutritious with a good composition of calcium and Vitamin C that improves the immune system.²⁷

Figure 1 represent the star diagram with organoleptic quality mean average score of Soup Code 1. According to the figure it is exhibited that soup has been more acceptability value from the respondents (4.12).

The panellist opinion about Soup Code 1 is represented

in Figure 2, the bar diagram illustrates that the soup taste with an exotic aroma, clear and authentic in taste.

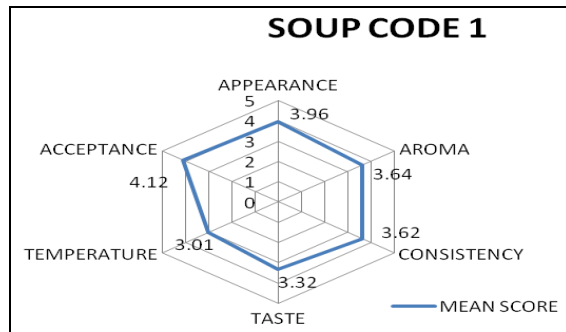


Figure 1: Star diagram of Average mean score value of Soup Code 1

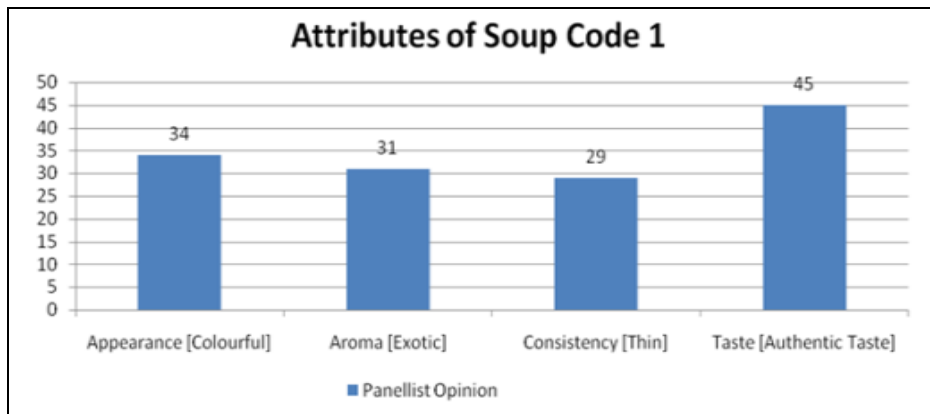


Figure 2: Bar Diagram representing Panellist opinion on Soup Code 1

Nandu Kollu soup (Soup Code 2):

Nandu Kollu soup is made out of minced horse gram and crab meat with the formulated stock. Crab meat in papaya stock acts as the best traditional remedy for dengue fever.²⁸ Horse Gram (Kollu) (*Macrotyloma uniflorum*) in any form of consumption is rich in fibres, antioxidants and vitamins it acts as a best food to fight against dengue viruses.²⁹ The soup code 2 is rich in calcium, vitamin K and phosphorus helps to cure body and joint pains.

According to figure 3 the star diagram represents the soup has the highest acceptance score among than the other soups. Figure 4 shows the panellist opinion about the soup code 2; the soup was cloudy, creamy and well seasoned in taste.

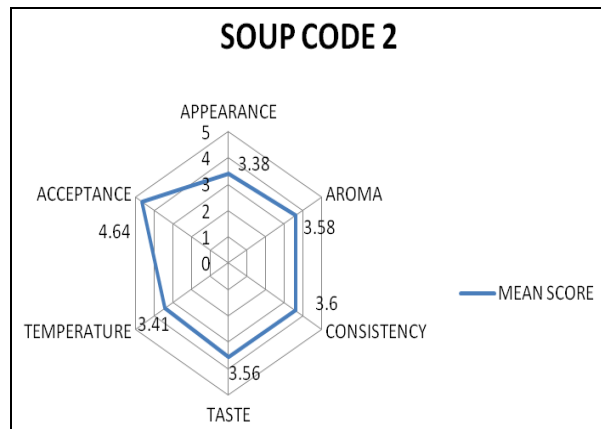


Figure 3: Star diagram of Average mean score value of Soup Code 2

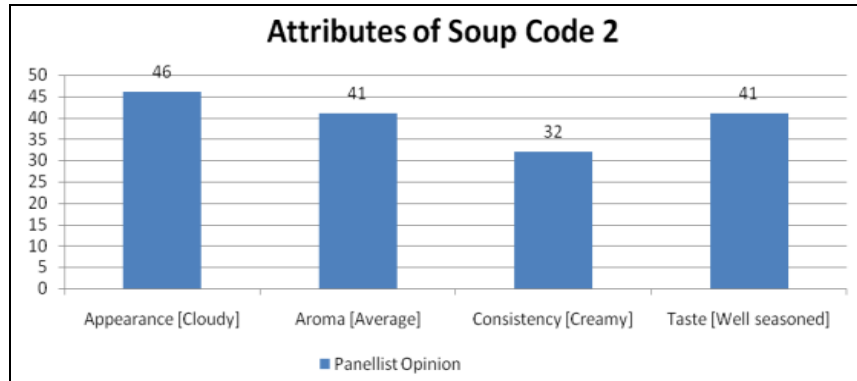


Figure 4: Bar Diagram representing Panellist opinion on Soup Code 2

Milagu Murungai Keerai Soup (Soup Code 3):

Milagu murungai keerai soup is a prepared with blanched Drumstick Leaves (murungai keerai (moringa oleifera) seasoned with black pepper. Murungai Keerai is a good source of vitamin C and iron, it helps out to improve the blood platelets and red blood cell formation.³⁰ Black pepper helps to recover from severe fever symptom of dengue fever.³¹ The nutrition chart shows the soup is rich in Vitamin C and Vitamin K.

From the figure 5 the panellist opinion on the soup was considered to be thin in consistency with appropriate colour. The star diagram illustrates the acceptance mean score (4.44) is high hence the soup is accepted and widely preferred.

The soup is cloudy, creamy, well seasoned and with exotic aroma according to the figure 6, the panellist’s

opinion.

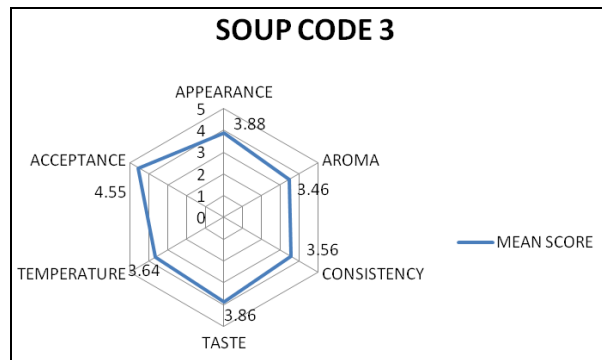


Figure 5: Star diagram of Average mean score value of Soup Code 3

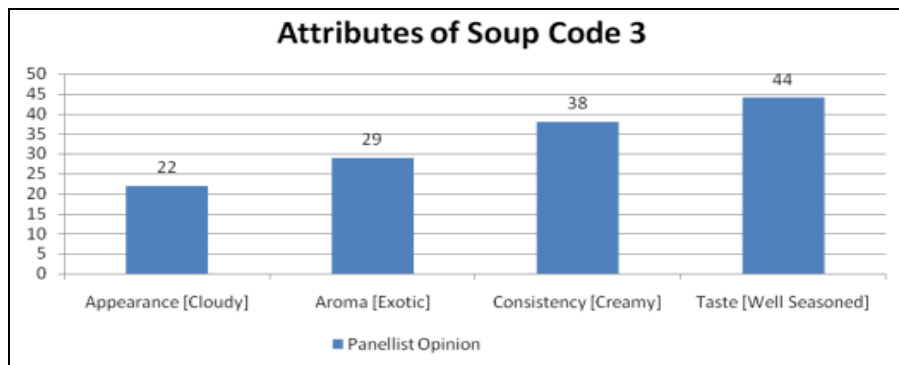


Figure 6: Bar Diagram representing Panellist opinion on Soup Code 3

Nellikai Kara Rasam (Soup Code 4):

The soup is prepared with an authentic method of south Indian rasam with Goose berry (nellikai) (*phyllanthus emblica*) and black pepper. Nellikai is an efficient source of Vitamin and anti-oxidant,³² helps to recover from the effects of dengue fever.³³

The star diagram (Figure 7) and bar diagram reveals that the soup code 4 is well seasoned and tasty, thin in consistency, have an exotic aroma and good acceptance score.

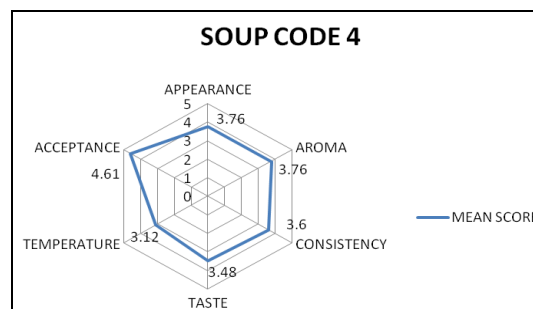


Figure 7: Star diagram of Average mean score value of Soup Code 4

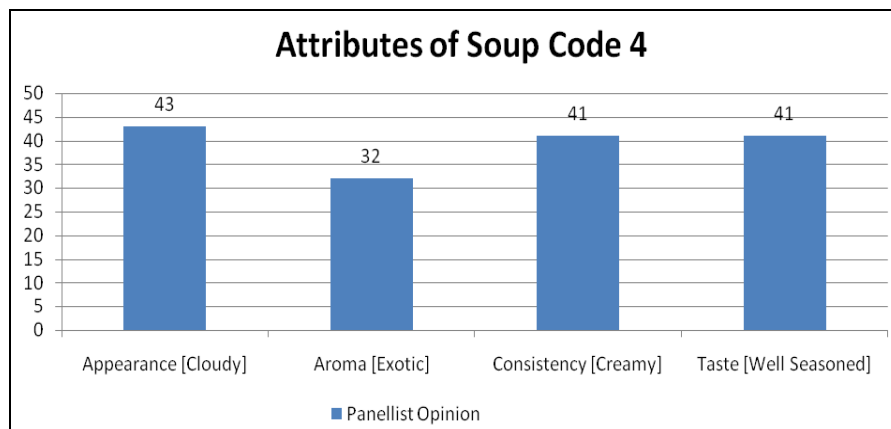


Figure 8. Bar Diagram representing Panellist opinion on Soup Code 4

Friedman’s Test:

To evaluate the acceptance of a product or recipe among the panellist members Friedman test is done to check the products ranking positions, ¹⁹. hereby the Friedman’s test is done to check the degree of acceptance among the panellist Table 8 and Table 9 shows the ranking position of the soups and the statistic test values. Among the soups, Nandu Kollu soup (Soup code 2) takes the first position in acceptance. The chi-square value is also greater (67.46) significant at (p=0.020) p<0.05. The ranking test done using questionnaire also stated the soup coded 2 has taken the first position as 73% of panellist members have preferred it.

Table 8. Ranking Position of the coded soups

Coded Soups	Mean Rank	Ranking Position
Soup Code 1	2.46	4
Soup Code 2	2.12	1
Soup Code 3	2.39	3
Soup Code 4	2.23	2

Table 9. Test Statistics^a

N	50
Chi-Square	67.46
Df	3
Asymp. Sig.	.020

a. Friedman Test

Anova Test:

Anova test is used to check the preference and liking of samples among the panellist member³⁴. The test conducted for the organoleptic qualities among the coded soups have shown that there exist no significant relation among the soups in appearance, taste, consistency and aroma.

Correlation Analysis:

The Pearson correlation test among the organoleptic qualities among the coded soups using SPSS(21.0) also proves that there exist no relative correlation among the soups in their organoleptic qualities.

Table 10. Anova test Values for organoleptic qualities among the coded soups

S. No	Organoleptic Quality	F-Value	P-Value	Significance
1.	Appearance	0.51003	0.05129	(p>0.05) No significant relation
2.	Aroma	0.52165	0.06607	(p>0.05) No significant relation
3.	Taste	0.47056	0.0732	(p>0.05) No significant relation
4.	Consistency	0.44846	0.07186	(p>0.05) No significant relation

CONCLUSION:

Globally it is accepted that the natural and home-made remedies plays a vital role in protecting and recovering from dengue fever. This study brings in awareness on multiple preparations of modified recipes and prepared to palatable acceptance consistency level for this generation. This project brought an eye opener among the chefs to known about the general expectations and preferences of soup by the consumers. The soups formulated with nutritive ingredients to fight against the dengue fever are with exotic aroma, well seasoned, and with an appropriate taste, having a good mean score of acceptability.

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