Nutraceutical Supplements and Sedentary Lifestyle to improve Heart Patients: Development and Characterization of Instant Soup Formulations

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Short title: Development of Instant Soup Formulations for Heart Patients

ABSTRACT

A modern lifestyle of many Indian people today, especially living in big cities, needs fast paced and practical things almost in all aspects, including preparation, processing and presentation of food. It creates a society who loves instant food products such as food that are ready to cook and ready to eat. Instant soups play an important role in the balancing the nutrients required for the people to stay healthy and also it is easy to prepare with least time. The advantages of dehydrated foods, particularly, dry soup mixes could act as a protection from enzymatic and oxidative spoilage and flavor stability at room temperature over a long period of time. Nutraceutical supplementation and their intake could improve blood pressure control and must be considered strategic management aimed at preventing hypertension, when considering its benefits and low costs.

Keywords: Sedentary, Lifestyle, Herbal, Instant soups, Arjuna, Red Yeast Rice, Tomato, Garlic

1. INTRODUCTION

A Nutraceutical is defined as a “food, or parts of a food, that provide medical or health benefits, including the prevention and treatment of disease”. The definition encompasses medicinal products made from natural ingredients. Several classes of Nutraceutical have been proposed to have potential benefits in the treatment of CVD. A modern lifestyle of many Indian people today, especially living in big cities, needs fast paced and practical things almost in all aspects, including preparation, processing and presentation of food. It creates a society who loves instant food products such as food that are ready to cook and ready to eat. One of the potential products that can be developed into an instant food is functional soup. For fulfilling consumer social requirements dried soups play a vital role. A sedentary lifestyle can be defined as “a type of lifestyle with little or no physical activity” Sedentary behavior includes reading, computer use, watching television, office work, and cell phone use. A similar but somewhat different term is screen time. This is the sum of the time spent viewing a television, computer monitor, mobile device, video game playing or other screen. Prospective evidence is accumulating that sedentary behavior can be a risk factor for the morbidity and mortality of cardiovascular disease and diabetes mellitus, and for all-cause mortality [1].

Instant soups play an important role in the balancing the nutrients required for the people to stay healthy and also it is easy to prepare with least time. The advantages of dehydrated foods, particularly, dry soup mixes could act as a protection from enzymatic and oxidative spoilage and flavor stability at room temperature over a long period of time. Also, they do not need any preservatives or refrigerator to preserve them. It has high nutritive value particularly it is rich in Fiber, Vitamins Carbohydrates, Proteins and various phytochemicals. In addition to that, they are ready for reconstitution in a short time. The term "heart disease" is often used interchangeably with the term "cardiovascular disease." Cardiovascular disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke. Other heart conditions, such as those that affect your heart's muscle, valves or rhythm, also are considered forms of heart disease [2].

Various nutraceuticals used in cardiovascular diseases like carnitine, N-acetylcysteine, creatine, glutathione, selenium, resveratrol, beta-sitosterol and flavonoids. Carnitine is an amino acid derivative that is found in all cells of the body, especially in striated muscles. It is synthesized in the liver, kidneys and brain from the amino acids lysine and methionine. Two analogs of carnitine, acetyl-L-carnitine and propionyl-L-carnitine, have been used clinically. It plays an important role in the transport of free fatty acids across the inner mitochondrial membranes for energy production. It is a cofactor in carbohydrate metabolism and has noted to reduce the buildup of toxic metabolites in an ischemic condition. Although its approved indications are primary/secondary carnitine deficiencies, it is widely utilized by patients with a variety of cardiovascular conditions. L-carnitine has reported to have beneficial effect on cardiac function and it has postulated to be cardio protective due to its antioxidant effects. Studies have suggested that it will lower, to a variable extent, plasma triglycerides and elevate high-density lipoprotein cholesterol levels [3].

As the formulation and development of complementary foods from locally and readily available raw materials have received a lot of attentions, the present research work aimed in

preparing instant soup mixtures with Arjuna powder, Red Yeast Rice, Tomato and Garlic other ingredients which needs to be incorporated to get the best soup mix of desired health benefits and without compromising on taste, odorants and their sensorial properties.

2. MATERIALS AND METHODS

2.1. Materials

All the materials such as Arjuna bark powder, Tomato powder, Red Yeast Rice powder, Garlic powder and flavors were obtained from local market at Nagpur, India. All reagents, consumables, and chemicals for evaluation were purchased from Sigma-Aldrich (Germany) and HiMedia (India) through a local vendor at Nagpur. Double distilled water apparatus (Borosil®, India) was used for the experiment.

2.2. Instrumentations

All weighing were performed using Shimadzu® electronic balance (Model AUW220D, Kyoto, Japan). Sonication was performed using Transonic Digital S (Sonicator), USA. The FT-IR spectra were recorded on KBr discs on the IRAffinity-1 instrument.

2.3. Phytochemical Screening

Phytochemical screening was executed for the presence of sugars, alkaloids, glycosides, tannins, flavonoids, steroids, proteins, and terpenes as per the standard test procedures [4].

2.3.1. Alkaloids

Hager's test: Saturated solution of picric acid was added to extract (10 mg/mL), the formation of yellow precipitate indicates the presence of alkaloids.

2.3.2. Flavonoids

Shinoda's test: Few magnesium turnings and concentrated HCl was added dropwise to extract (10 mg/mL), appearance of a pink scarlet or crimson red color after few minutes confirmed the presence of flavonoids.

2.3.3. Carbohydrate

Fehling's test: 2 mL of extract was mixed with equal volumes of Fehling A and Fehling B in different tubes and boiled for few minutes. Both the contents were mixed as they attain nearly the boiling point. The appearance of brownish-red precipitate formation indicated the presence of carbohydrates.

2.3.4. Cardiac glycoside

Legal's test: To extract (10 mg/mL), pyridine and alkaline sodium nitroprusside solution were added. An appearance of blood red color signified the presence of cardiac glycoside, but no blood red color appeared reflecting complete absence of cardiac glycoside.

2.3.5. Anthraquinone glycoside

Borntrager's test: The extract (10 mg/mL) was boiled with 1 mL of sulfuric acid in a test tube for 5 minutes and filtered while hot. The filtrate was cooled and shaken with an equal volume of dichloromethane. The lower layer of dichloromethane was separated and shaken with the half of its volume of dilute ammonia. A rose pink to red color was produced in the ammonia layer and indicated the presence of anthraquinone glycoside.

2.3.6. Tannin

Gelatin test: To the extract (10 mg/mL), 1% gelatin solution containing 10% NaCl was added, formation of buff-colored precipitate resulted due to the presence of tannins.

2.3.7. Saponin

Froth formation test: 2 mL of extract was taken in a test tube and shaken until a stable froth or foam was formed for 5 minutes (in presence of saponin), however, no foam was formed for 5 minutes indicating the absence of saponin in extract.

2.3.8. Steroid

Libermann-Burchard's test: The extract (10 mg/mL) was treated with 7-8 drops of acetic anhydride solution, boiled, and cooled further. Concentrated sulfuric acid (5-6 drops) was further added from the side of the test tube, where a brown ring was formed at the junction of both layers; and upper layer changed to green, which demonstrated the presence of steroids.

2.3.9. Protein

Xanthoproteic test: To the extract (10 mg/mL), 1 mL of concentrated nitric acid was added and boiled to get a yellow precipitate, which after cooling, were added 2 mL of 40% sodium hydroxide solution, orange color appears (if protein is present). No orange color was formed with *P. betle* extract indicating absence of protein.

2.3.10. Phenol

Ferric trichloride: The extract (10 mg/mL) was dissolved in water, and 8-10 drops of dilute ferric trichloride were added, the formation of bluish-black color indicated the presence of phenol.

2.3.11. Diterpene

Copper acetate test: The extract (10 mg/mL) was treated with 3-4 drops of copper acetate solution, emerald green color appeared (in presence of diterpene). In *P. betle* extract, no emerald green color appeared, which confirmed the absence of diterpenes.

2.3.12. Triterpene

Salkowski's test: The extract (10 mg/mL) was treated with 5-6 drops of concentrated sulfuric acid, yellow color formation occurs in the lower layer (if triterpene is present), however no yellow color was formed describing absence of triterpene.

2.4. Formulation of nutraceutical instant soup mixture

Nutraceutical soup powder was prepared by mixing of Arjuna, Red Yeast Rice, Tomato, and Garlic powder with other ingredients (sodium benzoate, Cherry flavor, Vanilla flavor, Fruti punch flavor, Trusil Tonovil, Milk Rich, Mix Berry, and Xantan gum). The prepared soup powders were then sealed in translucent or colored polythene bag and used for chemical analysis and sensory evaluation. For shelf life study, prepared Nutraceutical soup powder was also sealed in colored polythene bags and stored up to 4 months at room temperature [5]. The preparation and formulation of the product has been depicted in **Figure 1**.

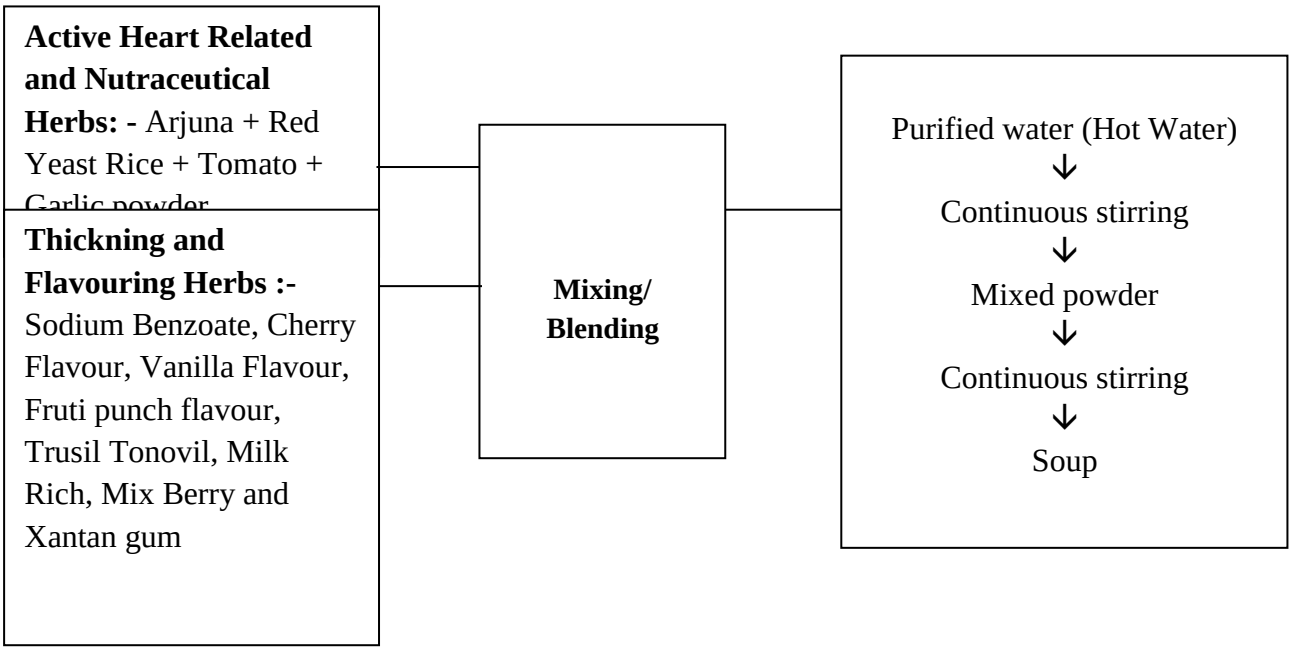

Figure 1. Nutraceutical formulation for heart-related patients.

2.5. Procedure for prepared instant soup powder

100 mL of water and 10 g of the prepared soup mix powder were added in it. Then, it was allowed to boil for 3 min to 5 min. Finally, it was poured into a soup bowl, stirred, and served it hot [5].

2.6. Trial Batches to obtain appropriate ratio of thickening and flavor with active drug

To obtained appropriate ratio of thickening and flavor with active heart related drug and various trials were carried out shown according to need adjustment of quantity of ingredients ananomialy done by visual and organoleptic analysis (**Table 1**). 9 formulations were selected for sensory analysis and initial accelerated stability study.

Table 1. Trials Batches.

Formulation	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**
Ingredient	**Quantity (mg)**								
Arjuna	500	500	500	500	500	500	500	500	500
Red Yeast Rice	1200	1200	1200	1200	1200	1200	1200	1200	1200
Tomato	1000	1200	1500	1000	1200	1500	1000	1200	1500
Garlic	500	700	900	500	700	900	500	600	800
Sodium Benzoate	7.435	8.22	9.24	7.42	8.25	8.2	7.65	8.25	9.25
Cherry Flavour	500	-	-	-	-	-	300	-	-
Vanilla Flavour	-	500	-	-		-		-	-
Fruti punch	-	-	500	-	-	-	-	-	300
Trusil Tonovil	-	-	-	500	-	-	-	-	-
Milk Rich	-	-	-	-	500	-	300	-	-
Mix Berry	-	-	-	-	-	500	-	-	300
Total	**3707.435**	**4108.22**	**4609.24**	**3707.42**	**4108.25**	**4608.20**	**3807.65**	**3508.25**	**4609.25**

2.7. Characterization of instant soup powder mixture formula

2.7.1. Physicochemical characteristics

The powder form of plant materials was evaluated regarding organoleptic, physicochemical, histological and phytochemical aspects. In organoleptic part, the color, shape, size, texture and frac-ture were studied suitably. The physiochemical parameters like a loss on drying (LOD) at 105°C, total ash content, acid insoluble ash, water soluble ash and alcohol soluble extractive value were determined as per methods given in Indian Pharmacopoeia (2010). The LOD determination is highly significant since any excess of water in plant materials will promote bacterial growth, the presence of molds and cause deterioration by hydrolytic activity. The total ash value serves as an indicator for de-termination of chalk powder, earthy silica materials lime or other earthy matter. Acid insoluble ash is used to detect excessive earthy materials, which has varying amount of calcium oxalate crystals in the cells while water-soluble ash is used to detect the presence of material exhausted by water. Alcohol soluble extractive values are indicative of the presence of the adulterants, defective processing and poor quality of the drug [6].

2.7.2. Pharmaceutical characteristics

The final blend was characterized by the physical parameters such as bulk density, tapped density, and angle of repose. The prepared granules were initially evaluated suitably for their

characteristic parameters such as angle of repose (by funnel method), bulk density and tapped density (by cylinder method) [7].

2.7.3. Infrared spectral analysis

IR absorption spectrum of plant materials were recorded by potassium bromide dispersion technique in the range of 4000–400 cm^{-1}. The compounds were scanned at a resolution of 0.15 cm^{-1} and scan speed was 20 scan/s [8].

2.7.4. Antioxidant activity

The potential of extract to scavenging the 1,1-diphenyl-2-picrylhydrazyl radical (DPPH) was investigated. A stock solution of whole plant extract was prepared to the concentration of 1 mg/mL. The plant extract (100 μg/mL) was added at an equal quantity to a methanolic solution of DPPH (0.1 mM). The aliquot was incubated for 30 minutes at room temperature. The absorbance was recorded at 517 nm keeping ascorbic acid as a standard control [9].

2.7.5. Antibacterial activity

The *in vitro* antibacterial activity of plant extract was tested by disc diffusion method under standard conditions using the Muller Hinton Agar medium. The test organisms were first cultured in nutrient broth, incubated for 24 hr at 37°C, and then freshly prepared bacterial cells were spread onto the Muller Hinton agar plates in a laminar flow cabinet. The extract was dissolved in dimethylsulfoxide (DMSO) and soaked onto sterile discs of Whatman filter paper No. 1 (6 mm diameter). The discs were then placed onto the surface of the previously prepared bacterial plates and incubated. After 24 hr of incubation at 37°C, the diameter of the zone of inhibition was measured for extract in mm. The activity was compared with standard antibiotic ciprofloxacin (positive control) and a disc impregnated with DMSO was used as a negative control. The tests were conducted for three times [10].

2.7.6. Sensory evaluation

Different prototypes of instant soup powder mixture formulations were characterized and optimized based on their appearance, consistency, colour, taste, odour, etc. under sensory evaluation [11].

2.7.7. Nutritional analysis

The nutraceutical parameters of fat, protein, carbohydrate, and total energy were determined as per the standard method [12].

2.8. Statistical analysis

All experiments were carried out in a triplicate manner. The obtained data were expressed as mean ± standard deviation (SD). For statistical calculations, Minitab® v.17 was employed. For pharmacological activities, the unpaired Student t-test (two-tailed) was used to determine the difference between control and tested groups.

3. RESULTS AND DISCUSSION

3.1. Phytochemical Screening

Phytochemical screening of the extracts revealed the presence of carbohydrates, tannins, flavonoids, alkaloids, sterols, phenols, proteins, vitamins, and glycosides (**Table 2**).

Table 2. Phytochemical Screening.

Chemical Compound	Test	Arjuna	Garlic	Red Yeast Rice	Tomato
Test For carbohydrates	Molisch's	+ve	+ve	+ve	+ve
	Fehlings	+ve	-ve	+ve	+ve
	Benedicts	+ve	+ve	+ve	+ve
	Iodine	+ve	+ve	+ve	+ve
	tannic acid	+ve	+ve	+ve	+ve
Chemical Compound	**Test**	**Arjuna**	**Garlic**	**Red Yeast Rice**	**Tomato**
Test for steroids	Salkowski reaction	+ve	-ve	-ve	+ve
	Libermann's reaction	+ve	-ve	-ve	-ve
Test for protein	Biurate	+ve	+ve	+ve	+ve
	Millon's	+ve	-ve	+ve	+ve
Test for amino acid	Ninhydrin test for tyrosin	+ve	+ve	-ve	+ve
	Ninhydrin test for cystein	+ve	+ve	-ve	+ve
Test for glycoside (cardiac)	Legal's test for cardinolides	+ve	-ve	+ve	+ve
	Killer-Kilani test	+ve	-ve	+ve	+ve
	Borntrager test	+ve	+ve	+ve	+ve
Test for glycoside (anthraquinone)	Borntrager test	+ve	+ve	+ve	+ve
Test for glycoside (saponin)	Foam test	+ve	+ve	+ve	+ve

Test for flavonoids	Shinoda test	+ve	+ve	+ve	+ve
	Sulphuric acid test	+ve	-ve	+ve	+ve
Test for alkaloids	Dragendorff's	+ve	+ve	+ve	+ve
	Mayer's	+ve	-ve	+ve	-ve
	Hager's	+ve	+ve	+ve	-ve
	Wagner's	+ve	+ve	+ve	+ve
Test for tannins and phenolic compound	5% $FeCl_3$ solution	+ve	-ve	+ve	-ve
	Lead acetate solution	+ve	+ve	+ve	-ve
	Bromine water	+ve	+ve	+ve	+ve
	Dilute HNO_3	+ve	+ve	+ve	+ve
Test for vitamins	Test for Vitamin A	+ve	+ve	+ve	+ve
	Test for Vitamin C	+ve	+ve	-ve	+ve
	Test for Vitamin D	+ve	-ve	-ve	+ve

Where, - = absent, + = present

3.2. Fourier Transform Infrared Spectroscopy (FTIR)

An infrared spectrum represents a fingerprint of a sample with absorption peaks which correspond to the frequencies of vibrations between the bonds of the atoms making up the material. Because each different material is a unique combination of atoms, no two compounds produce the exact same infrared spectrum. Therefore, infrared spectroscopy can result in a positive identification (qualitative analysis) of every different kind of material. In addition, the size of the peaks in the spectrum is a direct indication of the amount of material present. The FTIR was performed in powder samples of Arjuna, Garlic, Red Yeast Rice, Tomato and Formulation F8 are depicted in **Figure 2** and **Table 3**.

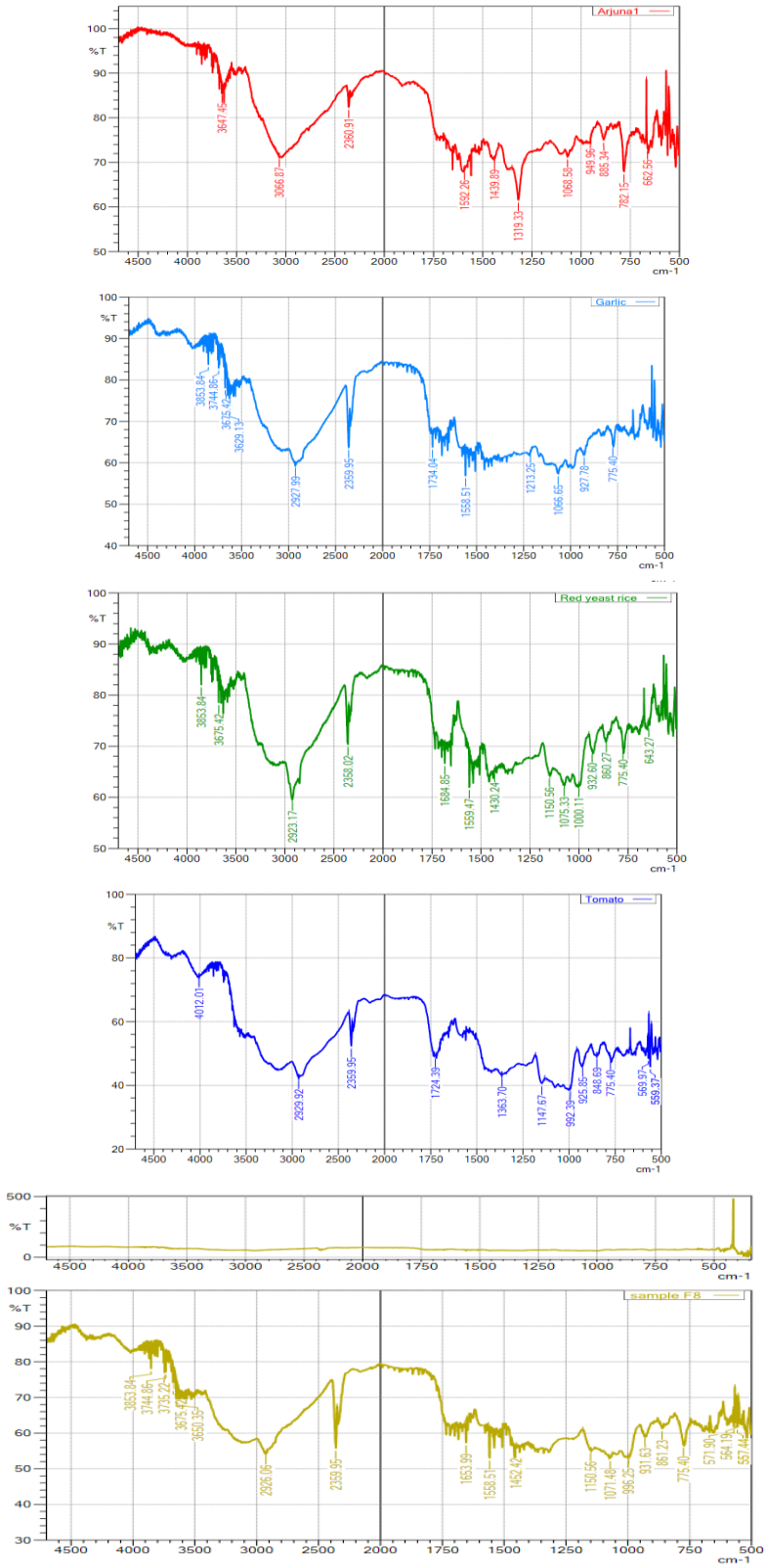

Figure 2. FTIR spectra of (A) Arjuna (B) Garlic (C) Red Yeast Rice (D) Tomato (E) Formulation F8.

Table 3. FTIR Peaks and characteristics functional group of various plant extracts.

Material	Peaks $(cm)^{-1}$	Characteristics functional group
Arjuna	3647.45	Stretching mode of N-H (Primary Amine / Aromatic Amine / Amides) / O-H (H-bonded) of phenolic compounds (Tannins/ Flavonoids)
	3066.87	Stretching mode of C-H (Alkene)
	1592.26	Stretching mode C=C (alpha-beta-unsaturated ketone)
	1439.89	Stretching mode S=O, C-N (Sulfate / Primary Amine)
	1319.33	Stretching mode C-N Aromatic Amine, CF_3 attached to a benzene ring
Garlic	2927.99	C-H stretching mainly: lipids
	1558.51	Amide I: C=O stretching mainly proteins
	1213.25	C-N stretching mainly amino acids
	1066.65	SO3 symmetric stretching vibration, presence of acid and RSO_3 Ionic sulphones
	775.40	C-H bending: mainly glycogen
Red Yeast Rice	2923.17	C-H Stretching
	2358.02	C-H stretching
Tomato	1724.39	Lipid Group
	1363.70	C-C and C-C-H stretching
	1147.67	C-O stretching
Formulation F8	3675.42	Stretching mode of N-H
	2926.06	C-H stretching
	2359.95	C-H stretching
	1558.51	Amide I: C=O stretching mainly proteins

3.3. Physicochemical parameter

The physicochemical quality standardization like moisture content and ash values of herbal crude drug and formulation batches (pre and post stability) were determined, moisture (loss on drying) is one of the major factors responsible for the deterioration of the drugs and formulations. Low moisture content is always desirable for higher stability of herbal drugs. Moisture contents of the individual herbal drug (**Table 4**) were found in the range 4.01 -7.21 %, w/w. Different Formulation batches (F1-F9) pre and post stability in the range of 2.11 –

4.57 % w/w, all the values were less than 5%, were formulation F1-F9 shows change in moisture content and F8 shows 2.08 - 2.15% w/w moisture shows better stability, and high ash value is indicative of contamination, substitution, adulteration, or carelessness in preparing the drug or drug combinations for marketing.

Table 4. % LOD, ash values, and moisture content of plant components.

Parameter	%LOD Mean (n = 3) ± SD (% w/w)	Total ash Mean (n = 3) ± SD (% w/w	Water-soluble ash Mean (n = 3) ± SD (% w/w)	Acid-insoluble ash Mean (n = 3) ± SD (% w/w)	Moisture Content Mean (n = 3) ± SD (% w/w)
Arjuna	7.21 ± 0.03	15.98 ± 0.02	19.22 ± 0.02	1.61 ± 0.015	5.68 ± 0.06
Garlic	5.24 ± 0.01	3.40 ± 0.02	16.29 ± 0.02	1.04 ± 0.05	3.88 ± 0.03
Red Yeast Rice	4.01 ± 0.035	4.22 ± 0.025	14.63 ± 0.05	1.12 ± 0.03	4.32 ± 0.02
Tomato	4.81 ± 0.011	0.62 ± 0.05	15.88 ± 0.03	1.34 ± 0.02	8.48 ± 0.04

*All values are average of three determination (n=3)

Total ash values of the individual herbal drug found to be in the range 0.62 – 15.98% w/w, Water-soluble ash in range of 14.63 - 19.22% w/w and acid-insoluble ash in the range of 1.04 – 1.61% w/w. Ash values of different formulation batches F1-F9 pre and post stability (table no 9) were found to be, total ash value in the range of 4.67 – 8.31 % w/w, water soluble ash in the range of 11.34 – 16.35% w/w, acid insoluble ash (**Table 5**) in the range of 0.33 - 0.85% w/w. These values were found to be reasonably low indicating low contamination. Moisture and ash values of the formulations matches with the average total ash values of the individual drugs. were formulation F1-F9 shows change in values and F8 shows total ash 6.08 - 6.19, water soluble ash 12.62 - 16.29 and acid insoluble 0.47 - 0.76 having better stability.

Table 5. % LOD and ash value for instant soup powder formulations.

Formulation	%LOD Mean (n = 3) ± SD (% w/w)	Total ash Mean (n = 3) ± SD (% w/w	Water-soluble ash Mean (n = 3) ± SD (% w/w)	Acid-insoluble ash Mean (n = 3) ± SD (% w/w)
F1	4.65 ± 0.030	5.86 ± 0.015	14.23 ± 0.040	0.44 ± 0.020
F2	4.23 ± 0.025	6.57 ± 0.012	15.70 ± 0.020	0.63 ± 0.083
F3	4.62 ± 0.025	5.95 ± 0.030	15.27 ± 0.037	0.62 ± 0.005
F4	5.11 ± 0.015	6.25 ± 0.025	15.64 ± 0.030	0.85 ± 0.035
F5	4.26 ± 0.036	4.67 ± 0.020	16.35 ± 0.026	0.66 ± 0.025
F6	5.63 ± 0.025	6.24 ± 0.015	17.26 ± 0.032	0.83 ± 0.030
F7	5.15 ± 0.036	5.35 ± 0.032	15.70 ± 0.126	0.74 ± 0.035
F8	3.45 ± 0.025	6.08 ± 0.020	16.29 ± 0.020	0.54 ± 0.020
F9	5.72 ± 0.021	6.73 ± 0.021	15.29 ± 0.055	0.76 ± 0.026

*All values are average of three determination (n=3)

3.4. Pharmaceutical characteristics

Nutraceutical Instant soup formulation for Heart related patients batches F1-F9 combination were prepared and evaluated further by determining pH and viscosity. Formulations F1-F9 shows change in pH, and viscosity Only F8 formulation shows pH range 5.55 – 5.62, and acceptable viscosity, with better stability. Nutraceutical Instant soup formulation for Heart related patients batches F1-F9 combination were prepared and evaluated further for physical characterization. Bulk density shows bulk of the powder were bulk density of different formulation batches F1-F9 (pre and post stability) found in the range of 0.36 – 0.52 g/ml in a acceptable range (**Table 6**). Tapped density gives information on consolidation of a powder. A consolidated powder is likely to have a greater arch strength than a less consolidated one, and may therefore be more resistant to powder flow. Tapped density of all the formulation batches F1-F9 (pre and post stability) were found in the range of 0.48 to 0.67 g/ml in a acceptable range. Angle of repose of powder shows its flow property were angle of repose of all the formulation batches F1-F9 (pre and post stability) F8 found in the range of 24.76 - 25.26˚ showing excellent flow. Result (pre and post stability) show no major change in physical characterization of instant soup powder formulation batches and does not affect its stability.

Table 6. pH, viscosity, bulk density, tapped density, and angle of repose of nutraceuticals formulations.

Formulation	Viscosity (cPs) Mean ± SD	pH Mean ± SD	Bulk density (gm/ml) Mean ± SD	Tapped density (gm/ml) Mean ± SD	Angle of repose(º) Mean ± SD
F1	356 ± 1.52	5.18 ± 0.050	0.46 ± 0.002	0.62 ± 0.010	30.94 ± 1.110
F2	388 ± 3.00	4.94 ± 0.047	0.44 ± 0.021	0.57 ± 0.021	20.67 ± 0.140
F3	357 ± 2.08	5.19 ± 0.010	0.39 ± 0.006	0.52 ± 0.010	28.41 ± 0.373
F4	403 ± 1.52	5.37 ± 0.010	0.45 ± 0.015	0.62 ± 0.010	35.30 ± 0.053
F5	367 ± 2.08	4.31 ± 0.040	0.45 ± 0.020	0.57 ± 0.010	34.47 ± 0.204
F6	354 ± 1.52	4.65 ± 0.061	0.52 ± 0.015	0.66 ± 0.021	32.57 ± 0.042
F7	334 ± 2.08	4.53 ± 0.042	0.44 ± 0.017	0.58 ± 0.006	38.46 ± 0.066
F8	389 ± 5.68	5.55 ± 0.031	0.41 ± 0.010	0.56 ± 0.006	24.76 ± 0.387
F9	359 ± 1.00	4.29 ± 0.031	0.36 ± 0.015	0.48 ± 0.010	32.25 ± 0.105

*All values are average of three determination (n=3)

3.5. Sensory Evaluation

Table 7. Sensory Evaluation of instant soup mix formulation.

	Parameter	Very Poor	Poor	Good	Very Good	Excellence
F1	Flavour	07	10	10	-	-
	Taste	18	09	-	-	-
	Consistency	12	08	07	-	-
	Colour	16	11	-	-	-
F2	Flavour	09	13	05	-	-
	Taste	10	15	02	-	-
	Consistency	08	05	07	-	-
	Colour	10	06	11	-	-
F3	Flavour	13	04	03	04	-
	Taste	11	12	04	-	-
	Consistency	05	12	08	-	02
	Colour	07	13	07	-	-
F4	Flavour	08	04	15	-	-
	Taste	10	13	04	-	-
	Consistency	09	12	06	-	-
	Colour	07	16	04	-	-
F5	Flavour	12	15	-	-	-
	Taste	22	05	-	-	-
	Consistency	12	08	07	-	-
	Colour	21	06	-	-	-
F6	Flavour	09	13	05	-	-
	Taste	10	15	02	-	-
	Consistency	08	05	07	-	-
	Colour	18	06	03	-	-
F7	Flavour	03	13	08	03	-
	Taste	02	09	10	06	-
	Consistency	-	05	14	08	02
	Colour	-	07	13	07	-
F8	Flavour	-	02	08	15	02
	Taste	-	01	03	13	10
	Consistency	-	-	09	12	06
	Colour	-	-	07	16	04
F9	Flavour	02	08	15	02	-
	Taste	01	10	13	03	-
	Consistency	-	09	12	06	-
	Colour	-	07	16	04	-

3.6. Estimation of Nutritional Values

Instant Soup powder formulation was prepared using heart related problems herb's, spices, flavour and finger millet flour for thickening of soup and optimized formulation subjected for nutritional analysis and it was found to highly acceptable. The nutrient analysis of the formulation protein content was found to be 6.54 gm/100g shows high in protein which required for cancer patients, carbohydrates was found to 70.62 gm/100g which was in the safety range required for cancer patient, total fat 0.60 g/100g shows low total fat essential for cancer patient, Energy Value (Calories) was found to 314.58 Kcal/100g shows acceptable calorie value (**Table 8**). The above study shows prepared formulation is in superior and safe nutrition content.

Table 8. Nutritional value of instant soup mix formulation.

S. No.	Nutritional Parameter	Nutritional Values (per 100 gm)
1.	Energy Value (KCal/100 g)	314.58
2.	Carbohydrates	70.62
3.	Total Fat	0.60
4.	Protein	6.54

3.7. *In-vitro* antibacterial activity

The standard drug ofloxacin and extract of instant soup powder sample subjected for antimicrobial assessment for checking sustainability against *S. bacillus* (**Figure 3**). were different concentration of sample extract shows zone of inhibition as follows: 50 mg/ml shows 11 mm, 100mg/ml shows 14.50 mm, 150 mg/ml shows 17.50 mm, 200 mg/ml shows 19.75 mm against standard ofloxacin were not superior than standard but good susceptibility shown by sample against *S. bacillus* (**Table 9**).

Table 9. Antibacterial study of formulation.

Strain Used: S. bacillus **Zone of Inhibition (in mm)**					**Standard drug (Ofloxacin) 10 mcg/ml**
Concentration	**50 mg/ml**	**100 mg/ml**	**150 mg/ml**	**200 mg/ml**	
Sample	11.00±0.816	14.50±0.577	17.50±0.577	19.75±0.500	31.25±0.957

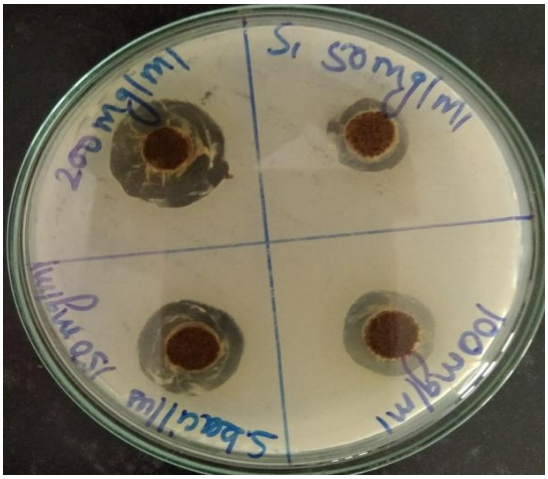

Figure 3. Zone of Inhibition of instant soup mix powder formulation at various concentrations against *S. bacillus*.

3.8. *In-Vitro* antioxidant activity (DPPH Free Radical Scavenging method)

Antioxidant activity of both ascorbic acid and nutraceutical instant soup mix powder showed antioxidant activity with different concentration. The IC_{50} ascorbic acid and Nutraceutical instant soup mix powder were found to be 11.54 and 16.52 which was within range (**Table 10**).

Table 10. % inhibition of ascorbic acid and DPPH radical.

Concentration in mg/ml	% inhibition of ascorbic acid	% inhibition of DPPH
20	52.741	49.890
40	56.360	56.140
60	61.513	59.211
80	68.969	63.706
100	71.711	67.434

4. CONCLUSION

Nutraceutical Herb's Like Arjuna powder, Red Yeast Rice, Tomato powder, Garlic and Flavours with other ingredients play vital role in Heart related patients by make use of this Nutraceutical Herb's of Nutraceutical Formulation were Formulated in the form of Instant soup powder Formulation by making use of Arjuna powder, Red Yeast Rice, Tomato powder, Garlic powder, thickening agents, antimicrobial agents and flavour all the ingredients are collected from local market having good quality. The formulated Nutraceutical Formulation for Heart related patients were Evaluated for sensory evaluation, initial accelerated stability study, pH, Viscosity, Moisture, Ash Values, Physicochemical Properties, nutritional Values, Heavy Metal Content, Antioxidant and Antimicrobial assessment were formulation showed satisfactory results. The stability studies were carried on the basis of ICH guideline for 90 days. Safe and effective Nutraceutical formulation for Heart patients of combined herb's, Nutraceutical herbs and spices, flavour, and thickeners in the form of instant soup powder was successfully developed, the present investigation revealed that on the basic of sensory

evaluation and Initial Accelerated Stability Study F8 is superior than rest with least moisture content, and taken for further analysis and it shows absence of trace heavy metals like arsenic, cadmium, lead and mercury, it is important to note that this soup is high in protein ash carbohydrate and low fat, high energy value of the soup powder which make it appropriate choice for fulfilment of nutritional demand. Further study for Antioxidant and Antimicrobial Shows the product is high in Antioxidant and Antimicrobial. The management, prevention and treatment of cardiovascular diseases, such as hypertension, are based on lifestyle, hereditary factors and physical activity. The nutritional supplementation represents a possible strategy for management and prevention of hypertension and other cardiovascular diseases. The nutraceuticals act not only direct by antioxidant or anti-inflammatory properties but also indirectly, via modulation on various physiological pathways. A lot of the nutraceuticals that was described, such as oil extracts, plants, fruits and vegetables as well as botanical extracts, have shown beneficial effects on the cardiovascular system through substances such as phenolic compounds or polyphenols, lycopene and flavonoids. Nutraceutical supplementation and their intake could improve blood pressure control and must be considered strategic management aimed at preventing hypertension, when considering its benefits and low costs. This review demonstrates the importance of new strategies in the control and treatment of hypertension with non-pharmacologic therapy, and through the use of the nutraceuticals established antihypertensive activity in humans, in association with a coherent improvement in diet and lifestyle.

CONFLICT OF INTEREST

None declared.

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