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RESEARCH ARTICLE

STUDIES ON PREPARATION OF APPLE (*MALUS DOMESTICA*) BASED R.T.S WITH ADDITION OF AMLA (*EMBLICA OFFICINALIS G.*), BRAHMI (*BACOPA MONNERI*), DATE PALM (*PHOENIX DACTYLIFERA*), GILOY (*TINOSPORA CORDIFOLIA*), MULETHI (*GLYCORRHIZA GLABRA*) AND BLACK PEPPER (*PIPER NIGRUM*)

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ABSTRACT

This study was done to produce innovative product by giving a vast importance to the nature provided material. Keeping in view of the above facts these fruits and medicinal herb benefits health and nutritional values was carried out with the following objective. Various recipes for the development and acceptability of different value added products made using Apple, amla, dates pulp were standardized with addition of brahmi, giloy, mulethi and Piper nigrum. For preparation of apple RTS initially standardized the fruit juice (apple and amla), after standardization the best ratio used for the same with giloy percentage along with a very least amount of mulethi and brahmi fortification. Dates can be crushed and heated with little water and extracted sugar can be used for sweetness. The physicochemical analysis was carried out as per method described in AOAC (1984) and products were prepared as per technical program. The various analysis including organoleptic evaluation was carried out just after the preparation of the sample. pH was measured with pH meter as described by Ranganna (1986)52. The fruit juices were extracted from ten fruits and extracted satva from ten stems, homogenized and pH was measured using pH Meter. Total soluble solids were determined by Hand Refractometer as per method of Ranganna (1986)52. Acidity was analyzed by acid - base titration method as described by Miller (1950)43. Ascorbic acid was estimated according to Bessey and King (1933)14. Reducing, Non-reducing, and Total sugar were measured by the method of Lane and Eynon (1943). The prepared RTS was packed in glass bottles with cork cap and stored at room temperature. The data pertaining to chemical composition of apple based RTS just after preparation represented in table and The pH was depicted 3.10 in T1 followed by 3.09, 3.09, 2.81 and 2.90 in T3, T4, T1 and T5. Result of R.T.S. beverages were analyzed for their chemical characters immediately after preparation data presented in table and were observed that pH is approximately 3.0 in each treatment. Total soluble solids were observed is 160 Brix in in each treatment. T.S.S of fresh dates is 87-degree Brix while that of date syrup prepared is 26-degree Brix. The acidity was approximately 0.28% as citric acid in each treatment, Organoleptic evaluation was convened in the institute with 5 experts panel. The R.T.S. secured 79-96% marks. Among 5 treatments T 2 secured highest 96% score whereas T3 secured 95% followed by T1 79% T4 89% and T5 86%. The result clearly indicates that good quality R.T.S is prepared.

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INTRODUCTION

The Blending Technology has become an important tool in modern fruit beverage processing in the developing of new beverages of superior quality having sensory, nutritional and medicinal properties of two or more plant species. The attractive appearance, appealing flavour, nutrients retention, medicinal values and other organoleptic qualities are the main consideration in standardization of different ratios of blend

components which meets the consumer preference and improves the marketability of the new blended products. The ready to serve (RTS) beverages are very popular among consumers of all groups because of its easiness to carry and to consume Deen Bhagwan and Kumar Awadhesh, (2014). Fruit beverage such as RTS are becoming increasingly popular in comparison to synthetic drinks, Evidently because of their taste, flavour and nutritive value. These are easily digestible, highly refreshing, invigorating, thirst quencher appetizer and superior to almost all kinds of aerated drinks which have

practically no food value. "RTS is type of fruit beverage which contains at least 10 per cent fruit juice and 10 percent total solids besides about 0.3percentacid. It is not diluted before serving." R.P Shrivastava" (2005). Food processing industry has been termed as —sun rise industryl and most of the efforts can be made in last few years to reach big impact in this processing sector. Fruit is good source for nutrients to meet out requirement of human nutritional status, as these foods not only meet the quantitative needs to some extent but also supply vitamins and minerals, which improve the quality of our diet and also maintain the health. An increasing the time for availability of this fruits and its processed products has help to meet out their nutrient content and palatability will have improved the health of humans, added variety to the diet and reduced the time required for food preparation. To avoid the waste of surplus, fruits have to be processed into juice, pulp, squash, jam and the like. The increased need for processed fruit and vegetable products has resulted from rising standard of living, the desire for a more diversified diet continued with the ever-expanding urbanization and increased the population. To fulfill this need, various new processed products are entering the market. Fruit and fruit products both are an important supplement to the human diet as they provide almost all the vital components required for normal growth and development of the human body leading to the healthy physique and mind. Blending of fruit juices with herbal components is practiced to overcome the high cost of some exotic fruit juices, scarcity or seasonal availability, balancing of strong Flavour, high acidity, astringency, or improving total soluble solids, as well as stabilizing colour. Nutritional or phytochemical properties can be improved by blending which offers to adjust sugar/acid ratios and compensate undesirable juice consistency. Fruits are mostly water (75- 90%), maximum located in vacuole producing turgor in the fruit tissue, and fruit juice is produced by infusing fresh fruits. Fruits cell wall contains of cellulose micro fibrils entrenched in an amorphous matrix of hemicelluloses and pectin. Juice includes water; pectic substances; vitamins and minerals; pigments; aroma and flavor compounds and soluble solids (sugars and organic acids). The acidity and starch in fruits decrease while sugars increase during ripening. It has been stated that regular consumption of fruit juices, rich in polyphenols, can enhance the protective effects against numerous degenerative diseases. Moreover, regular fruit juice consumption was reported to reduce the risk of several chronic diseases. Nowadays, there are many types of fruit juices available commercially in the market. The consumption of the fruit juices is popularizing rapidly as they are convenient, nutritious and ready-to-drink. Although most of the fiber from whole fruit is removed during fruit juice processing, 100% fruit juices retain similar levels of other healthy vitamins, minerals and phytochemicals.

SCIENTIFIC CLASSIFICATION OF APPLE



KINGDOM	- Plantae
UNRANKED	- Angiosperms
UNRANKED	- Eudicots
UNRANKED	- Rosids
ORDER	- Rosales
FAMILY	- Rosaceae
GENUS	- Malus
SPECIES	- domestica

APPLE

The apple is the *pomaceous* fruit of the apple tree, species *Malus domestica* in the rose family (*rosaceae*). It is one of most widely known of many members of genus *Malus* that are used by humans. Apples have grown for thousands of years in Asia and Europe, and were brought to North America by European colonists. Apples have been present in mythology and religious of many cultures, including Norse, Greek and Christian tradition [*Elzebroke, Wind et. al.(2008)*] The Apple (*Malus domestica*) is one of fruits which are still to be exploited its maximum extent. It is native to Central Asia. The largest aggregate fruits are composed of peel and pulp. Pulp is cream coloured, sweet with pleasant Flavour and aroma. Fruits are rich in fiber vitamin C and various antioxidants. 100gm of which has composition of 80.5 g moisture, sugar 10.4g, 13.8g carbohydrates, 0.3g protein, 0.2 g fat, fiber 2.4 g and gives 52 k calories of energy *Singh (1995)*. The main mineral in apples is potassium which benefit heart health. Rich in antioxidants like Quercetin, Catechin, Chlorogenic acid. In 2010, the fruit's genome was decoded, leading to new understandings of disease control and selective breeding in apple production. There are more than 7500 known cultivators of apples resulting in a range of desired characteristics. Different cultivators are bred for various tastes and uses including cooking, fresh eating and cider production. About 69 million tons of apple were grown worldwide in 2010, and China produced almost half of this total. The United States is the second leading producer, with more than 6% of world production. Turkey is the third, followed by Italy, India and Poland.

NUTRITIONAL VALUE OF APPLE PER 100GM

Calories	52 KCAL.	Calcium	6 mg
Carbohydrates	13.8 1gm	Vitamin D	0 IU
Sodium	1 mg	Magnesium	5m g
Potassium	107 mg	Iron	0.1 mg
Sugar	10.4gm	Vitamin A	54 IU
fat	0.2 gm	Protein	0.3 gm
Fiber	2.4gm	Moisture	80 gm

OTHER NAMES OF APPLE

Abilde, Almindelig Aeble, Apfel, Apfelbaum, Apple, Appeltrad, apple tree, Eble, Echter Apfelbaum, Iabloko, Iablonia, JablonDomaca, *Malus domestica* (Source: N.H.B. Gov. of India).

MEDICINAL VALUE OF APPLE FRUIT

The proverb "*AN APPLE A DAY KEEP DOCTOR AWAY.*" Addressing the health effects of the fruit dates from 19th century Wales. Preliminary research suggests that apples may reduce the risk of *colon cancer, prostate cancer, lung cancer*. Apples peels contain folic acid which in rat studies,

increases skeletal muscle and brown fat, and decreases white fat obesity, glucose intolerance, and fatty liver diseases. According to the U.S. Department of Agriculture, a typical apple serving weight 242 grams and contain 126 calories with significant dietary fiber and vitamin C content. Apples peels are a source of various phytochemicals with unknown nutritional value and possible antioxidant activity invitro.

Top APPLE Producing Countries (in Metric Tons)

Rank	Country	Production (in tons)	production per person/kg.	Acreage (hectare)	Yield (kg/hectare)
1	China	44,448,271	31,889	2,381,905	18,645.1
2	United States	4,649,323	14,285	130,512	35,612.1
3	Poland	1,604,271	95,079	177,283	28,339.6
4	Turkey	2,921,828	36,206	173,384	16,873.9
5	India	2,872,000	2,149	114,089	9,146.5
6	Iran	2,789,197	34,238	238,618	12,729.7
7	Italy	2,433,616	40,831	36,164	43,722.2
8	Russian Federation	1,841,344	12,252	214,279	8,603.8
9	France	1,819,762	27,041	9,638	36,675.1
10	Chile	1,739,421	200,113	36,661	48,787.1

DATE PALM



BOTANICALNAME- Phoenix dactylifera L.
GROUP- Spadiciflora
ORDER- Palmae
FAMILY- Palmaceae
SUBFAMILY- Coryphoideae
TRIBE- Phoeniceae
GENUS- Phoenix
SPECIES- dactylifera L.

Palm (*Phoenix dactylifera*) is a flowering plant species in the palm family Areacaceae. It is cultivated for sweet fruit. The date palm is dioecious, that is, there are both male and female palms, the former normally bearing only pollen and later normally only fruit. Date palm is mainly grown for its fruit, but the whole tree is utilized. Dates are highly nutritious source of sugars, minerals, vitamins and antiatherogenic nutrients. Dates

are used as a sweetener in numerous traditional desserts and contemporary baked goods, *Manickavasagan et al. (2013)* Date is one of the oldest known fruit crops and has been cultivated in North Africa and the Middle East for at least 5000 years, *Zohary and Hopf, (2000)*. Besides dates can be grown in Australia, Mexico, South America, and the U.S. especially in southern California, Arizona, and Texas, *Chao and Krueger, (2007)*. Date fruits ranging from bright red to bright yellow in colour depending on variety. They are very sweet containing about 75 percent of sugar when it dried. Date fruits are good source of iron, magnesium, calcium and sulfur and also a minor source of phosphorus. In addition, dates are source of 16 amino acids and vitamin A, B1 and B2, *Ahmed et al. 1995; Vandertcook et al., (1980)* Date fruits also have many medicinal uses as an astringent for treating intestinal problems, for sore throat treatment, liver and abdominal problems.

NUTRITIONAL VALUE OF DATE PALM PER 100 GM

Calories	20 K CAL	Sugar	4.5 g
Total ash	0.03 g	Protein	0.17 g
Total carbohydrates	5.33g	Vitamin B6	0.012 mg
Dietary fiber	0.6 g	Iron	0.07 mg
magnesium	3 mg	potassium	47mg

Aonla/ amla



SCIENTIFIC CLASSIFICATION OF AONLA

BINOMIALNAME- Phyllanthusemblica
KINGDOM- Plantae
ORDER- Malpighiales
FAMILY- Phyllanthaceae
TRIBE- Phyllanthaeae
SUBTRIBE- Flueggeinae
GENUS- Phyllanthus

Aonla/ amla (*Embllica officinalis Gaertn*) also known as 'Indian gooseberry' is one of the oldest minor fruits of India. It belongs to the family Euphorbiaceae; sub family Phyllanthoidae and is native to India, Srilanka, Malaysia and China. Aonla is quite hard, prolific bearer and highly remunerative even without much care. Amla is richest source of vitamin C ranges up to 950 mg /100g. Due to astringent taste, it is not palatable for direct consumption, hence processing is essential. Amla have been reported to possess expectorant, purgative, spasmolytic, antibacterial. *Jamwal et al. (1959); Jayshree and Jolly (1993)* Amla is a gift of nature to mankind. It is indispensable part of the Ayurvedic and unani system with the

amazing remedial qualities. In Sanskrit, it is called Amalaki or Dhartiphala. Amla is perhaps the single most often mentioned herb in "Charak Samhita", the Ayurvedic medicine literature (500 BC). Amla is a wonder herb and one of the precious gifts of nature to humans. Amla is known as "Divya" and "Amrut" or amrit phala in Sanskrit, which literally means fruit of heaven or nectar fruit.

The Sanskrit name Amalaki, translates as the Sustainer or the Fruit where Goddess of Prosperity Resides. In Hindu mythology the tree is worshipped as the Earth Mother as its fruit is considered to be so nourishing as to be the nurse of mankind (Onions, 1994). The fresh fruit of Amla is a very rich source of ascorbic acid (454.40 mg/ 100 g) and appreciable source of total sugar (7.53mg /100 g), calcium (14.91 mg /100 g), iron (0.62 mg / 100 g) and also has great potential for processing.

MEDICINAL BENEFITS OF AONLA FRUIT

A Natural Wonder: Amla is a rich source of Vitamin C, among 1 gm of Vitamin C per 100 ml fresh juice and requisite for the synthesis of collagen, which is liable for keeping the cells of the body together. It has the same amount of vitamin C present in two oranges Kapoor L.D. (1990).

It increases the Red Blood Cell count and help to promote good health. Numerous experimental evidences have shown that Amla fruit possess antioxidant Bhattacharya et al. (1999), hepatoprotective Jeena, et. al. (1999), hypocholesterolic Mishra et. al. (1981) and anti-inflammatory activities Asmawi et al. (1993).

The Natural Refresher: Vitamin C present in Amla is one of the main factors that can help to retrieve or refill the energy lost by body. So, the replenishment of new energy causing by Amla is considered as a natural refresher.

In Anemia Therapy: Amla is a good absorption agent of iron. Ascorbic acid is highly present in Amla, which helps to reduce iron deficiency. Singh DP, Govindarajan R, Rawat AK (2008).

Action on toxins: Some of the toxins may be stored in liver by regular uptake of pain killers, antibiotics, medication and alcohol consumption. Amla prevents the body from these toxins by strengthening the liver thereby Amla act as good detoxifier helps to purify blood.

Well Digestive agent: Fresh green leaves of Amla is crushed and mixed with curd taken before food can improve good digestion.

NUTRITIONAL VALUE OF AMLA PER 150GRAMS

Calories	66Cal	Vitamin C	41.6 mg
Carbohydrates	15.3 gm	Vitamin E	0.6 mg
Dietary fiber	6.4 gm	Thiamin	0.1 mg
Total fat	0.9 gm	Niacin	0.4 mg
omega 3 fatty acid	69 mg	Vitamin B6	0.1 mg
Omega 6 fatty acid	406 mg	Folate	9 mcg
Protein	1.3gm	Calcium	37.5mg
Vitamin A	435 IU	Iron	0.5 mg
Magnesium	15 mg	sodium	1.5 mg
phosphorus	40.5 mg	zinc	0.2 mg
potassium	297 mg	copper	0.1 mg
water	132 gm	ash	0.7 gm

GILOY

Tinospora cordifolia (*Menispermaceae*) commonly known as Giloy, a Hindu mythological term is referring to the heavenly Elixir.

Its stems and roots are used as herbal remedies. Giloy are potent antioxidant found in Ayurveda also reported in Rasayana. The stem is bitter in taste and stimulates bile secretion, stomachic, diuretic and cures jaundice, it also has anticancer and antidiabetic activities.

It is best remedy for children suffering from upper tract infections, Vedavathy and Rao (1991). So keeping in view its therapeutic as well as nutritional value, the present study was envisaged with the objective of development and evaluation of value added product by using stem.

ORIGIN AND HABITAT: *T. Cordifolia* is a climbing shrub native to lower elevation in tropical areas of the Indian subcontinent and climbs numerous types of trees.

THE FAMILY: *T. Cordifolia* belongs to the family *Menispermaceae* which consists of about 70 genera and 450 species that are found in tropical lowland regions. This family is rich source of alkaloid and terpenes.

THE GENUS: The genus is represented by four species; two species, *T. cordifolia* (thunb.) Miers and *T. sinensis* (Lour.) Merr. are known to occur in South India and other two *T. crispa* (L.)

VERNACULAR NAMES: Giloy, Amarlata; Gadancha; Guluncha; giloe; K'uan chu Culuncha; Gado; Amrytu; ambarvel; Gurjo.

BOTANICAL DESCRIPTION: Large, glabrous, deciduous, climbing shrubs. Leaves broadly ovate, cordate, long petiole. Flowers small yellow or greenish yellow, appearing when the plant leafless.

PARTS USED: Root, stem and leaf

ACTION AND USES: The stem is bitter, astringent, sweet, thermogenic, alterant antiperiodic, antispasmodic, anti-inflammatory, antipyretic, digestive, carminative, appetiser, stomachic constipating, cardioto, depurative, galactopoietic and tonic.

It is useful in burning sensation, vomiting, flatulence, acid gastritis, jaundice, intermittent fever, leprosy. The whole plant, well ground is applied on fractures. Starch from roots and stems is useful in acid diarrhea. Due to acidity of intestinal canal or acid dyspepsia. Juice from fresh plant is useful in diuretic. Leaves are useful in jaundice.

NUTRITIVE VALUE OF GILLOY PER 100GM

Energy	292.54 CAL	FAT	3.1%
Fiber	15.9 %	IRON	0.28%
Carbohydrates	61.66%	POTASSIUM	0.845%
Protein	4.5-11.2%	CHROMIUM	0.006%
Calcium	0.131%		

MULETHI

BOTANICAL NAME: *Glycyrrhiza glabra* Linn

ORDER: Fabaceae

CLASSICAL NAMES: Yashtimadhu; Yashti; Yashtimadhuka
Madhuyashtika ; Madhuka; Kleetaka; Yashtyahva.

VERNACULAR NAMES: Eng.- Liquorice. Hindi -Mulhatti,
Jethimadhu, Mulethi. Beng- Jashtimadhu;

Guj.- Jethimadha,

Kan.- Yashti madhuka.

PARTS USED: Root

BOTANICAL DESCRIPTION: It is hardy herb or under shrub attaining a height of 1-2 m. Leaves multi foliolate; flowers in axillary spikes; lavender to violet in colour; pods compressed; containing reniform seeds.

Glycyrrhiza glabra called yastimadhu in Sanskrit, mulethi in Hindi and liquorice in English, is a ligneous perennial shrub. It is the principle component to which sweetness and medicinal properties of mulethi are attributed. Attempts are going to be made by utilizing mulethi root powder for fortification of RTS with approximately 2 percent mulethi powder. Glycyrrhizin is a triterpene saponin, which is 50 times sweeter than sucrose. It is clinically employed for centuries due to its anti-inflammatory, anti-ulcer, antimicrobial and anxiolytic activities.

ACTION AND USES

The roots are sweet, refrigerant, emetic in large doses, tonic, diuretic. They are useful in hyperdipsia, cough, bronchitis, ulceration of urinary tract, gastric ulcer, fever, skin diseases, hoarseness of voice. Decoction of root is good wash for falling and greying hair. It is externally applied for cuts and wounds.

PHARMACOGNOSY

The drug sold in market in the name of Yastimadhu or liquorice consist of stem and root of *Glycyrrhiza glabra*. Stem is yellowish brown or dark brown, odour is faint, taste sweetish.

PHARMACOLOGICAL ACTIVITIES

Smooth muscle depressant, antimicrobial, hypolipidemic, antiviral, hepatoprotective, anti-exudative, spasmolytic, antidiuretic, antiulcer, antipyretic, antioxidant, anti-inflammatory.

NUTRITIVE VALUE OF MULETHI PER 100GM

CALORIES- 312
CARBOHYDRATES- 65 g

Fat- 0
Protein- 7g
Dietary fiber- 12g

BRAHMI

BOTANICAL NAME	: <i>Bacopa monnieri</i> (Linn.)
FAMILY	: Scrophulariaceae
KINGDOM	: Plantae
DIVISION	: Anthophyt
CLASS	: Dicotyledoneae
ORDER	: Scrophulariales
GENUS	: Bacopa
SPECIES	: monnieri
CLASSICAL NAMES	: Bra hmi ; Janimba ; Kapotavanka ; Somavalli ;
VERNACULAR NAMES:	ENG-Thyme leaved gratiola ; HINDI- Bra hmi, Jalnim, KAN -Nirubrahmi ; MAL-Brahmi, Nirbrahmi ; TEL- Sambra ni
PARTS USED	: Whole plant

Brahmi (*Bacopa monnieri*) is one of the oldest traditional ayurvedic medicine of India. Brahmi is known for enhancing memory, cognition, mood and other mental disorder. Saponins are the major compounds in Brahmi which is responsible to enhance the nerve impulse. It can only be used as a value added product and hence used in very less amount due to its unique herbal after taste. It was originated in India more than 3000 years ago. It has many long researched and proved for many beneficial medicinal and functional properties. Functional ingredients are the foods that have health benefits beyond normal nutrition. It is classified as Medhyarasayana, a drug used to improve memory and intellect (medhya). It was used traditionally as brain tonic to enhance memory development, learning and concentration, and to provide relief to patients with anxiety or epileptic disorders. Brahmi name is derived from the word "Brahma-creator of the universe in the Hindu pantheon. Because brain is the center for creative activity, any compound that improves the brain health is called Brahmi, which also means "bringing knowledge of supreme reality".

NUTRITIONAL VALUE OF BRAHMI PER 100 GMS

MOISTURE	88.4 g	CALCIUM	202 g
PROTEIN	2.1 g	PHOSPHORUS	16 g
FAT	0.6 g	ASCORBIC ACID	63 g
CARBOHYDRATES	5.9 g	NICOTINIC ACID	0.3 g
FIBER	1.05 g	IRON	7.8 mg
ASH	1.9 g	ENERGY	38 cal

PIPER NIGRUM



Adopted from internet (A) Climbing vine of *P. nigrum* (B) Green mature berries of *P. nigrum* (C) Black, white and green fruits of *P. nigrum* (D) Processed pepper com. Piper Nigrum is famous as the spices king due to its pungent quality, pepper com *P. Nigrum* as a whole or its active components are used in most of the food items. Black pepper is also used in traditional medicine, particularly for digestive ailments. Black pepper is native to the Western Ghats of Kerala State in India, where it grows wild in the mountains. It is cultivated all over the tropics as a commercial crop. Vietnam, Indonesia, Brazil and India are the major producers. It is used as flavouring, particularly for savoury foods, meat dishes, sauces and snack foods. It is also used as a table condiment. Black pepper, white pepper and green pepper coms are all produced from *Piper nigrum* fruits, but are harvested at different times and are processed differently. India is a key producer of black pepper and exports much of what is grown. Pepper coms from Malabar and Tellicherry in Kerala, India, are particularly prized for their Flavour and pungency. Black pepper is also used to produce pepper oil and oleoresin, which are frequently used in the production of convenience foods and sometimes also for perfumery. Black pepper coms feature as remedies in Ayurveda, Siddha and Unani medicine in South Asia. They are most frequently used as an appetizer and to treat problems associated with the digestive system, particularly to eradicate parasitic worms.

Some traditional uses of black pepper are supported by scientific evidence. In Ayurvedic medicine, black pepper has been used to aid digestion, improve appetite, treat coughs, colds, breathing and heart problems, colic, diabetes, anemia and piles. Stomach ailments such as dyspepsia, flatulence, constipation and diarrhea are all treated with black pepper, which may be mixed with other substances such as castor oil, cow's urine or ghee. Black pepper has been prepared in tablet form as a remedy for cholera and syphilis, sometimes combined with other substances. It has also been used in tooth powder for toothache, and an infusion of black pepper has been suggested as a remedy for sore throat and hoarseness. Black pepper may be chewed to reduce throat inflammation.

NUTRITIONAL VALUE OF PIPER NIGRUM PER 100GRAMS

CALORIES	251	DIETARY FIBER	25 g
FAT(SATURATED)	1.4 g	SODIUM	20 mg
TOTAL FAT	3.3 g	PROTEIN	10 g
SUGAR	0.6 g	IRON	9.71 mg
total carbohydrates	64 g		
CALCIUM	443 mg	POTASSIUM	1329 mg

OBJECTIVES

- To standardize the techniques to prepare and procure herbal raw material by fortifying the drink with them.
- Determination of physicochemical properties of RTS (ready to serve).

- To formulation Apple based RTS blended with Dates, and herbal Fortification with Amla, Giloy, Mulethi and Brahmi.
- Determination of microbiological analysis of soft drink.
- Determination of sensory properties and storability of ready to serve beverage/ soft drink.

REVIEW OF LITERATURE

- Amerine and Winker et. al.(1940)** suggested that brix, acid ratio calculated from the number of degree brix and from titratable acidity expressed as present (w/w) tartaric acid.
- Capsida Jr.IW.(1968)** "Industrial Microbiology" John Willy and sons, Inc.
- Bajpat et.al. (1969-71)** investigated the seasonal changes in vitamin C content of Aonla fruit and also determined the optimum stage of maturity for harvesting fruits. During the study they found that Vit.C contents of Aonla fruit increases with the advance in the season and maximum amount of Vitamin C (563mg/100 gm) was observed in the fruit collected by the middle of February.
- Mapson, (1970)** The ascorbic acid (vitamin C) content of the juice decreased during storage with the advancement of storage period, which was probably due to the fact that ascorbic acid being sensitive to oxygen, light and heat was easily oxidized in the presence of oxygen by both enzymatic and non-enzymatic catalyst.
- Ranganna et. al. (1977):** found methods of estimation of total soluble solid, total acidity, volatile acidity, ash, moisture, reducing and non-reducing sugar and ascorbic acid.
- Singh and Tripathi (1988)** studied the comparative compositional changes in different preserved products of Aonla such as jam, jelly, candy, squash, juice and preserve. principle piperine Pepper corn of *Piper nigrum* as a whole or its active components are used in most of the food items. Different parts of *Piper nigrum* including secondary metabolites are used as drug, preservative and natural control agents. The review based on the biological role of *Piper nigrum* can provide that pepper com or other parts can be used as crude drug for various diseases while the secondary metabolites such as piperine can be used for specific diseases.
- Mishra Vandana, Vinita Puranik, et. al. (2012)** conducted development of Vitamin C rich value added beverage that Amla is richest source of vitamin C ranges up to 950mg /100 g. Due to its astringent taste, it is not palatable for direct consumption, hence processing is essential. The fruit juices were analysed for its chemical composition and different formulations of mixed juices were prepared.
- J.M. Al-Khayri, D.V. Johnson, S.M. Jain (2013)** provided an editorial on special issue on Date Palm Current Research.
- Choudhary Namrta, M.B. Siddiqui, et. al. (2013)** reviewed ethnobotany, phytopharmacology and phytochemistry aspects of *Tinospora Cordifolia*. It is the plant of significant medicinal importance in the Indian system and designated as Rasayana. Its efficiency has been also recognised by the modern system of medicine.

- **Damle Monica (2014)** reviewed that *Glycyrrhiza glabra* (Licorice) is a potent medicinal herb. It is effectively used as anti-inflammatory, anti-bacterial, anti-fungal, anti-diabetic, anti-ulcer antioxidant and anti-diuretic. The present article is an effort to compile the available literature on *Glycyrrhiza glabra* with respect to its traditional uses.
- **Sood Sangita, and Shilpa (2015)** conducted studies on preparation and evaluation of value added products from Giloy. It stated that Giloy is rich in nutritional and therapeutic values. It is consumed by the peoples in the form of decoction to cure certain ailments. The plant is well known for its phytochemical constituents. There was urgent need for recognition of medical properties of giloy and to prepare certain value added products. Result of the study revealed that Giloy contains good amount of crude fiber (5.72%) and ash content (6.35%).
- **Stough Con, et. al. (2015)** conducted the detail about Mechanisms, efficacy, and safety of *Bacopa monnieri* (brahmi) for Cognitive and brain enhancement.
- **Sajneetha Sukapriya et. al. (2015)** blending of fruit juices is practiced to overcome the high cost of some exotic fruit juices, scarcity or seasonal availability, balancing of strong flavours, high acidity, astringency, or bitterness, improving total soluble solids, blend flavour, improving and stabilizing color.
- **Farheena Iftikhar et al. (2015)** Fruits of date palm (*Phoenix dactylifera* L.) are consumed throughout the world and are a vital component of the diet in most Arabian countries. Dates have less fat content, hence heart patients can consume dates as such or their products. Dates contain high amount of dietary fiber. This fiber helps to control diabetes by decreasing the blood glucose levels and helps to lower the blood cholesterol level. Qualitative and quantitative properties of cookies was studied. Levels of date paste used were 10%, 15%, and 20%. Quantitative (ash, moisture, protein, fat, carbohydrates and caloric value) and qualitative properties (colour, texture, taste and flavour) were
- Assessed. Results obtained indicated that ash and fiber contents gradually increase in mineral content by addition of date paste. Crude fiber and protein showed a slight increase with increasing date paste ratio but carbohydrates (T0 =76.09 to T3=70.75) and overall caloric value (T0=384.85 to T3=377.86) decreased simultaneously.
- **Ashalata and Shenoy (2016)** gives a critical review that *Centella asiatica* is largely treasured as a revitalizing herb used by Ayurvedic medical practitioners. The herb is being mentioned a well-known nootropic herb. It is also being used as an antispasmodic, astringent, cardio tonic, diuretic, anticonvulsant, anti-inflammatory, analgesic, antipyretic. Brahmi is well known nootropic herb and it is used in neurological and psychiatric disorders are well recognized.
- **Essa Mohamed Musthafa, et. al. (2016)** reported the beneficial effects of Date palm fruits on neurodegenerative diseases. Recently science has caught up to confirm what our distant ancestors know and what they were talking about. Hence, dates are frequently consumed among Arabian peoples not only by virtue of the fact of awareness but also due to its high nutritive value and the lost cost of agriculture. Fresh Dates are composed of soft easily digestible flesh and simple sugars. Dates are chemically composed of sugar (81-88% mainly fructose, glucose and sucrose), dietary fiber (~5-8.5%) and small amount of protein, fat, ash and high quantities of phenol (Elluch et.al.2008).
- **Singh HK, Dhawan BN.** Stated Neuropharmacological effects of Ayurvedic nootropic *Bacopa monnieri* Linn. (BRAHMI).
- **Mukherjee Arun, Vipla Gombar, et al. (2017)** reviewed the effectiveness of Brahmi in various illnesses. Plants have been used as treatments for thousands of years, based on experience and folk remedies and continue to draw wide attention for their role in the treatment of mild and chronic diseases. In this era, focus on plant research has increased all over the world and a large body of evidence has been accumulated to highlight the immense potential of medical plants. The present paper reviews Brahmi (*Centella asiatica*) as medicinal plants and highlights its benefits in various health problems.
- **Bishnoi Prabha Jyoti, et. al. (2018)** conducted experiment on utilization of *Glycyrrhiza glabra* for the preparation of herbal Amla laddoo. Glycyrrhizin is the principle component to which sweetness and medicinal properties of mulethi are attributed. High temperature during processing has no effect on these active constituents. This study was first in its kind to determine overall acceptability, chemical composition and effect of storage period on chemical constituents of herbal Amla laddoo obtained from Amla fruits cv. Chakiya and mulethi root powder.
- **Patel Saurabh Shankar, et. al. (2018)** reviewed the *Brahmi* as functional food ingredients food processing industry. It is also studied that Brahmi is known for enhancing memory cognition, mood and other mental disorders. Saponins are the major compounds in Brahmi which responsible to enhance the nerve impulse transmission. Brahmi has its own unique strong herbal taste and a bitter aftertaste.
- **Sonkar Shashi, et. al. (2018)** experimented fortification of functional value of pineapple RTS beverage by the addition of Amla and giloy. Fortification of this RTS in terms to increase functional value by addition of Amla and giloy both possess health protective properties.
- **Snafi Al., Dr. Esmail Ali. (2018)** reviewed about the phytochemical screening of *Glycyrrhiza glabra* root revealed the presence of alkaloids, glycosides, carbohydrates, starches, phenolic compounds, flavonoids, proteins, pectin, mucilage, saponins, lipids, tannins, sterols and steroids. It showed memory enhancement antidepressant, antioxidant, protective anti-inflammatory, anti-ulcer, antidiabetic and many other pharmacological effects.
- **Surya. N, et. al. (2019)** reported development of Amla (*Embolica officinalis*) ready to serve beverage fortified with dietary fiber. The present investigation was carried out to standardize the fortification of dietary fiber into Amla RTS Beverages. The Amla beverage were fortified with different concentration level (0.5%, 1% and 3%). Prepared RTS was packed and stored and then further evaluated for different organoleptic as well as chemical parameters.

- **Sharma Nikhil, et.al.(2019)** studies on the sensory analysis of preparation of Date Palm ready to serve beverage by using Soya protein powder. The present investigation is an attempt to formulate higher nutritional value of beverage with added health benefits by addition of date palm pulp and whey with soya protein. Studied for its sensory properties such as colour and appearance, flavour and taste, consistency and overall acceptability by trained panelist by using 9 points hedonic scale.

MATERIALS AND METHODS

Increasing consumer/ public demand for sustained growth of food processing industry and reducing the unpalatable tastes or else nutritionally superior ingredients are important factors which impose the development of novel RTS. To produce innovative product by giving a vast importance to the nature provided material. Keeping in view of the above facts these fruits and medicinal herb benefits health and nutritional values was carried out with the following objective. To study on the preparation of apple based RTS with addition of Amla and dates pulp and various herbs such as Giloy, Mulethi, brahmi and piper nigrum an experiment was conducted at "State Institute of Food Processing, Technology", Lucknow (U.P.)

The raw material that is apple and amla having uniform maturity and size were procured from local market for the preparation of apple and Amla RTS. Brahmi and giloy have to be taken from CMAP. Raw materials are devoid of blemish and also free from infection and infestation and blemished, deformed fruits and over dried giloy was discarded before analysis and removal of juice. The selected material analysed in regards to physical and chemical characters. Fruit of each lot were washed in running water thoroughly, extract juice.

OBSERVATIONS TO BE RECORDED:

- Physical observations.
- Chemical observations.
- Organoleptic observations.
- Microbiological observations.

Physical Observations: Apple fruit, Aonla fruit, Giloy stem, Mulethi root, Brahmi leaves and Piper nigrum were randomly taken for determination of following physical aspects.

- WEIGHT (gm)
- FRUIT CIRCUMFERENCE (cm)
- SPECIFIC GRAVITY
- JUICE PERCENTAGE

Weight: Weight of each was recorded individually and separately on a laboratory physical balance to the nearest two decimal place and then the weight of ten fruits, ten roots and ten stems was reported as average weight in grams per fruit, root and stem.

Fruit circumference: The circumference of Aonla and apple fruit was measured with the help of tension free cotton thread and the data recorded in centimeters.

Specific Gravity: Specific Gravity was worked out by water displacement method under which the weight of fruit was divided by the volume of the water displaced by the fruit.

$$\text{Specific Gravity} = \frac{\text{weight of fruit in air}}{\text{Volume of water displaced by fruit.}}$$

Juice percentage:

The extracted juice was measured with the help of measuring cylinder and juice percentage was calculated as follows -

$$\text{Juice percentage} = \frac{\text{wt. of extracted juice}}{\text{weight of fruit taken}} \times 100$$

Chemical Observations: The Aonla and Apple fruit from each treatment and each replication were analyzed to determine for chemical aspects.

- pH
- T.S.S (° Brix)
- Titratable Acidity (% citric acid)
- Ascorbic acid (mg/100gm)
- Reducing Sugar (%)
- Non Reducing Sugars
- Total Sugars
- Moisture Test

pH

Methods of Determining P^H: pH is actually an abbreviation for **potential of hydrogen**. It is a numerical value assigned to a solution that tells show acidic or basic that solution is. The pH scale ranges from 0 to 14; pH values that are less than 7 are defined as being acidic while pH values greater than 7 are defined as basic. A pH that is a perfect 7 is said to be neutral and is neither acidic nor basic. Various method and instrument available for measuring the pH of a solution. pH was measured with pH meter as described by Ranganna (1986)⁵². The fruit juices were extracted from ten fruits and extracted satva from ten stems, homogenized and pH was measured using pH Meter.



pH Meter: Another way chemists determine the pH of a solution is by using a pH meter. A pH meter is very similar to a conductivity meter, however the pH meter specifically looks for and detects the hydrogen ion concentration within a solution. Usually a pH meter must be calibrated to ensure its accuracy, and this is typically done by using a standard

solution whose exact pH is known. The meter is set to that specific value and then unknown pH values are determined in reference to the standard.

Total Soluble Solids

Total soluble solids were determined by Hand Refractometer as per method of *Ranganna (1986)*³². For T.S.S. determination, each apple fruit pulp sample (1-2 drops) was placed between the prism of refractometer and the reading was measured as degree Brix at room temperature and corrected at 20°C. The zero error in the refractometer used in the experiment was found nil.



Titrateable Acidity- Acidity was analyzed by acid - base titration method as described by *Miller (1950)*⁴³. 10 grams of sample was taken then it was diluted with water and final volume was made up to 250 ml. 10 ml of aliquot was taken in a conical flask titrated against N/10 NaOH Solution using as indicator till the pink colour appeared which persisted for at least 30 seconds. Volume of NaOH used was previously standardized with the same (N/10) strength of Oxalic Acid solution using phenolphthalein as indicator. The values were however reported in terms of citric acid on the basis of standard calculations.

$$(\%) \text{ Acidity (as citric acid)} = \frac{\text{Titre} \times \text{Normality of NaOH} \times \text{Factor}}{\text{Weight or volume of sample}} \times 100$$

Ascorbic Acid: Ascorbic acid was estimated according to *Bessey and King (1933)*⁴⁴. 10 gm of sample is taken and the final volume is made up to 250 ml with extracting solution. 5ml of the above aliquot was taken in a conical flask and rapidly titrated against standardized 2-6 di-chloro-phenol indo phenol dye solution. The end point was noted with the appearance of light but distinct rose pink colour which persisted for at least 15 seconds. The dye solution was standardized against freshly prepared 0.1% ascorbic acid solution.

MOISTURE: A known quantity of sample was weighted into previously weighted moisture cup and dried in hot air oven at 98° to 100° C to a constant weight (*Anon 1990*). Moisture content was calculated using the formula.

$$(\%) \text{ Moisture} = \frac{\text{Initial Wt. (gm)} - \text{Final Wt. (gm)}}{\text{Sample Wt. (gm)}} \times 100$$

SUGAR (Reducing, Non-reducing, and Total sugar):

Reducing, Non-reducing, and Total sugar were measured by the method of *Lane and Eynons (1943)*. 10 gm of the sample was taken and crushed along with distilled water. The volume was made up to 250 ml using distilled water. Pipetted out Fehling's solution A (Containing

34.64 grams of crystalline copper sulphate in 500 ml of water.) and 5 ml of Fehling's solution B (Containing 173 grams of Sodium Potassium Tartarate and 50 grams of NaOH in 500 ml of water). Solutions were taken in conical flask and titrated in boiling condition against the aliquot present in the burette using Methylene blue as indicator. A brick red colour obtained due to precipitate of cuprous oxide indicates the end point. The volume of the solution was noted for the calculations of reducing sugars.

TOTAL SUGAR: 50 ml of aliquot sample solution was transferred to 250 ml conical flask. Then 10 ml HCl was added in it and allowed to stand for 24 hours. For inversion of sucrose, the inverted sample solution was then neutralized with Sodium Bi Carbonate (NaHCO₃) and the volume was made up to 100 ml with distilled water.

The aliquot was taken to determine the total reducing sugar.

Reading obtained was used for calculation of reducing sugar as per following formula 0.2 percent dextrose solution was used as a standardization of Fehling's solution. (Feh. A & Feh. B).

Factor x Volume of sample make up

$$(\%) \text{ Reducing Sugar} = \frac{\text{Factor} \times \text{Volume of sample make up}}{\text{Reading} \times \text{Wt. of sample}} \times 100$$

$$(\%) \text{ Total sugar} = \frac{\text{Factor} \times \text{Vol. of sample make up} \times 100}{\text{Reading} \times \text{Wt. of sample}} \times 100$$

PREPARATION OF GILOY SATVA

Clean and thumb size stem of giloy herb and cut into small pieces, boiled and crushed well and heated till one-fourth water rest and then filter

Procurement of sample Washing Soaking sample (overnight)

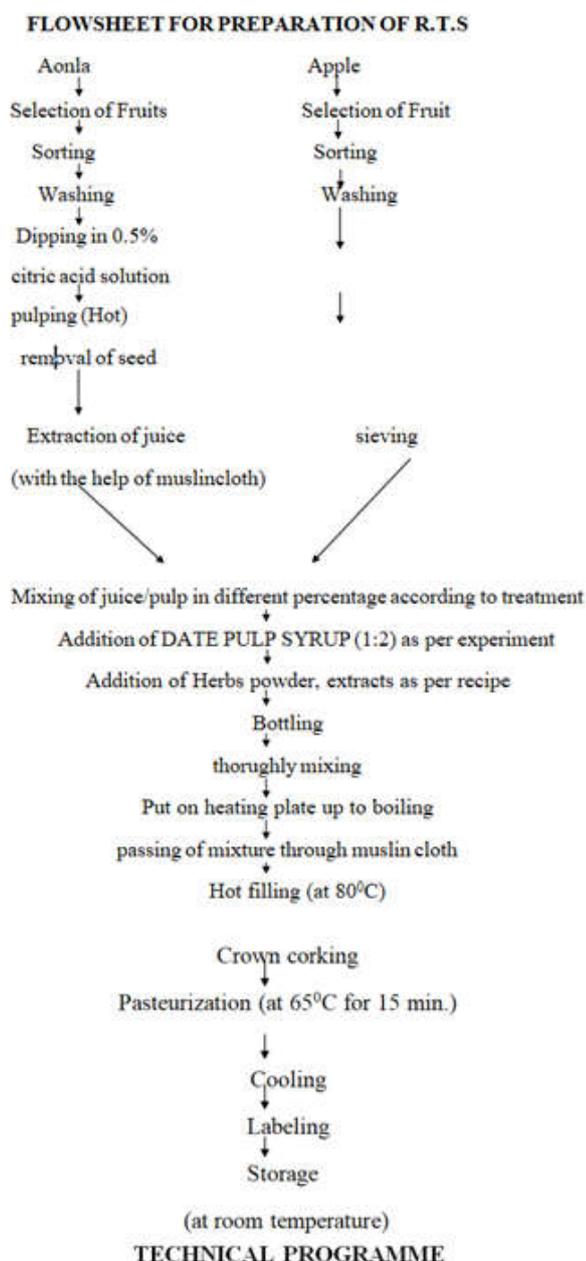
Bottling filtering Grinding

STANDARDIZATION OF JUICES AND OTHER HERBAL MATERIAL:

For preparation of apple RTS initially standardize the fruit juice (apple and amla), after standardization the best ratio used for the same with giloy percentage along with a very least amount of mulethi and Brahmi fortification. Dates can be crushed and heated with little water and extracted sugar can be used for sweetness.

JUICE EXTRACTION, PREPARATION OF BEVERAGE:

Apple cut into small pieces and juice is extracted, Amla fruit is blanched, seed removed manually, and centrifugal juice extractor can be used for extraction of juice. Then juices strained through Muslin cloth and pasteurize at 90-degree temperature for 1-2 minutes. Dates were crushed heated with little water sugar extracted. The apple and Amla juice was mixed in different ratios along with giloy, mulethi and Brahmi. All the blends were adjusted with requisite amount of R.O. water and citric acid in order to contain 15% JUICE, 12% TSS AND 0.3% ACIDITY.



RESULT AND DISCUSSION

The data related to physical parameters of fresh apple are presented on table no.1. The colour of fruit was visually observed greenish red, weight was found 171.80 gm, and length of apple fruit was measured 7.21 cm while circumference of fruit was found 11.3 cm. Specific gravity was observed 0.97. The flavor of the fruit was sensory evaluated was pleasant sweet flavor. And that of fresh amla as per table 1 Data of physical analysis of fresh Aonla and apple fruits are presented in table. It reveals that the Aonla had an average weight of 32.50gm, length of 3.40cm., Specific gravity of 1.022, juice and pulp percentage for Aonla and apple was observed to between 65% and 78%. Giloy stem was evaluated physically in terms of colour, shape, weight and circumference. The colour of stem was light brown. Shape of test species delineated in plate 1 was found to be cylindrical. The mean length 4.24cm of the giloy stem cut pieces weighing 1.38 grams.

The circumference of Giloy stem was established as 0.45. Chemical characters observed in fresh Aonla are presented in table 2. It shows that Aonla Contained 10⁰ Brix Total soluble solids and 2.5 p^H, Acidity observed in fruits as citric acid was 2.10mg. It contains a high amount of sugar that is 8.25% in which 1.90% reducing sugar and 6.35% non-reducing sugar fruits had 475.25mg./100gm of Ascorbic acid. On the other hand, chemical characters' observed in fresh apple are presented in the same table NO. 2. It shows that apple contained 13⁰ Brix total soluble solids and 3.02 pH, Acidity as citric acid was 0.5%, the total sugar control was 8.72% in which 8.27% reducing sugar and 0.45% non-reducing sugar. Ascorbic acid content was 442mg/100 gm, 0.27%.

The data pertaining to chemical composition of apple based RTS just after preparation represented in table 3. and The pH was depicted 3.10 in T₁ followed by 3.09, 3.09, 2.81 and 2.90 in T₃, T₄, T₁ and T₅. Result of R.T.S. beverages were analyzed for their chemical characters immediately after preparation data presented in table and were observed that p^H is approximately 3.0 in each treatment. Total soluble solids were observed is 16⁰Brix in in each treatment. T.S.S of fresh dates is 87-degree brix while that of date syrup prepared is 26-degree brix. The freshly prepared RTS contain moisture content (T₁ -15.10%, T₂ -5%, T₃- 6.50%, T₄-16.05% and T₅-8.7%).

The acidity was approximately 0.28% as citric acid in each treatment, ascorbic acid was found in T₂262.8 mg/ 100gm, while Total sugar was found maximum in T₂ 8.42%. 7.94% in which reducing sugar and were 0.45% non-reducingsugar, whereas total sugar in T₁ is 8.35%, in T₃ 8.40%, in T₄ 8.28% and in T₅ 8.41%. While Reducing sugar in T₁ is 8.25%, in T₃ 8.12% in T₄ 8.23% and in T₅ 7.64%. Non reducing sugar in T₁ is 0.1%, T₃ 0.28%, T₄ 0.05% and in T₅ 0.7%. Organoleptic evaluation was convened in the institute with 5 panelists. The R.T.S. secured 79- 96% marks. Among 5 treatments T₂ secured highest 96% score whereas T₃ secured 95% followed by T₁ 79%, T₄89% and T₅ 86%. The result clearly indicates that good quality R.T.S isprepared.

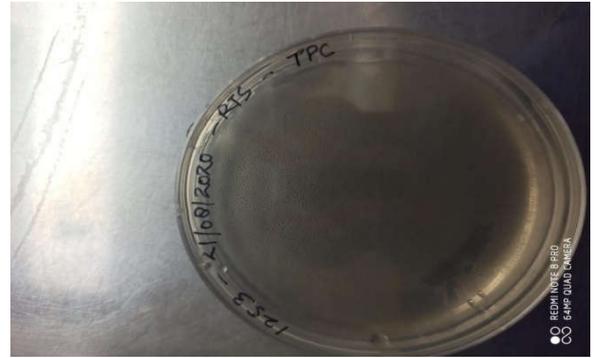
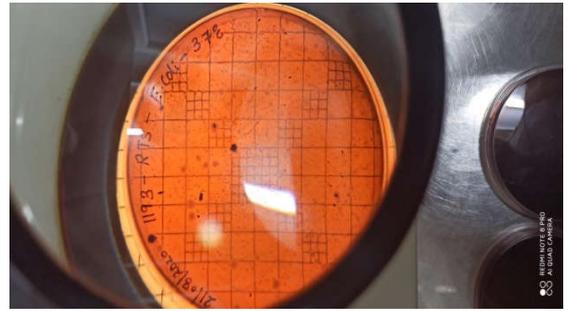
TREA TMENTS	TREATMENT SYMBOLS	PROPORTIONS
APPLE+FOR TIFIED ING REDIENTS	T1	100:00:00
APPLE+AMLA+GILLOY+MULET HI+BRAHMI +PIPER NIG RUM	T2	70:12:0.3:0.1:0.4:0.2
APPLE+AMLA+GILLOY+MULET HI+BRAHMI +PIPER NIG RUM	T3	72:14:0.1:0.1:0.5:0.2
APPLE+AMLA+GILLOY+MULET HI+BRAHMI +PIPER NIG RUM	T4	71:15:0.1:0.1:0.6:0.2
APPLE+AMLA+GILLOY+MULET HI+BRAHMI +PIPER NIG RUM	T5	74:16:0.1:0.1:0.7:0.2

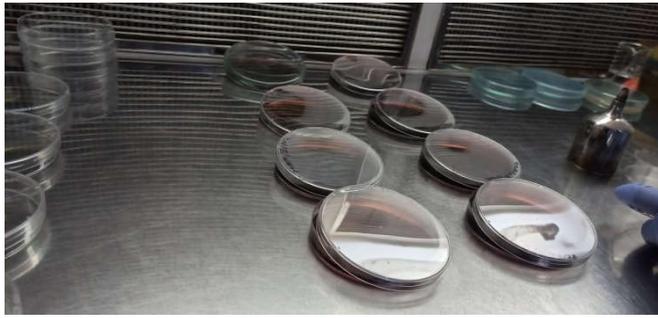
STATISTICAL DESIGN

DESIGN - COMPLETE RANDOMIZED DESIGN(CRD)

TREATMENTS - 5

REPLICALTIONS - 3





Preparation was also based on fortification of functional value to the beverage by addition of Amla and Giloy *Sashi Sonkar, Anand Kumar Chaudhary et. al* (2018). Studies on addition of Date Palm in RTS Beverage *Nikhil Sharma, Sandeep G.M. Prasad et. al.*(2019). Development of Vitamin C rich value added beverage, this study reflects Amla is richest source of vitamin C ranges up to 950mg /100 g *Vandana Mishra et.al.* (2012). The present study was an effort to develop a suitable formulation for preparation of Apple based RTS with addition of dates pulp, Amla juice, Giloy juice, Mulethi powder, Brahmi powder and Black pepper powder. The juices were analysed for its chemical composition and different formulations of different juices as well as powders which were prepared by different proportions as per technical program. The prepared RTS was packed in glass bottles with cork cap and stored at room temperature. The Giloy stem was evaluated physically in terms of colour, shape, weight and circumference. The colour of stem was light brown. Shape of test species delineated in plate 1 was found to be cylindrical. The mean length 4.24cm of the giloy stem cut pieces weighing 1.38grams. The circumference of Giloy stem was established as 0.45. Similar result was reported by *Sangita sood et. al.* (2015) The products were analysed for its keeping quality and acceptability for different constituents according to the procedure of A.O.A.C (1970) In present study Chemical analysis of fresh fruit as well as final products estimated accordingly methods described by Ranganna (1986) and RTS Beverage having composition in which acidity is 0.28%, 16-degree brix T.S.S, observed pH was 3 and was found optimum among other formulations. The freshly prepared RTS contain moisture content (T1 - 15.10%, T2 -5%, T3- 6.50%, T4-16.05% and T5-8.7%). Utilization of Mulethi (*Glycyrrhiza glabra*) for preparation, *Jyoti Prabha Bishnoi et.al.* (2018). Attempt was made to utilize Mulethi root powder for preparation of RTS. Mulethi roots were processed to prepare powder and used and were (2%,4%,6%) were found to be most acceptable. Vitamin C or ascorbic acid content of optimized product was observed to be high that is 303 mg /100 grams, *Mishra et. al.* (2011); *Puranik et. al.* (2011). Similar results were reported by *Vidhya and Narain (2011)* during storage of wood apple. Total sugar was found maximum in T₂ 8.42%. 7.94% in which reducing sugar and were 0.45% non-reducing sugar, whereas total sugar in T₁ is 8.35%, in T₃ 8.40%, in T₄ 8.28% and in T₅ 8.41%. While Reducing sugar in T₁ is 8.25%, in T₃ 8.12% in T₄ 8.23% and in T₅ 7.64%. Non reducing sugar in T₁ is 0.1%, T₃ 0.28%, T₄ 0.05% and in T₅ 0.7%. The products were analysed evaluated by taste testing panel for sensory attributes Colour, texture, flavour and consistency at scale of 100(25 marks for each attribute) for each treatment and control. The mean of result was calculated for sample contains and was found highest for T₂(96.2) followed by T₃(93.2), T₄(89.2), T₅(86.8) and T₁(79.2) *A.O.A.C* (1960). The result indicates that sample treatment T₂ was found to be most appropriate as per overall acceptability score for the prepared RTS.

TABLE01 Physical Characteristics Of Fresh Fruits And Giloy Stem

S.No.	Physical Characters	AONLA	APPLE	GILOY
1.	Weight(grams)	32.50	171.20	1.38
2.	Circumference(cm.)	4.12	11.3	0.45
3.	Length(cm.)	3.40	7.21	4.24
4.	Specific gravity	1.03	0.97	-
5.	Juice/pulp(%)	65%	70%	-

DISCUSSION

The experiment based on Preparation of R.T.S with Apple and value addition with Giloy (*Tinospora cordifolia*) *Sangita Sood et. al.* (2015).

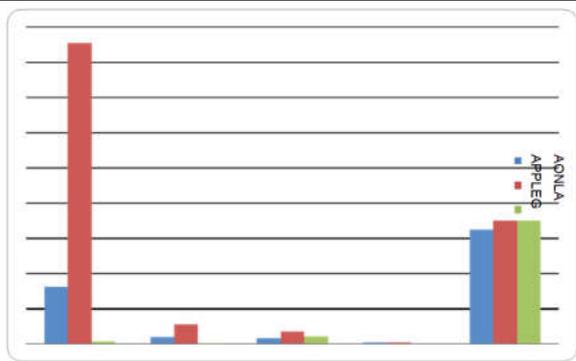


Figure 1

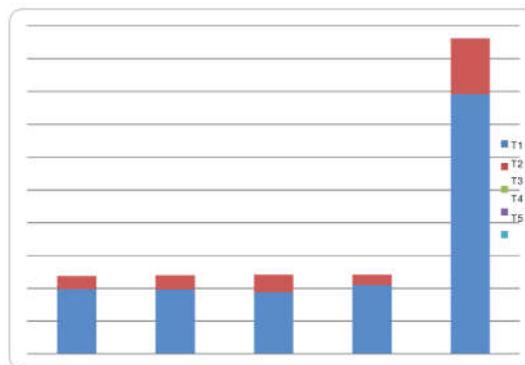


Figure 4

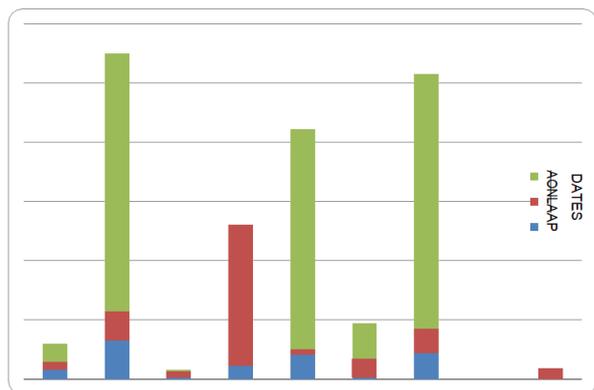


Figure 2

Table 02. Chemical characteristics of fresh fruits

S.No.	Chemical Characters	Apple	Aonla	Dates
1.	pH	3.20	2.50	6.30
2.	T.S.S. (Degree in Brix)	13 ⁰	10 ⁰	87 ⁰
3.	Acidity (%)	0.55	2.10	0.65
4.	Ascorbic Acid (mg/100gm.)	4.42	475.25	0
5.	Reducing Sugar (%)	8.27	1.90	74.23
6.	Non reducing sugar (%)	0.45	6.35	12.02
7.	Total Sugar (%)	8.72	8.25	86.25
8.	Pectin (%) as Calcium Pectate	X	0.05	-
9.	Tannin (as Gallutanic acid)(%)	X	3.75	-

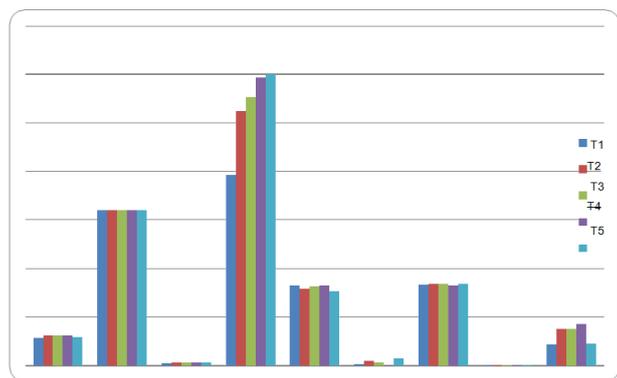


Figure 3

Table 04. Organoleptic evaluation of rts beverage

Treatment	COLOUR	FLAVOUR	CONSISTENCY	TASTE	Total
Marks	25	25	25	25	100
T ₁	19.8	19.6	18.80	21	79.2
T ₂	23.8	24.00	24.2	24.2	96.2
T ₃	23	23.00	23	24.2	93.2
T ₄	21	22.60	22.2	23	88.8
T ₅	21	22.40	21.2	22.2	86.80

SUMMARY AND CONCLUSION

The present research work on “To Study on the preparation of apple based RTS with addition of Amla and dates pulp and various herbs such as Giloy, Mulethi, Brahmi and piper nigrum and Were carried out at State Institute of Food Processing Technology, 18-B Ashok Marg, Lucknow (226001), India, in Microbiology section during year 2018 - 2020. The data were recorded on various parameters. The aim was subjected to physical and chemical analysis. The result has been described and discussed in concerned chapters. The salient features of the experimental findings on different aspects are summarized as follows. All the raw material that is apple and Aonla having uniform maturity and size were procured from local market for the preparation of apple and Amla RTS. Brahmi and giloy have to be taken from CMAP and brought to the laboratory within the same day and stored at room temp. The physical and chemical analytical procedure according to Ranganna (2000) and A.O.A.C. (1960). The present study was an effort to develop a suitable formulation for preparation of Apple based RTS with addition of dates pulp, Amla juice, Giloy juice, Mulethi powder, Brahmi powder and Black pepper powder. The juices were analysed for its chemical composition and different formulations of different juices as well as powders which were prepared by different proportions as per technical program. The Giloy stem was evaluated physically in terms of colour, shape, weight and circumference. The colour of stem was light brown. Shape of test species delineated in plate 1 was found to be cylindrical. The mean length 4.24cm of the giloy stem cut pieces weighing 1.38grams. The circumference of Giloy stem was established as 0.45. Chemical characters observed in fresh Aonla are presented in table 2. It shows that Aonla Contained 10⁰ Brix Total soluble solids and 2.5 p^H, Acidity observed in fruits as citric acid was 2.10mg. It contains a high amount of sugar that is 8.25% in which 1.90% reducing sugar and 6.35% non-reducing sugar fruits had 475.25mg./100gm of Ascorbic acid. On the other hand, chemical characters’ observed in fresh apple are presented in the same table NO. 2. It shows that apple contained 13⁰ Brix total soluble solids and 3.02 pH, Acidity as citric acid was 0.5%, the total sugar control was 8.72% in which 8.27% reducing sugar and 0.45% non-reducing sugar. Ascorbic acid content was 442mg/100gm, 0.27%. The data pertaining to chemical composition of apple based RTS just after preparation represented in table 3. and The pH was depicted 3.10 in T₁ followed by 3.09, 3.09, 2.81 and 2.90 in T₃, T₄, T₁ and T₅. Result of R.T.S. beverages were analyzed for their chemical characters immediately after preparation data presented in table and were observed that p^H is approximately 3.0 in each treatment.

Total soluble solids were observed is 16⁰Brix in in each treatment. T.S.S of fresh dates is 87-degree brix while that of date syrup prepared is 26-degree brix. The freshly prepared RTS contain moisture content (T₁ -15.10%, T₂ -5%, T₃- 6.50%, T₄-16.05% and T₅-8.7%). The acidity was approximately 0.28% as citric acid in each treatment, ascorbic acid was found in T₂ 262.8 mg/ 100gm, while Total sugar was found maximum in T₂ 8.42%. 7.94% in which reducing sugar and were 0.45% non-reducingsugar, whereas total sugar in T₁ is 8.35%, in T₃ 8.40%, in T₄ 8.28% and in T₅ 8.41%. While Reducing sugar in T₁ is 8.25%, in T₃ 8.12% in T₄ 8.23% and in T₅ 7.64%. Non reducing sugar in T₁ is 0.1%, T₃ 0.28%, T₄ 0.05% and in T₅ 0.7%. Organoleptic evaluation was convened in the institute with 5 panelists. The R.T.S. secured 79- 96% marks. Among 5 treatments T₂ secured highest 96% score whereas T₃ secured 95% followed by T₁ 79% T₄ 89% and T₅ 86%. The result clearly indicates that good quality R.T.S is prepared. Experimental findings and results is concluded that present study will create opportunity to Study will provide a platform to Research scholar to get better achievement in the preparation of apple based RTS with addition of Amla and dates pulp and various herbs such as Giloy, Mulethi, Brahmi and piper nigrum. Beverage industry will get an innovative product for market which will have both nutritive as well as pharmaceutical property

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