International Journal of Advanced Science and Research
ISSN: 2455-4227, Impact Factor: RJIF 5.12
www.allsciencejournal.com
Volume 2; Issue 3; May 2017; Page No. 01-04

A comparative study on phytochemical and biochemical of the fruit and ferment juice of *Morinda Citrifolia,* L., (Noni)

***Manju Mathew, Arul Sheeba Rani M**

M.Sc., Botany, Nirmala College for Women Coimbatore, Tamil Nadu, India

Abstract
Medicinal plants identified as a part of the evolution of human healthcare for thousands of years. India is known for its rich diversity of medicinal plants. The phytochemical constituents, natural bioactive compounds, nutrients and fibers present in medicinal plants, fruits and vegetables which are defend us from various ailments. *Morinda citrifolia* L.; (Rubiaceae) is an important medicinal plant with rich source of phytochemical constituents. The aim of the current study is to compare the phytochemicals and biochemicals of the fruit and fermented juice of *Morinda citrifolia.* The fresh noni fruits were collected and kept in aseptically cleaned empty jar and closed tightly for fermentation. Fermented juice used for further studies. Ripened fruits shade dried powdered and extracted with ethanol. The phytochemical and biochemical screening of fermented juice and fruit extract of *Morinda citrifolia* were analyzed by standard methods. Study reveals the presence of phenols, proteins, tannins, flavanoids, terpenoids and glycosides were more in fruit than the fermented juice also showed the presence of carbohydrate, protein and starch.

Keywords: *Morinda citrifolia*, fermented juice, fruit powder, phytochemicals, biochemicals

Introduction
Medicinal herbs are the local heritage with global importance. Many locally available plants which are not usually consumed by mankind due to the lack of knowledge about them. It has curative properties due to presence of various complex chemical substances of different composition, which are found as secondary plant metabolites in one or more parts of these plants. These plant metabolites according to their composition are grouped as alkaloids, glycosides, corticosteroids, essential oils etc. The fruit of this plant has been used as food, drink, medicine, colorful dye, cosmetics purpose and has a high demand in medicines for different kinds of illnesses like diabetes, high blood pressure, AIDS, arthritis, cancer, gastric ulcer, sprains, mental depression, senility, poor digestion, atherosclerosis, blood vessel problem etc. Its leaves, stem, bark, flowers, root and fruits are recorded as herbal remedies for different diseases. *Morinda citrifolia, L.;* has a long history related to medical uses in the majority of the Southeast Asian countries. It is thought to be the plant predominantly used before the era of modern European medicines. Noni juice is especially known for its medicinal properties: antibacterial, analgesic, anti-congestive, antioxidant, anti-inflammatory, astringent, laxative, sedative and hypo-tensor, which have been cited by many authors (Chopra *et al.* (1956) [3]; Adjanohoun *et al.,* (1983) [1]; Singh *et al.,* (1984) [8]; Singh *et al.,* (1986) [7]
The aim of the current study is to compare the phytochemicals and biochemicals of the fruit and fermented juice of *Morinda citrifolia*. In this present study the phytochemical screening is to identify the chemical compounds that are synthesized by plants used to perform important functions such as defend to against bacteria. The Bio chemical composition of the fruit was analyzed to detect the nutritional quality to suggest it as a health supplement.

Materials and Methods
Study Area- (Fig -1&2)
Tamil Nadu is one of the 28 states in India. Its capital is Chennai (Formerly known as Madras) the largest city. Tamil Nadu lies in the southern most part of the Indian peninsula and is bordered by the union territory of Puducherry and the states of Kerala, Karnataka and Andhra Pradesh. Coimbatore is the city in Tamil Nadu, South India. It is the capital city kongunadu region and is often been referred to as the Manchester of South India. Alvernia School is situated in the district of Coimbatore, which has a pleasant climate due to the presence of forests to the north and the cool winds blowing through the Palghat gap in the Western Ghats. The School campus is pollution free and eco-friendly. It is filled with coconut trees and fruit trees.

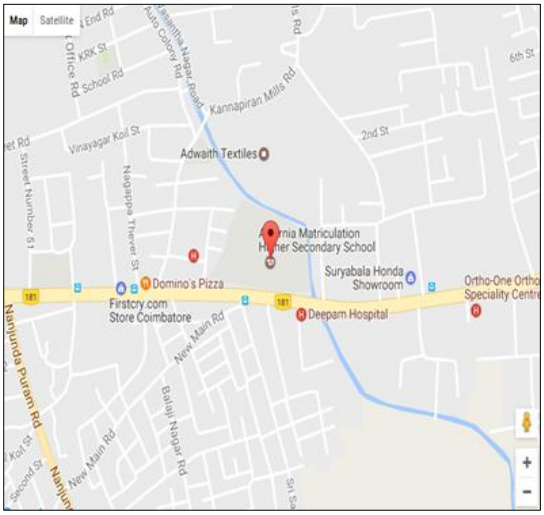

Fig 1: Location Map

Fig 2: Study Area

Fig 3: Habit of *Morinda citrifolia*

For the present study *Morinda citrifolia*, L.; collected from Alvernia School campus, Ramanathapuram, Coimbatore. The plant was bought from Agriculture University Coimbatore four years ago and planted in suitable place and nurtured properly. Fruits were collected from the campus during the month of October 2016.

Systematic position

Division	:	Phanerogams
Class	:	Dicotyledons
Series	:	Gamopetalae
Order	:	Gentianales
Family	:	Rubiaceae
Genus	:	*Morinda*
Species	:	*M. citrifolia*, L.

Morinda citrifolia, L.; is an important medicinal plant with rich source of phytochemical constituents. *Morinda citrifolia*, L.; Rubiaceae is one of the most important traditional Polynesian medicinal plants commercially known as Noni, Indian mulberry, Baji Tian, Nono or Nonu, Cheese fruit and Nhau in various cultures throughout the world. It indigenously found in open coast region at sea level and in forest areas about 1,300 feet above sea level. It is a small tropical evergreen shrub or tree, three to twelve meters height. It has straight trunk, large green leaves and distinctive grenade like yellow fruit.

Preparation of fermented fruit juice

The fresh noni fruits were collected and washed thoroughly with running tap water. The fruits were wiped with tissue paper and shade dried for 10 minutes to evaporate the water content from the fruits. Then the fruits were kept in aseptically cleaned empty jar and closed tightly for fermentation. After 60 days the fermented juice were collected from the jar. The collected juice was first filtered by nylon mesh to avoid the debris and seeds. The second filtration was done by Whaatman No.1 filter paper and used for further studies.

Fig 4: Fermenting fruits

Fig 5: Fermented juice

Preparation of fruit extract

Ripened fruits were collected from the selected plant and seed are removed by cutting in to small pieces and air dried and placed in an oven to dry at 50^0C. Then, powdered with help ofelectrical blender. 30 gm of this powder is extracted with 375 ml of ethanol under soxhelt apparatus for 24 hours. The collected extracts were used for further analysis.

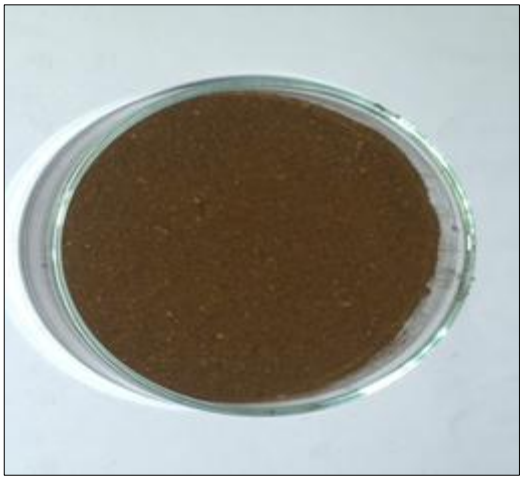

Fig 6: Powdered sample

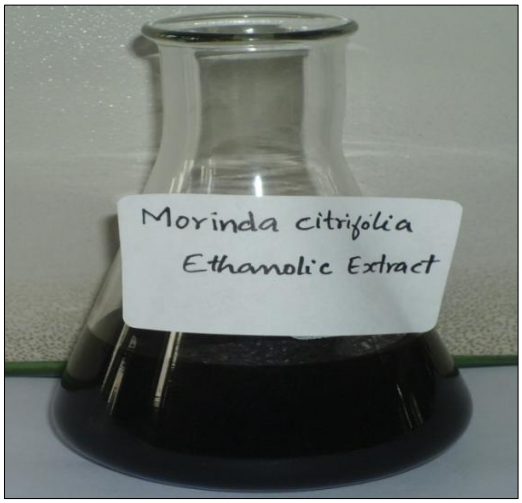

Fig 7: Ethanolic Extract

Preliminary Phytochemical Analysis

The phytochemical screening of fruit extract and fermented juice of *Morinda citrifolia* were analyzed by standard methods. Various phytochemical constituents such as saponins, phenols, alkaloids, protein, tannins, flavonoids, carbohydrates, quinone, terpenoids and glycosides are tested (Sidhique & Ali, 1997).

Biochemical Analysis

1. Estmation of total carbohydrates and starch by Anthrone method (Hedge, J.E. and Hofreiter, B.T (1962)
2. Estimaton of protein by Lowry's method (Lowry *et al.*, 1951)

Results and Discussion

In this present study the phytochemical screening was done to identify the chemical compounds that are synthesized by plants used to perform important functions such as defend to against bacteria. The Bio chemical composition of the fruit was analyzed to detect the nutritional quality to suggest it as a health supplement. The qualitative phytochemical screening of fruit revealed the presence of phenols, proteins, tannin, flavonoid, carbohydrate, terpenoides and glycosides. Fermented juice revealed the presence saponins, flavonoid, tannin, quinone, terpenoides and glycosides. The fruit of *M.citrifolia* revealed the presence of carbohydrates, terpenoid and glycosides in higher amount than fermented juice. Saponin and quinone are absent in ethanolic extract but moderately present in fermented juice. Phenol and flavonoids present in fruit but absent in fermented juice. The results of final identification on the basis of phytochemical analysis are shown in the table-1.

Table 1: Qualitative analysis of Phytochemicals present in the fruit and fermented juice of *Morinda citrifolia*.

S. No	Phytochemicals	Fruits	Fermented Juice
1	Saponins	_	+
2	Phenols	+	_
3	Alkaloids	_	_
4	Proteins	+	+
5	Tannins	+	+
6	Flavonoids	+	_
7	Carbohydrates	++	+
8	Quinone	_	+
9	Terpenoids	++	+
10	Glycosides	++	+

(++ indicates strongly present, + indicates moderately present, — indicates absent)

Proteins are important constituents of food form a number of different reasons. Protein is a macronutrient essential for the proper growth and metabolism of human body and it should be supplemented through diet. The Fruit extract contain an amino acid profile that is alpha lenolic acid which is polyunsaturated fatty acid; that are very important in lowering blood cholesterol level.

Carbohydrates are hydrates of carbon. Carbohydrates may be present as isolated molecules or they may be physically associated or chemically bound to other molecules. Some carbohydrates are digestible by humans and therefore provide an important source of energy. Carbohydrates also contributes to the sweetness, appearance and textual characteristic of many foods. Starch is a polymeric carbohydrate consisting of a large number of glucose units joined by glycosidic bonds. This polysaccharide is produced by most green plants as an energy store Carbohydrates, Starch and Protein content present in fermented juice and ethanolic extract of *Morinda citrifolia* fruits are shown in Table-2.

Table 2: Carbohydrate and Protein content in *Morinda citrifolia* fruit

Sample	Carbohydrate content in mg/g	Starch content in mg/g	Protein content in mg/g
Fruit Powder	60 mg	54 mg	22.4 mg
Fermented juice	28 mg	25.2 mg	4.4mg

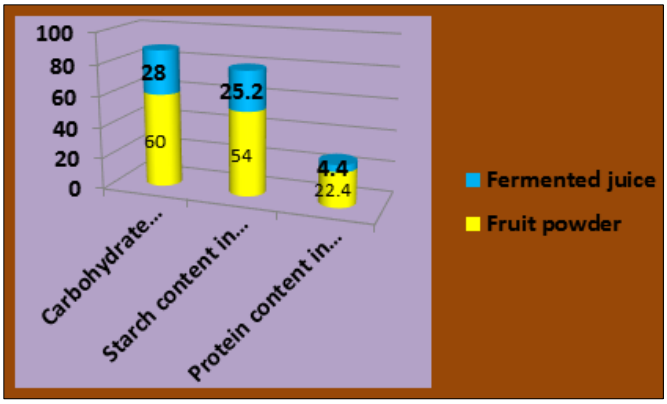

Fig 8: Carbohydrates, Starch and Protein contents present in the selected sample

The present study reveals that the fruit and fermented juice contains primary metabolites that are carbohydrate, starch and protein. Fruit sample contains more primary metabolites than fermented fruit juice. In mg/g it contains 60 mg of carbohydrates, 54 mg of starch and 22.4 mg of protein.

The study revealed the presence of phenols, proteins, tannins, flavonoids, terpenoids and glycosides were more in fruit than the fermented juice. It also showed the presence of carbohydrate, protein and starch. These phytochemicals may be useful for pharmaceutical industries and could be used as an effective nutraceutical health supplement. It is a medicinal plant. It doesn't need any special type of caring for growing in a home garden. If one single plant grown at a home, it will be a great treasure to the family. Now noni products are commercially available in shops. But its cost is not affordable to ordinary families. All the parts of this plant has a number of curative properties against infectious diseases. It can be used as health supplement and medicine for many diseases. As it is not a seasonal plant the fruits are available round the year. Direct consumption of this fruit and its juice is difficult because of its foul taste and pungent odour. So the fruit can be made in to tablets and decoctions after drying and can be used in our day to day life.

References

1. Adjanohoun EJ, Aké Assi L, Eyme J, Gassita JN, Goudote E, Gueho J. A contribution aux études ethnobotaniques et floristiques à Maurice (îles Maurice et Rodrigues), Agence de Coopération Culturelle et Technique, Paris, France. 1983, 214.
2. Kethani devi, Dr. Gopala Krishna D. Journal of pharmacognosy and phytochemistry; phytochemical screening, Antibacterial antifungal and antihelmintic activity of *Morinda citrifolia* stem. 2013; 2(1):115.
3. Chopra RN, Nayar SL, Chopra IC. Glossary of Indian medicinal plants, Council of Scientific and Industrial Research, New Delhi, India. 1956, 330.
4. Hedge JE, Hofreiter BT. In: carbohydrate chemistry, 17 (Eds. Whistler R.L. and Be Miller, J.N.), Academic press, New York. 1962.
5. Lowry OH, Rosebrough NJ, Farr AL, Randall RJ. J Biol. Chem. 1951; 193-265.
6. Samiraj Ramesh, Muthubalaji Radhakrishnan, Rajeswari Anburaj, Ramaraj Elangomathavan, Subban Patharajan. Physicochemical, phytochemical and antimicrobial studies on *morinda citrifolia* l. fruits at different maturity stages. 2012; 4(5). ISSN.0975-1491.
7. Singh YN. Traditional medicine in Fiji: some herbal folk cures used by Fiji Indians, J. Ethnopharmacol. 1986; 15:57-88.
8. Singh YN, Ikahihif T, Paune M, Slatter C. Folk medicine in Tonga. A study on the use of herbal medicines for obstetric and gynaecological conditions and disorders, J Ethnopharmacol. 1984; 12:305-329.
9. Threlfall EJ, Fisher IST, Ward L, Tschape H, Gernersmidt P. Harmonization of antibiotic susceptibility testing for *Salmonella*: result of a study by 18 national reference laboratories within the Eupropean Union-funded Enter-net group. Micrb. Drug Resist. 1999; 5:195-199.
10. Walker RD. Antimicrobial susceptibility testing and interpretation of results. In: Antimicrobial Therapy in Veterinary Medicine. Prescott J.F. Baggot J.D., WALKER R.D., eds. Ames, IA, Iowa State University Press. 2000, 12-26
11. Wang MY, West B, Jensen CJ, Nowicki D, Su C, Palu AK *et al. Morinda citrifolia* (Noni): a literature review and recent advances in Noni research, *Acta Pharmacologica Sinica*. 2002; 23:1127-1141. ISSN 1671-4083, 1127-1141.