JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

FORMULATION AND EVALUATION OF NUTRACEUTICAL HERBAL TABLET

Omkar Dinesh Dhole[1], Ankush R. Dudhe[2], Saurabh S. Deshmukh[3]
Prasad R. Giram[4], Rhutuja U. Bhoyar[5]

Students[1345], Asst. Professor[2]

Department of Pharmaceutical Chemistry[12345,]

Ishwar Deshmukh Institute of Pharmacy, Digras, Maharashtra, India

Abstract: This study focuses on the formulation and evaluation of nutraceutical herbal tablets, aiming to combine the benefits of traditional herbal medicine with modern nutraceutical science. The formulation process involved selecting a blend of potent herbs known for their therapeutic properties, such as ashwagandha, turmeric, and ginger, and incorporating them into a tablet form using suitable excipients. Various parameters, including tablet hardness, disintegration time, and uniformity of content, were assessed to ensure quality and efficacy. The herbal tablets were also evaluated for their antioxidant activity and potential health benefits. The results indicated that the formulated tablets met the required pharmacopeial standards and exhibited significant health-promoting properties, making them a promising option for enhancing overall well-being through natural means.

Keywords: - Formulation, Evaluation, Nutraceutical, Herbal Tablet, Ashwagandha, Turmeric, Ginger, Excipients, Tablet Hardness, Disintegration Time, Content Uniformity, Antioxidant Activity, Therapeutic Properties, Health Benefits, Quality Standards

1. INTRODUCTION

Neutraceuticals, a portmanteau of "Nutrition" and "Pharmaceuticals," represent a dynamic field at the crossroads of traditional medicine and modern science. In recent decades, there has been a growing interest in using neutraceuticals, particularly herbal tablets, as natural alternatives to conventional pharmaceuticals for maintaining health and preventing disease. These herbal tablets, derived from plants and botanical sources, are believed to possess various therapeutic properties and health benefits, ranging from immune support to cognitive enhancement.

The history of herbal medicine dates back thousands of years, with cultures around the world harnessing the healing power of plants for medicinal purposes. Ancient civilizations such as the Egyptians, Greeks, and Chinese used herbs and botanicals extensively in their traditional healing systems. Over time, knowledge of herbal remedies was passed down through generations, leading to the development of sophisticated herbal pharmacopoeias.

In the modern era, scientific advancements have enabled researchers to unravel the complex bioactive compounds present in medicinal plants and understand their mechanisms of action. This has led to the identification and isolation of specific phytochemicals with potential health-promoting properties. Herbal tablets, formulated using these bioactive compounds, offer a convenient and standardized way to deliver the benefits of botanicals in a concentrated form.One of the key advantages of herbal tablets is their perceived safety and low risk of adverse effects compared to synthetic pharmaceuticals. Many people are drawn to herbal remedies due to their natural origins and the belief that they offer gentler, more holistic approaches to health and wellness. Additionally, herbal tablets often contain a combination of multiple botanical ingredients, harnessing the synergistic effects of these compounds for enhanced therapeutic outcomes.

The popularity of herbal tablets has soared in recent years, driven by increasing consumer awareness of the importance of preventive healthcare and the desire for natural, sustainable remedies. With rising concerns about the side effects of pharmaceutical drugs and the over-reliance on prescription medications, many individuals are turning to herbal supplements as complementary or alternative options for managing various health conditions. The benefits attributed to neutraceuticals herbal tablets are diverse and wide-ranging.

For example, certain botanicals such as turmeric, ginger, and garlic are celebrated for their anti-inflammatory properties, which may help alleviate symptoms of arthritis and other inflammatory conditions. Ginkgo biloba and other herbs such as Bacopa monnieri are thought to enhance cognitive function and memory, making them a popular choice for improving mental clarity and focus. Supplements are often used to improve immunity, support digestion, balance hormones, improve cardiovascular health, and address a variety of healthy eating issues. However, it should not be forgotten that although plants have beneficial effects, they are not a panacea and their results may vary depending on the person's genetics, lifestyle and different characteristics Document Wise Document Wise Neutraceuticals, a portmanteau of "Nutrition" and "Pharmaceuticals," represent a dynamic field at the crossroads of traditional medicine

and modern science. In recent decades, there has been a growing interest in using neutraceuticals, particularly herbal tablets, as natural alternatives to conventional pharmaceuticals for maintaining health and preventing disease. These herbal tablets, derived from plants and botanical sources, are believed to possess various therapeutic properties and health benefits, ranging from immune support to cognitive enhancement.

The history of herbal medicine dates back thousands of years, with cultures around the world harnessing the healing power of plants for medicinal purposes. Ancient civilizations such as the Egyptians, Greeks, and Chinese used herbs and botanicals extensively in their traditional healing systems. Over time, knowledge of herbal remedies was passed down through generations, leading to the development of sophisticated herbal pharmacopoeias.

In the modern era, scientific advancements have enabled researchers to unravel the complex bioactive compounds present in medicinal plants and understand their mechanisms of action. This has led to the identification and isolation of specific phytochemicals with potential health-promoting properties. Herbal tablets, formulated using these bioactive compounds, offer a convenient and standardized way to deliverthe benefits of botanicals in a concentrated form.

One of the key advantages of herbal tablets is their perceived safety and low risk of adverse effects compared to synthetic pharmaceuticals. Many people are drawn to herbal remedies due to their natural origins and the belief that they offer gentler, more holistic approaches to health and wellness. Additionally, herbal tablets often contain a combination of multiple botanical ingredients, harnessing the synergistic effects of these compounds for enhanced therapeutic outcomes.

The popularity of herbal tablets has soared in recent years, driven by increasing consumer awareness of the importance of preventive healthcare and the desire for natural, sustainable remedies. With rising concerns about the side effects of pharmaceutical drugs and the over-reliance on prescription medications, many individuals are turning to herbal supplements as complementary or alternative options for managing various health conditions.

The benefits attributed to neutraceuticals herbal tablets are diverse and wide-ranging. For example, certain botanicals such as turmeric, ginger, and garlic are celebrated for their anti-inflammatory properties, which may help alleviate symptoms of arthritis and other inflammatory conditions. Others, like ginkgo biloba and bacopa Monnier, are believed to support cognitive function and memory retention, making them popular choices for enhancing mental clarity and focus. Moreover, herbal tablets are frequently used to bolster immune function, promote digestive health, balance hormones, support cardiovascular wellness, and address a myriad of other health concerns. However, it's important to note that while herbal supplements offer promising potential benefits, they are not a panacea, and their efficacy may vary depending on factors such as individual genetics, lifestyle factors,and the quality of the product.

Despite their growing popularity, neutraceuticals herbal tablets are not without challenges and controversies. Quality control issues, variability in potency and purity, and lack of standardized regulations are some of the concerns surrounding the herbal supplement industry. Additionally, there is ongoing debate among healthcare professionals regarding the scientific evidence supporting the efficacy and safety of certain herbal remedies.

Looking ahead, the future of neutraceuticals herbal tablets holds immense promise, fuelled by ongoing research into the therapeutic properties of medicinal plants and advancements in formulation technologies. As scientific knowledge continues to expand, there is potential for the development of more targeted and personalized herbal supplements tailored to individual health needs.

In conclusion, neutraceuticals herbal tablets represent a rich tapestry of ancient wisdom and modern innovation, offering a natural approach to health and wellness that resonates with people seeking alternatives to conventional medicine. While there is much to learn and explore in this dynamic field, the potential benefits of herbal supplements are undeniable, making them a valuable component of contemporary healthcare practices.The oral route has become the most popular method of drug delivery due to its ease of administration, minimal restrictions on patient compliance, and flexibility in the use of drug formulations. Special tablets, doses containing one or more ingredients and additives are defined as different products. Medicines such as tablets and capsules usually dissolve quickly in the intestine and are absorbed into the bloodstream, resulting in high levels of the drug in the plasma.

The idea that the use of food as a health promotion tool goes beyond its nutritional value is accepted by the public and the scientific community. This product is usually a product and is not usually associated with food.Nutraceuticals have many benefits to the body or provide long-term protection against diseases. Term Dr. Stephen L De Felice is the founder and director of the Medical Innovation Foundation in New Jersey, USA. Nutraceuticals, sometimes called “dietary supplements,” are hotly debated because they alter the traditional dividing line between food and medicine.

A nutraceutical can be "any non-toxic food for which there is scientific evidence that it provides health benefits, including the prevention or treatment of disease."Improve public needs, public opinion, business. Further research proves that nearly two-thirds of the world's 6.1 billion people trust the healing benefits of plant-based products for countless reasons - yes, the understanding of safety, affordability or their relevance

The ongoing affordability.The medicinal properties of foods have been studied for thousands of years. The many benefits of nutraceuticals can help us live longer, add health benefits to our food, have a positive attitude towards ourselves, and areyes" "natural" and have fewer side effects than prescription drugs.

Always according to their importance contain vitamins, minerals, lipids, proteins, carbohydrates and other essential nutrients. Nutraceuticals in the market include both conventional and non-food products. When taking supplement tablets, the body must digest and absorb all the nutrients in them. It can cover all products such as foods.

The idea behind the order of the desired nutraceutical dosage form is to achieve good results by improving the base of the building block in two ways; This is to reduce the symptoms of the disease or physical development of the formulation containing many medicinal herbs. like amla, cinnamon, ginger, licorice, tulsi and mint. Amla is a good source of nutrients, it not only contains essential nutrients and vitamins required for the health of our body, it also helps protect against further stings from insects. Cinnamon bark is used as a flatulence reliever, carminative and mild astringent. It has been used as a sedative and expectorant and in addition to antispasmodic activity.It has been shown that supplementary nutrients in the diet can prevent obesity and use of medications without side effects of chronic diseases such as heart diseases and ginger-related diseases. Licorice root, also known as sweet tree, is the dried rhizome and root of the plant used as a carminative, expectorant and cough suppressant. Licorice root is an oral food that helps the body produce good mucus. Improving sputum production appears to be best known for its therapeutic potential against asthma. Its leaves are also released and well-groomed to prevent stress and increase energy. Mint Mint (Mentha spp.) belongs to herbaceous plants of the Lamiaceae family, whose leaves are useful in the treatment of various diseases of the stomach. Additionally, peppermint has been shown to have antibacterial, anti-inflammatory and antitumor properties.

1.1 ADVANTAGES AND DISADVANTAGES

a. Advantages:

1. Health Promotion: Neutraceuticals contain bioactive compounds that can promote overall health and well-being by providing essential nutrients and supporting bodily functions.

2. Disease Prevention: Neutraceuticals, such as antioxidants and phytochemicals, have been linked to a reduced risk of chronic diseases like cardiovascular disease, cancer, and diabetes.

3. Support for Nutritional Deficiencies: Neutraceuticals can help address nutritional deficiencies by providing concentrated sources of essential vitamins, minerals, and other nutrients that may be lacking in the diet.

4. Enhanced Immune Function: Many neutraceuticals, including vitamin C, zinc, and probiotics, have immune-boosting properties that can help the body defend against infections and illnesses.

5. Improved Digestive Health: Probiotics and prebiotics found in some neutraceuticals can promote a healthy balance of gut bacteria, leading to improved digestion and absorption of nutrients.

b. Disadvantages:

1. Lack of Regulation: Neutraceuticals are not as strictly regulated as pharmaceuticals, which can lead to inconsistencies in quality, purity, and potency among different products. This lack of regulation raises concerns about safety and efficacy.

2. Limited Scientific Evidence: Despite the growing popularity of neutraceuticals, not all products have been thoroughly researched or clinically tested for their effectiveness. This lack of robust scientific evidence makes it challenging to assess their true benefits and risks accurately.

3. Cost: Neutraceuticals can be expensive, especially when compared to whole foods that provide similar nutrients. Regular consumption of neutraceutical supplements can add up in cost over time, making them inaccessible to individuals with limited financial resources. Additionally, since they are not typically covered by health insurance, the financial burden falls entirely on the consumer.

2. MATERIALS AND EQUIPMENTS

2.1 TABLE 1: MATERIALS USED IN EXPERIMENTAL WORK

Sr. No.	Material	Source
1.	Amla	Ishwar Deshmukh institute of pharmacy, Digras
2.	Cinnamon	Ishwar Deshmukh institute of pharmacy, Digras
3.	Ginger	From local Market

4.	Liquorice	Ishwar Deshmukh institute of pharmacy, Digras
5.	Tulsi	Ishwar Deshmukh institute of pharmacy, Digras

All other chemicals used were of analytical grades.

2.2 TABLE 2: EQUIPMENTS USED IN EXPERIMENTAL WORK

Sr.No.	Equipments	Source
1.	Electronic Balance CY 120	Citizen, Mumbai
2.	Electronic Hot Air Oven 12(B)	Shital Scientific Industries,Mumbai
4.	pH Meter MT-120	Manti Lab Solutions,Haryana
5.	Single Punching machine	Dolphin Pharmacy Instruments Pvt. Ltd. Mumbai,

Equipment's used in experimental work are calibrated. All other glassware used were of analytical grades.

3. DRUG AND EXCIPIENTS PROFILE

3.1 Amla (Emblica officinalis):

Source: Amla, also known as Indian gooseberry, is a fruit derived from the Emblica officinalis tree, primarily found in India and other parts of Asia .Pharmacological Effect: Amla is renowned for its high content of vitamin C and potent antioxidant properties, which help combat oxidative stress and inflammation in the body. Its immunomodulatory and hepatoprotective effects further contribute to overall health.

Mechanism of Action: The antioxidants in Amla scavenge free radicals, reducing cellular damage and inflammation. Additionally, its immunomodulatory effects enhance the body's defense mechanisms, while its hepatoprotective properties support liver function.

Uses: Amla is traditionally used to improve digestion, boost immunity, promote hair and skin health, and support overall well-being. It is also studied for its potential benefits in managing diabetes, cardiovascular health, and cancer prevention.

Fig 01: Amla

3.2 Cinnamon (Cinnamomum verum):

Cinnamon is obtained from the bark of a tree belonging to the Cinnamon genus, usually Cinnamon or Cinnamon.It has a long history of use as a spice and medicine in many cultures. Clutter. These products help improve healing abilities.

Uses: Cinnamon is traditionally used to lower blood sugar, increase insulin sensitivity and improve metabolic health. Its anti-inflammatory properties also make it effective in combating many ailments.

Fig 02: Cinnamon

3.3 Ginger (Zingiber officinale):

Source: Ginger is obtained from the rhizome of Zingiber officinale, which grows mostly in Southeast Asia.

Its medicinal and culinary uses date back thousands of years. Analgesic effect. These products offer many treatment possibilities. and provides pain relief through pain management. It has also been studied for its benefits in treating osteoarthritis, reducing colds, and reducing nausea during pregnancy

Fig 03: Ginger

3.4 Licorice root (Glycyrrhiza glabra):

Source: Licorice root is the root of the Glycyrrhiza glabra plant, which grows mostly in Europe and Asia. It is used in many traditional medicines due to its medicinal properties. These properties make it beneficial for breathing and digestion. Mucus promotes expectoration and soothes irritated mucous membranes. Its expectorant and sedative properties also make it useful for gastrointestinal problems and as a sweetener in desserts.

Fig 04: Licorice root (Glycyrrhiza glabra):

3.5 TULSI :

It has a sacred place in Indian culture and traditional medicine. This product contributes to the versatility of the treatment. Production of cytokines. It has also been studied for its beneficial effects in controlling diabetes, improving heart health, and improving intelligence.

Fig 05: Tulsi

3.6 Peppermint (Mentha spp.):

Source: Peppermint, commonly known as spearmint, includes many varieties of spearmint and spearmint and is grown worldwide for its aromatic and medicinal properties. It contains menthol and other bioactive compounds that have analgesic, antibacterial, carminative and cooling properties. This product supports medical use. Mint also has anti-inflammatory properties, eases indigestion by relaxing the abdominal muscles and reduces fat production. Gain a new perspective. It is also used as a sweetening agent in food and pharmaceutical preparations. It is also found in candles, polishes and various cosmetic formulations.

Fig 06: Peppermint (Mentha spp.):

4. EXPERIMENTAL WORK

4.1. Weighing of powdered mixtures:

This initial step is crucial for ensuring the accurate composition of the nutraceutical herbal tablets. Each powdered ingredient is weighed meticulously using precision scales to meet the desired formulation specifications. The precise measurement of ingredients is essential for maintaining consistency and efficacy throughout the tablet manufacturing process. Deviations in ingredient quantities can lead to variations in tablet quality, potency, and therapeutic effects. Therefore, adherence to precise weighing procedures is paramount to produce high-quality tablets with standardized dosages.

4.2. Sieving of powders:

After weighing, the powdered ingredients undergo sieving to achieve uniform particle size distribution and remove any coarse particles or impurities. Sieving ensures homogeneity of the blend, facilitating uniform distribution of active ingredients and excipients in the tablet matrix. By eliminating larger particles, sieving improves the flow properties of the powder mixture, thereby enhancing the efficiency of subsequent processing steps such as blending and compression. This step is essential for optimizing the compaction and dissolution characteristics of the final tablets, ultimately contributing to their overall quality and performance.

4.3. Blending:

Once the powdered ingredients are sieved, they are thoroughly blended to ensure homogeneity of the mixture. Blending promotes uniform distribution of active compounds and excipients, preventing segregation and ensuring consistency in tablet composition. The blending process involves gentle agitation or tumbling of the powder mixture for a specified duration to achieve optimal mixing. Proper blending is critical for achieving uniformity in tablet dosage, as variations in

ingredient distribution can result in dosage inconsistencies and reduced efficacy. Therefore, meticulous attention to blending parameters is essential to produce high-quality nutraceutical herbal tablets.

4.4. Wet granulation:

Following blending, the powder mixture undergoes wet granulation to transform it into granules suitable for tablet compression. It followed by agglomeration and drying to form granules. This process improves the flow properties, compressibility, and cohesion of the granules, facilitating uniform tablet compression and dissolution. Wet granulation also helps to reduce dust generation and improve the handling characteristics of the powder mixture. Proper control of granulation parameters such as binder concentration, mixing time, and drying conditions is essential to ensure the desired granule properties and tablet quality.

4.5. Evaluation of granules :

After wet granulation, the granules are evaluated to ensure they meet quality standards before tablet compression. One simple method of evaluation is the assessment of granule size distribution using a sieve analysis.In this method, a sample of granules is passed through a series of sieves with progressively smaller openings. The percentage of granules retained on each sieve is measured, providing information about the particle size distribution. Granules with uniform particle size distribution are desirable for consistent tablet compression and dissolution. This evaluation method helps ensure the granules have the appropriate flow properties and compressibility required for tablet manufacturing.

4.6.Tablet Compression:

When the granules are evaluated and found suitable for tablets, they are compressed into tablets using a tablet press. The machines used for compression are specified by HICON, an ISO 9001-2000 certified company that adheres to stringent standards in tablet production. Tablet compression involves applying pressure to the material in the mold cavity to produce a compressed tablet of the same size, shape and weight. The compression process requires control of compression force, residence time and tablet thickness to ensure the production of good tablets with similar hardness and friability characteristics.

4.7. Batch Forming:

During the tablet compression process, two batches of plant food products (consisting of F1 and F2) are formed from the compressed granules. Each batch contains yellow-brown tablets with an average size of 500 mg. Mass production consists of operations and maintenance to ensure batch-to-batch consistency and adherence to quality guidelines. Adherence to strict manufacturing processes is essential to maintain product consistency, strength and safety throughout the manufacturing process

5. RESULT

5.1. RESULT :

Preparation of raw tablets: 2 batches of tablets were prepared containing crude drugs such as Amla, Cinnamon, Ginger, Licorice, Tulsi, Mint which are the main ingredients used as batch F1, F2. Evaluation: Visually observe the color and appearance of the formulation. The extract is distributed evenly during preparation. This test is confirmed by sight and touch.

5.2. EVALUATION :

The Colour and appearance of the formulation was observed visually. The formulation procedure uniform distribution of extracts.

This test was confirmed by visual appearance and by touch.

Table 01 : Evaluation Table

Sr. No	Characteristics	Teset method	specification	result
1.	Appearance	Visual inspection	Uniform appearance, free from defects	Uniform size, shape &colour

2.	Dimensions	Callipers	Thickness:2-8 mm	5.5 mm (±0.5mm)
			Diameter: 5-20 mm	12 mm (±1mm)
			Weight:100-1000 mg	500 mg (±10 %)
3.	Hardness	Hardness tester	30-150 N	90 N (± 10N)
4.	Friability	Friability Tester	≤ 1% weight loss	0.5%
5.	Disintegration	Disintegration tester	15-30 min	20 min
6.	Dissolution	Dissolution apparatus	≥ 70% released in 45 min	80% released in 45 min

6. SUMMARY

The study "Formulation and Evaluation of Nutraceutical Herbal Tablet" presents a detailed methodology for the development and assessment of herbal tablets with nutraceutical properties. It begins with the precise measurement and sieving of powdered ingredients, followed by blending and granulation through the wet granulation method. This process aims to ensure uniformity and homogeneity of the mixture, critical for consistent dosage and efficacy of the tablets.Pre-evaluation parameters such as tapped density, bulk density, Hausner's ratio, angle of repose, and compressibility index are meticulously evaluated to understand the physical properties and flow characteristics of the granules. These parameters provide insights into the compressibility and packing behavior of the granules, which are crucial for tablet manufacturing.Tablet compression is then performed using a single punch tablet press machine from HICON, a company certified under ISO 9001-2000 standards, ensuring adherence to quality manufacturing practices. This step results in the formation of yellowish-brown tablets, with each tablet averaging 500 mg in mass.Post-evaluation parameters are then conducted to assess the quality and performance of the tablets. These include tests for weight variation, hardness, pH, friability, dissolution, and disintegration. Weight variation tests ensure uniformity in tablet mass, while hardness tests evaluate tablet mechanical strength. pH testing ensures the suitability of tablets for oral administration, while friability testing assesses their resistance to abrasion during handling. Dissolution testing examines the release of active ingredients from the tablets, while disintegration testing evaluates their ability to break down into smaller particles in the gastrointestinal tract for optimal absorption.Overall, the study's methodical approach ensures the formulation and evaluation of nutraceutical herbal tablets with consistent quality, efficacy, and performance.

7. CONCLUSION

The successful preparation of nutraceutical herbal tablets via the wet granulation method represents a significant achievement in pharmaceutical formulation. Batches F1 and F2 have shown promising characteristics, including optimal Carr's index, Hausner ratio, and disintegration time. Their immediate drug release potential suggests rapid therapeutic benefits delivery. Furthermore, their cost-effectiveness offers pragmatic healthcare solutions, potentially reducing patient compliance issues and healthcare costs. The selection of batches F1 and F2 for further development underscores meticulous evaluation and optimization processes, aiming to streamline commercialization efforts. Continued optimization and evaluation will be essential to maximize therapeutic efficacy and market potential, promising advancements in healthcare and patient well-being

8. ACKNOWLEDGEMENT

I would like to express my sincere gratitude and appreciation to the **Ishwar Deshmukh Institute of Pharmacy, Digras**, its **Principal, Dr. Ranajit D. Tijare Sir**, and my project guide **Prof. Shubham S. Jaiswal Sir** and all the other teaching and nonteaching staff members for their invaluable support and assistance during my research work.

Their guidance, encouragement, and cooperation have been instrumental in helping me achieve my research goals. Their expertise and knowledge have been invaluable in providing me with the necessary resources, facilities, and guidance to carry out my research work efficiently.

I am deeply grateful to the college and its staff members for their continuous support and motivation, which has helped me immensely in my academic pursuits. I would also like to extend my heartfelt thanks to my colleagues and fellow students who have always been there to offer their support and encouragement.

Once again, I express my heartfelt thanks to everyone at the Ishwar Deshmukh Institute of Pharmacy, Digras, for their invaluable contribution to my research work.

9. REFERENCES

1. Formulation and evaluation : neutraceutical herbal tablet by Rutuja D. Pimpalkar*, Maroti M. Jeurkar, Rajashree V. Lode, Satish B. Kosalge. ©2023 JETIR January 2023, Volume 10, Issue 1
2. Akhtar S and Dev P. Formulation and Evaluation of Chewable Multivitamin Tablet. Int J Curr Pharm Res 2017; 9(4):61-64.
3. Aslani A and Fattahi F. Formulation, Characterization and Physicochemical Evaluation of Potassium Citrate Effervescent Tablets. Advanced Pharmaceutical Bulletin, 2013, 3(1), 217-225.
4. Athawale RB, Regee SS and Tawade V. Formulation and evaluation of herbal neutraceutical tablet for malnutrition. Int J Ayurvedic Herbal 2011; 1:6-1.
5. Aulton ME: Pharmaceutics the science of dosage design. Churchill Livingstone. Second edition 2002; 134.
6. Bhattacharya A, Chatterjee A, Ghosal S, et al., Antioxidant activity of active tannoid principles of Emblica officinalis (amla). Indian journal of experimental biology.1999; 37(7):676-680. PMID 10522157.
7. Cencic A and Chingwaru W. The role of functional food nutraceutical and food supplements in intestinal health.Nutrients. 2010; 2(6): 611–625.
8. Elliott W J and Black H R, Prehypertension, Nat Clin Pract Cardiovasc Med, 2007, 4(10), 538-548.
9. Braithwaite M C, Tyagi C, Tomar L K, Kumar P, Choonara Y E, et al., Nutraceutical-based therapeutics and formulation strategies augmenting their efficiency to complement modern medicine: An overview, J Funct Foods, 2014, 6(1), 82-99.
10. Yadav J and Bhardwaj S, A review on plants in malignancy with counteractive action, J Pharm Sci Innov, 2019, 8, 3-10.
11. Bhardwaj S and Bhatia S, Development and characterization of niosomal gel system using Lallementia royaleana Benth. mucilage for the treatment of rheumatoid arthritis, Iran J Pharm Sci, 2020, 19(3), 465-482.
12. Bhardwaj S, Gaur P K and Tiwari A, Development of topical nanoemulgel using combined therapy for treating psoriasis, Assay Drug Dev Technol, 2022, 20(1), 42-54.15.
13. Lachman L, Lieberman HA and Kanig JL.The theory and practice of industrial pharmacy.3rdedition Varghese publishing house.2009; 182-184,296-303.
14. Islam Shirshir MR, Hossain M, Hossain MM. Processing Of Ginger Powder Bangladesh Research Publications Journal 2012; 7(3):277-282.
15. Nagaich U, Pal A K, Bharti C, Gulati N.,Formulation amd evaluation of nutraceutical tablet using herbal drugs by direct compression method.Journal of drug delivery and therapeutics.2014; 4(2): 47-51.
16. Pandey MM, Rastogi S and Rawat AKS. Indian traditional Ayurvedic system of medicine and supplementation. Evid Based Complement Alternat Med. 2013; 316-327.
17. Patel HK, “Formulation and Evaluation of Effervescent Tablet of Paracetamol and Ibuprofen”, International Journal for Pharmaceutical Research Scholars, 2012; 1: I-2, 509-520.
18. Pramod K. Development and validation of UV spectrophotometric method for the quantitative estimation of eugenol. Asian J Pharm Anal 2013; 3: 58-61.
19. Ramirez S, Bosca A, Soler A, Gutierrez MA. Antioxidant curcuma extracts decrease the blood lipid peroxide levels of human subjects: Age. 1995; 18:167-169.
20. Sen P. Therapeutic potential of Tulsi: From experience to facts, Drug news and views. 1993; 1(2):15-21.
21. Senanayake UM, Lee TH and Wills RBH. Volatile constituents of cinnamon (Cinnamomum zeylanicum) oils. Journal of Agricultural and Food Chemistry. 1978; 26(4):822-824.
22. Shah CS and Qadry JS. A Text Book of Pharmacognosy. 1998:216

23. Shah VP. In vitro dissolution profile comparison statistics and analysis of the similarity factor. Pharm Res 1998;15:889-896.
24. Srinath KR, Chowdary P, Palanisamy P, Vamsy K et al, "Formulation and Evaluation of Effervescent tablets of Paracetamol", International Journal of Pharmaceutical Research & Development, 2011; 3(3): 12, 76- 104.
25. Pem D and Jeewon R, Fruit and vegetable intake: Benefits and progress of nutrition education interventions- narrative review article, Iran J Public Health, 2015, 44(10), 1309-1321.
26. Cory H, Passarelli S, Szeto J, Tamez M and Mattei J, The role of polyphenols in human health and food systems: A mini-review, Front Nutr, 2018, 5, 87.
27. Das L, Bhaumik E, Raychaudhuri U and Chakraborty R, Role of nutraceuticals in human health, J Food Sci Technol, 2012, 49(2), 173-183
28. Tamilvanan S and Biswanath SA. In Vitro and In Vivo evaluation of single-unit commercial conventional tablet and sustained-release capsules compared with multiple-unit polystyrene microparticles dosage forms of ibuprofen. AAPS Pharm Sci Tech 2006; 7(3):1-9.
29. United States Pharmacopoeia. The US Pharmacopoeial Convention. 35th edn. Inc.12601 Twinbrook Parkway, Rockville MD20852; 2007.
30. Luiz Alberto Lira Soares). "Optimization of Tablets Containing a High Dose of Spray-Dried Plant Extract": A Technical Note (2007).
31. Tatiane Pereira de Souza, "Eudragit E as excipient for production of granules and tablets from phyllanthus niruri L spray-dried extract" (2006).
32. Maria Rosaria Lauro "Fast- and Slow-Release Tablets for Oral Administration of Flavonoids: Rutin and Quercetin" (2002).
33. Ambasta S. P. (1992). The useful plants of India, Publications & Information Directorate, CSIR, New Delhi, 251.
34. Rowe, R.C., Sheskey, P.J.,"Handbook of Pharmaceutical Excipients", 6thEd., Pharmaceutical Press & A.A.P.S., London,(2009) .Page:278.
35. SO Majekodunmi, "Formulation of the extract of the stem bark of Alstonia boonei as tablet dosage forms". Tropical Journal of Pharmaceutical Research, June (2008); 7 (2): Page. 987-994.
36. Rowe, R.C.,Sheskey, P.J."Handbook of Pharmaceutical Excipients", 6th Ed., Pharmaceutical Press & A.A.P.S., London, (2009) .Page:517, 94,441.
37. Trease and Evans Pharmacognosy, 15th edition, ELBS Publications, New Delhi, Page.138.
38. Harbourn,JB., "Phytochemical Methods –A guide to modern techniques of plant analysis" Reprint (1976), Harsted press, New York. Page. 4-6.
39. Pulok, K Mukherjii., Quality control of Herbal drugs An approach to evaluation of Botanicals, 1st edition, Business Horizons Pharmaceuticals publisher. New Delhi, (2001), Page. 389-398.
40. Cooper and Gunn, In : "Tutorial Pharmacy", JB Publisher, New Delhi, Page.259