International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

Research Formulation and Evaluation of Herbal Neem Tablet

Ashwini Manaskar , Swayam Trivedi, Mrs. Gauri Deodhar, Dr V. S. Babu Agala

G.H. Raisoni Institute of Life Sciences, Shradha Park, Hingna-wadi link road, Nagpur.

Date of Submission: 16-06-2026 Date of Acceptance: 29-06-2026

ABSTRACT

The present study was aimed at the formulation and evaluation of herbal Neem tablets using Neem leaf powder as the active ingredient. Neem (Azadirachta indica) is a well-known medicinal plant widely used in traditional medicine due to its antimicrobial, anti-inflammatory, antidiabetic, antioxidant, and immunomodulatory properties. The objective of this research was to develop a stable, effective, and acceptable tablet dosage form of Neem for better patient compliance and accurate dosing.

Neem leaves were collected, dried, pulverized, and sieved to obtain a uniform powder. The tablets were prepared by Wet granulation method using suitable excipients such as binders, diluents, lubricants, and disintegrants. Different formulations were prepared and evaluated to optimize tablet characteristics. Pre-compression parameters including bulk density, tapped density, angle of repose, Carr's index, and Hausner ratio were studied to determine the flow properties of the powder blend. The prepared tablets were evaluated for post-compression parameters such as weight variation, hardness, friability, disintegration time according to standard pharmacopoeial limits. The results showed that all formulations possessed acceptable physical characteristics with satisfactory hardness, low friability, good disintegration time and uniform weight variation.

The study concluded that Neem tablets can be successfully formulated by wet granulation technique with good stability and acceptable pharmaceutical properties. The developed herbal tablet may serve as a convenient and effective dosage form for therapeutic applications and can be further explored for large-scale production and clinical evaluation.

I. INTRODUCTION

Neem (Azadirachta indica A. Juss.) is one of the most important medicinal plants used in traditional systems of medicine since ancient times. Neem has been extensively used in traditional medicine for the treatment of skin diseases, fever, diabetes, infections, ulcers, dental disorders, and gastrointestinal problems. Neem leaves are especially known for their blood purifying and antimicrobial properties. Bark is used for fever and malaria, while neem oil obtained from seeds is widely used in skin care preparations and agricultural pesticides. Due to its wide therapeutic applications and natural origin, neem has gained significant attention in pharmaceutical and herbal research. In recent years, herbal formulations have become increasingly popular because of their safety, effectiveness, affordability, and minimal side effects compared to synthetic drugs. Herbal tablets are among the most convenient dosage forms because they provide accurate dosing, better patient compliance, ease of administration, and improved stability. Neem-based herbal tablets are formulated to utilize the medicinal benefits of Neem in a suitable and patient-friendly dosage form.

Fig no: 1 Leaves of Neem

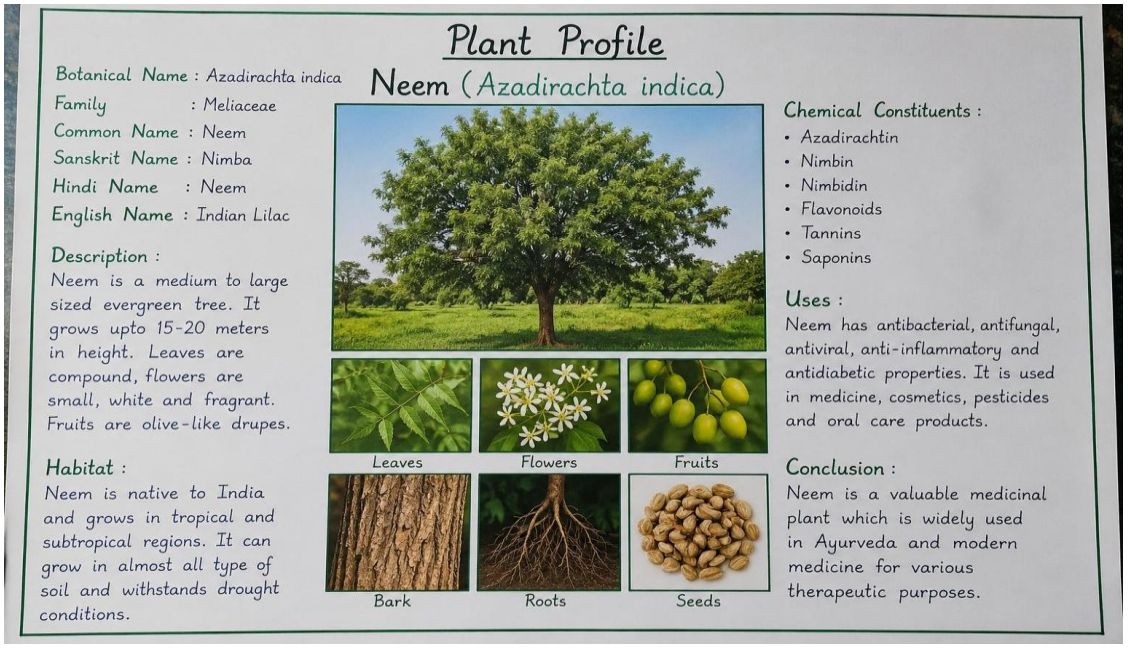
The formulation of herbal tablets requires proper selection of excipients and optimization of processing parameters to achieve acceptable pharmaceutical characteristics such as hardness, friability, weight variation, disintegration time, and dissolution profile. Evaluation studies are essential to ensure the quality, safety, efficacy, and stability of the prepared tablets. Various pre-compression and post-compression parameters are studied during the formulation process to determine the suitability of the prepared tablets. The increasing prevalence of infectious diseases, diabetes, and antibiotic resistance has encouraged researchers to explore plant-based

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

medicines as alternative therapeutic agents. Neem possesses significant antimicrobial and antidiabetic activities due to the presence of active phytoconstituents. Therefore, Neem tablets can be considered a promising herbal formulation for therapeutic use. In addition, the use of Neem in tablet form helps overcome problems associated with raw herbal preparations such as unpleasant taste, inaccurate dosage, and poor patient compliance.

The World Health Organization (WHO) has also recognized the importance of medicinal plants in primary healthcare systems. According to WHO, a large proportion of the world population depends on herbal medicines for basic healthcare needs. Herbal drug research is therefore gaining importance in modern pharmaceutical sciences. Standardization and scientific evaluation of herbal formulations are necessary to establish their therapeutic effectiveness and safety. The present study focuses on the formulation and evaluation of herbal Neem tablets using suitable pharmaceutical excipients and standard evaluation methods. The study aims to develop tablets with acceptable physical characteristics and good stability while retaining the medicinal properties of Neem. Various evaluation parameters such as bulk density, tapped density, angle of repose, Carr's index, Hausner ratio, hardness, friability, weight variation, and disintegration time are assessed during the study.

Neem has emerged as a valuable medicinal plant due to its diverse pharmacological activities and therapeutic potential. The development of Neem tablets not only improves patient convenience but also supports the growing demand for herbal medicines in modern healthcare systems. Thus, formulation and evaluation of herbal Neem tablets represent an important area of research in herbal drug technology and pharmaceutical sciences.



- **PLANT PROFILE OF NEEM**
- **MECHANISM OF ACTION OF NEEM**

Neem (Azadirachta indica), a member of the Meliaceae family, has therapeutics implication in the diseases prevention and treatment. But the exact molecular mechanism in the prevention of pathogenesis is not understood entirely. It is considered that Azadirachta indica shows therapeutic role due to the rich source of antioxidant and other valuable active compounds such as azadirachtin, nimbolinin, nimbin, nimbidin, nimbidol, salannin, and quercetin.

Possible mechanism of action of *Azadirachta indica* is presented as follows.

1. Neem (Azadirachta indica) plants parts show antimicrobial role through inhibitory effect on microbial growth/potentiality of cell wall breakdown. Azadirachtin, a complex tetranortriterpenoid limonoid present in seeds, is the key constituent responsible for both antifeedant and toxic effects in

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

insects. Results suggest that the ethanol extract of neem leaves showed in vitro antibacterial activity against both Staphylococcus aureus and MRSA with greatest zones of inhibition noted at 100% concentration.

2. Neem plays role as free radical scavenging properties due to rich source of antioxidant. Azadirachtin and nimbolide showed concentration-dependent antiradical scavenging activity and reductive potential in the following order: nimbolide > azadirachtin > ascorbate.

3. Neem ingredient shows effective role in the management of cancer through the regulation of cell signaling pathways. Neem modulates the activity of various tumour suppressor genes (e.g., p53, pTEN), angiogenesis (VEGF), transcription factors (e.g., NF-κB), and apoptosis (e.g., bcl2, bax).

4. Neem also plays role as anti-inflammatory via regulation of proinflammatory enzyme activities including cyclooxygenase (COX), and lipoxygenase (LOX) enzyme.

- **POTENTIAL EFFECT OF NEEM (Azadirachta indica**)

Neem (Azadirachta indica) has a versatile medicinal property that has been extensively used in Ayurvedic and Unani systems of drug. Its remedial implicit spans a broad range of affections, including skin diseases, infections, Inflammation, and specially, diabetes mellitus. Several studies have verified the salutary part of Neem in controlling Blood glucose situations and perfecting metabolic health.

1. Hypoglycemic and Antidiabetic activity:

Neem leaves retain significant antihyperglycemic activity. Extract from the leaves have been shown to lower blood Glucose level in both normal and diabetic animal models. This effect is believed to be intermediated through Mechanisms similar as increased insulin perceptivity, bettered supplemental glucose uptake, and rejuvenescence of Pancreatic β-cells.

2. Antioxidant Activity:

Free radical or reactive oxygen species are one of the main culprits in the genesis of various diseases. However, neutralization of free radical activity is one of the important steps in the diseases prevention. Antioxidants stabilize/deactivate free radicals, often before they attack targets in biological cells and also play role in the activation of antioxidative enzyme that plays role in the control of damage caused by free radicals/reactive oxygen species. Medicinal plants have been reported to have antioxidant activity. Plants fruits, seeds, oil, leaves, bark, and roots show an important role in diseases prevention due to the rich source of antioxidant.

A valuable study was carried out to evaluate in vitro antioxidant activity in different crude extracts of the leaves of Azadirachta indica (neem) and antioxidant capacity of different crude extracts was as follows: chloroform > butanol > ethyl acetate extract > hexane extract > methanol extract. Result of the current finding suggested that the chloroform crude extracts of neem could be used as a natural antioxidant ..

Other results revealed that azadirachtin and nimbolide showed concentration-dependent antiradical scavenging activity and reductive potential in the following order: nimbolide > azadirachtin > ascorbate. Furthermore, administration of azadirachtin and nimbolide inhibited the development of DMBA-induced HBP carcinomas through prevention of procarcinogen activation and oxidative DNA damage and upregulation of antioxidant and carcinogen detoxification enzymes.

3. Anticancerous Activity

Cancer is multifactorial disease and major health problem worldwide. The alteration of molecular/genetic pathways plays role in the development and progression of cancer. The treatment module based on allopathic is effective on one side but also shows adverse effects on the normal cell. Earlier studies reported that plants and their constituents show inhibitory effects on the growth of malignant cells via modulation of cellular proliferation, apoptosis, tumour suppressor gene, and various other molecular pathways. Neem contains flavanoids and various other ingredients that play an important role in inhibition of cancer development. Large number of epidemiological studies propose that high flavonoid intake may be correlated with a decreased risk of cancer.

4. Effect of Neem and Its Constituents on Tumour Suppressor Genes

P53 is an important tumour suppressor gene, and it plays role in the inhibition of the proliferation of abnormal cells, in that way inhibiting the development and progression of cancer. A study confirmed that ethanolic fraction of neem leaf (EFNL) treatment effectively upregulated the proapoptotic genes and proteins including p53, Bcl-

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

2-associated X protein (Bax), Bcl-2-associated death promoter protein (Bad) caspases, phosphatase and tensin homolog gene (pTEN), and c-Jun N-terminal kinase (JNK). A finding showed that ethanolic neem leaf extract enhanced the expression of proapoptotic genes, such as caspase-8 and caspase-3, and suppressed the expression of Bcl-2 and mutant p53 in the 7,12-dimethylbenz(a)anthracene-induced cancer cells.

Nimbolide, a tetranortriterpenoid limonoid, is one of the important contributors to the cytotoxicity of neem extracts. Nimbolide downregulated cell survival proteins, including I-FLICE, cIAP-1, cIAP-2, Bcl-2, Bcl-xL, survivin, and X-linked inhibitor of apoptosis protein, and upregulated the proapoptotic proteins p53 and Bax pTEN activity is commonly lost via mutations, deletions, or promoter methylation silencing in various types of primary and metastatic cancers. Inactivation of pTEN has been noticed in various types of tumour. A study confirmed that ethanolic fraction of neem leaf treatment significantly increased the expression of pTEN, which could inhibit mammary tumourigenesis through its inhibitory effect on Akt [.

5. Effect of Neem and Its Constituents on Apoptosis

Bcl2 and bax play an important role in the regulation of apoptotic process. Any alteration in bcl2 and bax causes the development and progression of tumours . Altered expressions of such genes have been noticed in many tumours. A study was performed to investigate the effect of extract in an in vivo 4T1 breast cancer model in mice and results confirmed that CN 250 and CN 500 groups had a higher incidence of apoptosis compared with cancer controls. Another study reported that extract has been shown to cause cell death of prostate cancer cells (PC-3) via inducing apoptosis.

A study finding revealed that leaf extract downregulated Bcl-2 expression and upregulated Bim, caspase-8, and caspase-3 expression in the buccal pouch indicating that it has apoptosis inducing effects in the target organ and study results confirmed that leaf extract induced a dose-dependent reduction in chronic lymphocytic leukemia (CLL) cell viability with significant apoptosis observed at 0.06% (w/v) by 24 h . Isolated compound and chief constituents from neem show a range of activities affecting multiple targets and play role in the induction of apoptotic cell death in cancer.

II. AIM AND OBJECTIVES

Aim:

Formulation and evaluation of herbal Neem tablets.

Objectives:

1. To prepare Neem powder suitable for tablet formulation.
2. To formulate Neem tablets by using appropriate pharmaceutical excipients such as binders, diluents, lubricants, and disintegrants.
3. To optimize the formulation for better tablet characteristics and patient acceptability.
4. To evaluate pre-compression parameters of powder blend such as:
   - Bulk density
   - Tapped density
   - Carr's index
   - Hausner ratio
   - Angle of Repose

5. To evaluate post-compression parameters of prepared Neem tablets including:
   1. Weight variation
   2. Hardness
   3. Thickness
   4. Friability
   5. Disintegration time

6. To compare the obtained evaluation results with standard Pharmacopoeial limits.

III. MATERIAL AND METHOD

Ingredient	Function
Neem leaf Powder	Active ingredient
Microcrystalline cellulose	Diluent / filler
Tamarind powder	Disintegrant
Pvp k -30	Binder
Magnesium stearate	Lubricant
Talc	Glidant

Table no: 1 Material and function

- **METHOD OF PREPARATION OF NEEM TABLETS**

Neem is one of the most important medicinal plants used in herbal medicine. Neem possesses

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

antibacterial, antifungal, anti-inflammatory, antiviral, and antioxidant properties. Because of these medicinal activities, Neem is formulated into different dosage forms such as tablets, capsules, syrups, creams, and powders. Among these dosage forms, tablets are preferred because they are easy to administer, provide accurate dosing, and possess better stability.

Neem tablets are generally prepared by the wet granulation method. Wet granulation is widely used in pharmaceutical industries because it improves the flow property and compressibility of powders. Herbal powders usually possess poor flow characteristics and low compressibility; therefore, wet granulation is considered the most suitable method for preparation of herbal tablets.

Collection of Neem Leaves
↓
Authentication of Plant Material
↓
Washing of Neem Leaves
↓
Shade Drying of Leaves (At Room Temperature)
↓
Pulverization / Grinding
↓
Sieving of Neem Powder (Through Sieve No. 22)
↓
Weighing of Drug and Excipients
↓
Dry Mixing of Neem Powder,
↓
Preparation of Binder Solution (PVP K-30 in Purified Water)
↓
Addition of Binder Solution to Powder Blend
↓
Wet Granulation
↓
Screening of Wet Mass (Through Sieve No. 16)
↓
Drying of Wet Granules (50–60°C in Hot Air Oven)
↓
Resieving of Dried Granules (Through Sieve No. 22)
↓
Lubrication with Talc and Magnesium Stearate
↓
Compression of Granules. Into Tablets
↓
Packaging in Airtight Containers
↓
Finished Neem Tablets

1. Collection of Plant Material

Fresh leaves of Neem are collected from healthy plants. The collected leaves are carefully examined to remove foreign matter such as dust, stems, insects, and damaged leaves.

Fig no :2 collection of plant material

Authentication is necessary because the use of incorrect plant material may reduce therapeutic activity and affect the quality of for properties.

2. Washing of Neem Leaves

The Neem leaves collected are washed thoroughly with clean water followed by distilled water. Washing removes dirt, microorganisms, soil particles, and other contaminants present on the surface of leaves.

Fig no :3 washing of leave

This step is essential because impurities may interfere with the formulation process and reduce product quality.

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

3. Drying of Neem Leaves

After washing, the leaves are dried under shade at room temperature for several days until complete drying occurs.

Fig no: 4 Drying of Neem leaves

Importance of Shade Drying

Shade drying is preferred because direct sunlight may destroy active constituents present in neem leaves. High temperature and sunlight can reduce medicinal activity by degrading phytochemicals such as nimbin and azadirachtin.

Proper drying prevents:

• Microbial growth
• Fungal contamination
• Moisture-related degradation

The drying process continues until the leaves become crisp and brittle.

4. Sieving

The powdered neem leaves and all excipients are passed separately through sieve no. 22.

Importance of Sieving

Sieving helps to:

- Obtain uniform particle size.
- Remove large particles and fibers
- Improve flow properties.
- Enhance mixing efficiency

Fig no: 5 sieving of powder

Uniform particle size is essential for preparing tablets with uniform weight and drug content.

5. Weighing of Ingredients

All ingredients are weighed accurately using a digital balance according to the required formulation.

Accurate weighing is very important because improper quantities may affect:

- Tablet hardness
- Drug content
- Stability
- Therapeutic activity

Fig no: 6 weighing of ingredients

Each ingredient performs a specific role in tablet formulation.

Neem powder acts as an active medicinal substance. Microcrystalline cellulose increases bulk volume and improves tablet size. Tamarind powder acts as disintegrant and helps the tablet break after administration. PVP K-30 acts as binder and provides cohesiveness to granules. Talc improves powder flow, whereas magnesium stearate reduces friction during compression.

6. Dry Mixing

The weighed neem powder, microcrystalline cellulose and a portion of Tamarind powder are transferred into a mortar or blender and mixed thoroughly for approximately 10–15 minutes.

Purpose of Dry Mixing

- The purpose of dry mixing is to achieve uniform distribution of the drug throughout the formulation. Proper mixing ensures that every tablet contains an equal amount of neem powder

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

Fig no: 7 Dry mixing

- Insufficient mixing may produce tablets with unequal drug content, resulting in poor therapeutic response.
- The mixing process should be carried out carefully to prevent segregation of powders.

7. Preparation of Binder Solution

A binder solution is prepared by dissolving PVP K-30 in purified water.

Function of Binder

The binder promotes adhesion between powder particles and converts the powder mixture into granules.

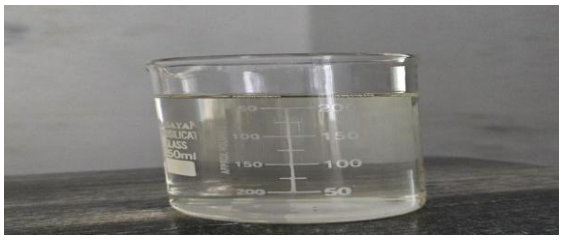


Fig no :8 Binder solution

Without binder:

- Granules become weak
- Tablets show poor hardness
- Friability increases

The binder solution should be prepared slowly with continuous stirring to obtain a clear and uniform solution.

8. Wet Granulation

The prepared binder solution is added slowly to the powder mixture with continuous mixing until a damp mass is formed.

Principle of Wet Granulation

Wet granulation converts fine powder particles into larger granules by using a granulating fluid. The liquid forms bridges between particles, resulting in aggregation and granule formation.

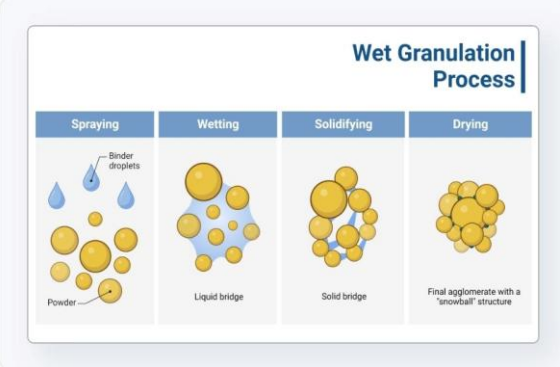


Fig no: 9 wet granulation process

- **Importance of Wet Granulation**

Wet granulation:

- Improves flow property
- Prevents segregation
- Reduces dust formation
- Improves compressibility
- Produces tablets with uniform hardness

9. Screening of Wet Mass

The wet mass is passed through sieve no. 16 to produce moist granules of uniform size.

Fig no: 10 screening of wet mass

- **Importance of Screening**

Screening ensures:

- Uniform granule formation
- Better drying efficiency
- Uniform tablet weight
- Improved compression

Granules should not be too large or too fine.

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

10. Drying of Granules

The moist granules are dried using a hot air oven at 50–60°C until optimum moisture content is achieved.

Fig no: 11 Drying of granules

- **Purpose of Drying**

Drying removes excess moisture from granules.
Proper drying:

- Prevents sticking during compression
- Improves stability
- Prevents microbial growth
- Enhances shelf life

Overdrying may produce brittle granules, whereas insufficient drying may cause sticking and poor tablet formation. Therefore, controlled drying conditions are necessary.

11. Resieving of Dried Granules

The dried granules are passed again through sieve no. 22.

- **Purpose of Resieving**

Resieving breaks large lumps formed during drying and produces granules of uniform size.

Fig no: 12 Resieving of granules

Uniform granules provide:

- Better flow property
- Uniform die filling
- Consistent tablet weight

12. Lubrication

Talc and magnesium stearate are added to the dried granules and mixed gently.

- **Function of Talc**

Talc acts as glidant and improves flow of granules.

- **Function of Magnesium Stearate**

Magnesium stearate acts as lubricant and reduces friction between tablet material and machine surfaces.

Lubrication prevents:

- Sticking
- Picking
- Punch binding

Excessive lubrication should be avoided because it may reduce tablet hardness and delay drug release.

13. Compression of Tablets

The lubricated granules are compressed into tablets using a tablet compression machine.

- **Principle of Compression**

Compression involves application of mechanical force to granules present inside a die cavity using upper and lower punches.

Fig no: 13 compression of tablet

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

Fig no :14 Neem tablets

During compression:

- Granules rearrange
- Air is expelled
- Particles bond together
- Tablets are formed

Compression force should be properly adjusted to obtain tablets with suitable hardness and thickness.

14. Packaging and Storage

The prepared neem tablets are packed in airtight containers or blister packs.

- **Importance of Proper Packaging**

Packaging protects tablets from:

- Moisture
- Light
- Air
- Physical damage

The tablets should be stored in a cool and dry place away from direct sunlight.

- **EVALUATION PARAMETERS**

Pre compression parameters:

1.Angle of repose:

The angle of repose is the maximum angle formed between the surface of a pile of powder and the horizontal plane. It is a crucial parameter used to evaluate powder flowability and cohesiveness, ensuring consistent weight and quality during tablet and capsule manufacturing.

Formula: Tan θ=h/r

Where:
H = height of powder cone
R = radius of powder cone

Benefits:

- Helps in assessing powder flow during tablet manufacturing.
- Ensures uniform die filling.
- Prevents weight variation problems.

2. Bulk density:

Bulk density is a property of granular or particulate materials (like powders, soils, or grains) defined as the mass of the material divided by its total bulk volume. This total volume includes the solid particles themselves as well as the inter-particle voids and internal pores.

Formula: Bulk density = mass of powder / bulk volume

Benefits:

- Indicates packing ability of powder.
- Helps in selection of container size.
- Important for flow property evaluation.

3. Tapped bulk density (TBD):

Determined by placing a graduated cylinder, containing a known mass of granules. The cylinder was Allowed to fall under its own weight onto a hard surface from a height of 10 cm at two seconds intervals. The tapping continued until no further change in. volume was noted

Formula: TBD = Weight of the Powder/Volume of the Packing

Benefits:

- Measures compressibility of powder.
- Helps in determining flow behavior.

4. Hausner ratio:

The Hausner Ratio is a simple, widely used metric to measure the flowability and cohesiveness of powders, primarily calculated by dividing tapped density by bulk density. It helps predict how a powder will behave during manufacturing processes like tablet compression and capsule filling.

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

Formula: Hausner ratio-TBD/LBD

Benefits:
- Indicates interparticle friction.
- Useful for optimization of granulation process.

5.Compressibility index:
Carr's Compressibility Index is a key metric used in pharmaceutical and powder technology to evaluate the flowability and cohesion of powders. It is calculated using bulk (poured) density and tapped density, helping manufacturers predict how powders will behave during storage, mixing, and tablet compression processes.

Formula: Compressibility Index (%) = (TBD-LBD) X 100/TBD

Benefits:
• Predicts flow characteristics.
• Helps avoid manufacturing defects.

Post-compression parameters:

1. Weight Variation:
The average weight was determined by randomly selecting and weighing 20 tablets. Each tablet was also
Weighed individually. The deviation from the average weight in each case was calculated and expressed as Percentage. Not more than two of the tablets from the sample size deviate from the average weight by a greater percentage and none of the tablets deviate by more than double that percentage.

Fig no: 15 weighing balance

Benefits:
- Ensures each tablet contains an equal amount of drug.
- Maintains accuracy and therapeutic effectiveness.
- Detects problems in granule flow or machine filling.
- Helps maintain quality control during production.

2. Hardness test:
The Hardness of the Tablet is also called Tablet Crushing strength. Harness test is used to check the Hardness of the prepared tablet. In this test we can measure the force which is required for the breaking of the tablet. Pfizer tablet hardness tester is used to check the hardness of the tablet. The hardness is Express in Kg/cm².

Fig no: 16 Pfizer Tester

Benefits:
- Prevents tablet breakage during handling and transportation.
- Ensure tablets can withstand packaging stress.
- Maintains proper disintegration and drug release.
- Indicates suitable compression force during manufacturing.

3. Friability test:
The friability test is used to check the combined effect of abrasion and stock. This test is used to check whether the Tablet is suitable for transportation or not for that purpose Roche Friabilator is used it is laboratory friability Tester. In that the preweighed antidiabetic tablet sample is placed in the friabilator which consists of plastic Chamber that operate 100 revolutions for 4 min means 25 rpm. The tablets are then dusted and reweighed. Conventional compressed tablets that lose less than 0.5-1.0% of their weight are generally acceptable.

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

Fig no: 17 Friability Test Apparatus

Benefits:

- Checks durability of tablets during packaging and transport.
- Ensure tablets do not chip or break easily.
- Help evaluate mechanical stability of tablets.
- Indicates proper binding and compression of formulation.

4. Disintegration test:

A glass of plastic tube 80-100 mm long with an internal diameter of about 28 mm and external diameter 30-31mm fitted at the lower end with a disc of rust proof wire gauge. Six tablets were placed in the tube, raise and lower the tube in such a manner that the complete up and down movement is repeated 28 to 32 per minute. The tablets are disintegrated when no particles remain above the gauge, which readily pass through mesh (10 mesh Screen.

Fig no: 18 Disintegration Test Apparatus

Benefits:

- Ensures proper breakdown of tablets after administration.
- Helps in effective drug release and absorption.
- Confirms suitability of disintegrants used in formulation.
- Important for immediate-release tablet performance.

Table no: 2 Results of pre - compression parameters.

Sr. No	Parameter	Result	Standard Range	Interpretation
1	Bulk Density	0.609 g/ml	Depending on powder	Indicates packing ability of granules
2	Tapped Density	0.735 g/ml	Higher than bulk density	Shows compressibility behavior of powder
3	Carr's Index	17.8%	15–20% = Good flow	Granules showed good flow property
4	Hausner Ratio	1.21	1.2–1.25 = Good flow	Indicates acceptable flowability
5	Angle of Repose	27.8°	<30° = Excellent flow	Powder exhibited excellent flow characteristics

Table no: 3 Results of post – compression parameter.

Sr. No	Parameter	Result	Standard Range	Interpretation
1	Weight Variation	Passed	±5% limit	Tablets showed uniform weight distribution
2	Hardness	7 kg/cm²	4–8kg/cm²	Tablets possessed adequate mechanical strength
3	Friability	0.72%	<1%	Tablets showed good resistance

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June2026, pp:2239-2251 www.ijprajournal.com ISSN:2456-4494

				to abrasion
4	Disintegration Time	7 min	<15 min	Tablets disintegrated within official limit

IV. SUMMARY AND CONCLUSION

Summary

The present study was focused on the formulation and evaluation of herbal Neem tablets using the wet granulation method. Neem (Azadirachta indica) is a well-known medicinal plant widely used in traditional medicine because of its antimicrobial, anti-inflammatory, antifungal, antioxidant, and antidiabetic properties. Due to these therapeutic activities, Neem was selected as the active herbal ingredient for tablet formulation. In this study, Neem powder was mixed with suitable excipients such as binders, diluents, lubricants, and disintegrants to prepare tablets with acceptable pharmaceutical properties. The wet granulation method was used to improve the flow properties and compressibility of the powder blend. The prepared granules were dried, sieved, lubricated, and compressed into tablets.

The formulated Neem tablets were evaluated for both pre-compression and post-compression parameters. Pre-compression studies included angle of repose, bulk density, tapped density, Carr's index, and Hausner ratio, which indicated satisfactory flow characteristics of granules suitable for tablet compression. Post-compression evaluation tests such as appearance, thickness, hardness, weight variation, friability, and disintegration time were carried out according to standard procedures. The tablets showed acceptable hardness and low friability, indicating good mechanical strength. Weight variation results confirmed uniformity of tablet weight. The disintegration time was found within the acceptable pharmacopoeial limit, showing proper breakdown of tablets after administration.

The overall results demonstrated that the formulated herbal neem tablets possessed good physical characteristics, stability, and tablet quality. The wet granulation technique was found suitable for preparing neem tablets with improved flowability and compressibility.

Conclusion

From the present study, it can be concluded that herbal Neem tablets were successfully formulated by the wet granulation method and evaluated using standard pharmaceutical parameters. The prepared tablets showed satisfactory pre-compression and post-compression characteristics, including good flow properties, adequate hardness, acceptable friability, uniform weight variation, and proper disintegration time. Neem possesses significant medicinal properties, and its incorporation into tablet dosage form provides advantages such as accurate dosing, ease of administration, better patient compliance, and improved stability compared to traditional herbal preparations.

The study confirmed that the selected formulation method and excipients were suitable for the preparation of effective herbal Neem tablets. Therefore, herbal Neem tablets can be considered a promising natural dosage form for therapeutic applications and may be further explored for large-scale manufacturing and clinical studies in the future.

ACKNOWLEDGEMENT

I'm sincerely thankful to all those who supported me throughout the completion of this project. First and foremost, I Express my sincere thanks to(Mrs. Gauri Deodhar) mam , my project companion, for their constant guidance, Encouragement, and precious suggestions. Their expertise and tolerance have been necessary in shaping this work and Helping me understand the subject more deeply.

I would also like to extend my gratefulness to Dr. Venkata suresh babu agala sir, Principal of G.H Raisonicollege Of life sciences, for providing the necessary facilities and a supportive environment to carry out this project Successfully.

REFERENCE

[1]. Biswas, K., Chattopadhyay, I., Banerjee, R.K., and Bandyopadhyay, U. (2002). Biological activities and medicinal properties of neem (Azadirachta indica). Current Science, 82(11), 1336–1345.
[2]. Subapriya, R. and Nagini, S. (2005). Medicinal properties of neem leaves: A review. Current Medicinal Chemistry – Anti-Cancer Agents, 5(2), 149–156.
[3]. Khandelwal, K.R. (2008). Practical Pharmacognosy: Techniques and Experiments.

Nirali Prakashan, Pune.
[4]. Kokate, C.K., Purohit, A.P., and Gokhale, S.B. (2010). Pharmacognosy. Nirali Prakashan.
[5]. World Health Organization. (2011). Quality Control Methods for Herbal Materials. WHO Publications, Geneva.
[6]. World Health Organization. (2020). WHO Guidelines on Herbal Medicines. Geneva.
[7]. Lachman, L., Lieberman, H.A., and Kanig, J.L. (2009). The Theory and Practice of Industrial Pharmacy. CBS Publishers.
[8]. Aulton, M.E. (2013). Aulton's Pharmaceutics: The Design and Manufacture of Medicines. Churchill Livingstone.
[9]. Banker, G.S. and Anderson, N.R. (2012). Tablets. In: The Theory and Practice of Industrial Pharmacy.
[10]. Patel, R. and Shah, M. (2014). Formulation and evaluation of herbal neem tablets by direct compression method. Journal of Herbal Drug Technology, 4(2), 45–52.
[11]. Singh, H., et al. (2018). Preparation and evaluation of neem tablets using wet granulation method. Journal of Pharmaceutical Sciences and Research, 10(5), 1120–1124.
[12]. Sharma, V. and Gupta, A. (2016). Effect of binders on formulation of neem tablets. International Research Journal of Pharmacy, 7(3), 56–61.
[13]. Reddy, P., et al. (2015). Antidiabetic activity of neem leaf tablet formulation. Asian Journal of Pharmaceutical Research, 5(4), 220–225.
[14]. Mehta, D. and Patel, J. (2019). Antimicrobial evaluation of herbal neem tablets. International Journal of Green Pharmacy, 13(2), 95–101.
[15]. Desai, N., et al. (2021). Antioxidant evaluation of neem leaf extract tablets. Journal of Herbal Medicine and Toxicology, 15(1), 22–28.
[16]. Kumar, S., et al. (2012). Medicinal properties of Azadirachta indica: A review. International Journal of Pharmaceutical Sciences Review and Research, 15(2), 94–99.
[17]. Ghimeray, A.K., et al. (2009). Pharmacological and toxicological properties of neem. Journal of Medicinal Plants Research, 3(10), 761–767.
[18]. Bhowmik, D., et al. (2010). Herbal remedies of Azadirachta indica and its medicinal application. Journal of Chemical and Pharmaceutical Research, 2(1), 62–72.
[19]. Chaturvedi, P. (2012). Antidiabetic potentials of neem. International Journal of Pharmaceutical Sciences and Research, 3(5), 1365–1375.
[20]. Prajapati, N.D., et al. (2010). A Handbook of Medicinal Plants. Agrobios Publications.
[21]. Trease, G.E. and Evans, W.C. (2009). Pharmacognosy. Saunders Elsevier.
[22]. Harborne, J.B. (2007). Phytochemical Methods. Springer Publications.
[23]. Evans, W.C. (2008). Trease and Evans Pharmacognosy. Elsevier.
[24]. Allen, L.V., Popovich, N.G., and Ansel, H.C. (2011). Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems.
[25]. Martin, A. (2011). Physical Pharmacy. Lippincott Williams and Wilkins.
[26]. Liberman, H.A. and Lachman, L. (2013). Pharmaceutical Dosage Forms: Tablets. Marcel Dekker.