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PREPARATION, EVALUATION OF NUTRACEUTICAL PRODUCTS OF ASHWAGANDHA AND PHYTOCHEMICAL SCREENING OF ASHWAGANDHA

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ABSTRACT

Ashwagandha (*Withania somnifera*) also known as Indian ginseng, is a ancient branch of ayurveda that deal with preparation and use of herbal medicines. Ashwagandha is used for treatment of wounds, cough, asthma, diabetes, hemiplegia, dyspepsia, diarrhoea, rheumatoid arthritis, lumbago, insomnia, sexual debility, menstrual problems, scabies and leucorrhoea. Ashwagandha also used as an dietary supplement as it contains variety of nutrients and phytochemicals. Ashwagandha root drug finds an important place in treatment of rheumatic pain, inflammation of joints, nervous disorders and epilepsy. Dried roots are used as tonic for hiccup, cold, cough, female disorders, as a sedative, in care of senile debility, ulcers, etc. Leaves are applied for carbuncles, inflammation and swellings. Our study focused on preparation of nutraceutical products from Ashwagandha root powder. We had formulated Ashwagandha churna and syrup. The raw drug is procured and subjected for further pharmaceutical process, 10 gm root powder of Ashwagandha was soaked separately in 100 ml of acetone, water and ethanol in a conical flask and kept at room temperature for 72 hours. The phytochemical study revaled that the Ashwagandha root extract of acetone, water and ethanol contains carbohydrates, proteins, amino acid, steroids, glycosides, flavonoids, alkaloids, tannins and phenolic compounds.

KEYWORDS: Ashwagandha, *Withania somnifera*, Phytochemical screening, Ashwagandha root, Ashwagandha churna, Ashwagandha syrup.

INTRODUCTION

Ashwagandha (*Withania somnifera*), also known as Indian ginseng, is an important ancient plant, the roots of which have been employed in Indian traditional systems of medicine, Ayurveda and Unani. It is an erect branching under shrub reaching about 1.50 m in height.[1]

It grows in dry and sub-tropical regions. Being hardy and drought tolerant species with its enormous bio compounds, its usage is forever regarded and continuous to enjoy the monopoly in many parts of India, particularly in Madhya Pradesh. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhya Pradesh are the major Ashwagandha producing states of the country. In Madhya Pradesh alone it is cultivated in more than 5000 hectare.[2]

Figure 1: ***Withania somnifera*** **L.**

The estimated production of Ashwagandha roots in India is more than 1500 tonnes and the annual requirement is about 7000 tonnes necessitating the increase in its cultivation and higher production. Ashwagandha root drug finds an important place in treatment of rheumatic pain, inflammation of Joints, nervous disorders and

epilepsy. Dried roots are used as tonic for hiccup, cold, cough, female disorders, as a sedative, in care of senile debility, ulcers, etc. Leaves are applied for Carbuncles, inflammation and swellings. Leaf juice is useful in conjunctivitis. Bark decoction is taken for asthma and applied locally to bed sores. Ashwagandha and its extracts are used in preparation of herbal tea, powders, tablets and syrups.[3]

MATERIALS AND METHODS

Preparation of fine powder from Ashwagandha root

The first basic step is preparation of fine powder of Ashwagandha root extract. In this method we used the mixer and motar pestle to grind the roots of Ashwagandha. Then the obtained powder is passed through sieve no.100 and finally the fine powder of Ashwagandha root is obtained which is used for further phytochemical screening and formulation purposes.[4]

Figure 2: Ashwagandha root.

Figure 3: Grinding Ashwagandha root.

Figure 4: Sieving.

Figure 5: Fine powder.

Preparation of Ashwagandha root extract

10 gm root powder of Ashwagandha were soaked separately in 100 ml of acetone, water and ethanol in a conical flask and kept at room temperature for 72 hours. The extracts so obtained were filtered through filter paper. Then the filtrate was taken in porcelain dish and concentrated it on a water bath till semi solid extract was obtained. Then the phytochemical screening was performed on obtained solution.[4]

Tests for preliminary phytochemical screening

1. Test for Carbohydrates

Molisch's test

To 2-3 ml of extract few drops of alpha naphthol solution in alcohol was added, it was shaken and then conc.H_2SO_4 was added from side of the test tube. The violet ring was formed at the junction of two liquids confirms the presence of carbohydrates in the extract.[5]

2. Test for proteins

Biuret test

3 ml of test solution and 4% NaOH and 1% $CuSO_4$ solution was added. Violet or pink colour was formed confirms the presence of proteins in the extract.[5]

3. Test for amino acids

Ninhydrin test

3 ml of test solution was heated and 3 drops of 5% Ninhydrin solution was added to it. It was boiled on water bath for 10 min. Purple or bluish colour was formed confirms the presence of amino acids in the extract.[5]

4. Test for steroids

Salkowski reaction

To 2 ml of extract, 2 ml of choloroform and 2 ml of conc.H2SO4 was added to it. It was shaken properly. Chloroform layer appeared red and acid layer showed greenish yellow fluorescence confirms the presence of steroids in the extract.[5]

5. Test for glycosides
To 2 ml extract, glacial acetic acid, 1 drop of 5% $FeCL_3$ and conc. H_2SO_4 was added. Reddish brown colour appeared at junction of the two liquid layers and upperlayer appeared bluish green confirms the presence of glycosides in the extract.[5]

6. Test for flavonoids
Few drops of ferric chloride solution was added to each extract. Blackish red colour was formed confirms the presence of flavonoids in the extract.[5]

7. Test for Alkaloids
Mayer's test
To 2-3 ml extract, few drops of Mayer's reagent was added. Cream colour precipitate was formed confirms the presence of alkaloids in the extract.[5]

8. Test for tannins and phenolic compounds
To 2-3 ml of extract, few drops of 5% $FeCL_3$ solution was added. Deep blue black colour was formed confirms the presence of tannins and phenolic compounds in the extract.[5]

Preparation of nutraceutical products from Ashwagandha and their evaluations
A. Ashwagandha churna
Ashwagandha churna is a powdered formulation of the ashwagandha plant (mainly the roots) used for treating various infertility issues and anti-anxiety and improve the immunity.[6]

• Ingredients
Table 1: Ingredients of Ashwagandha churna.

Sr.no.	Ingredients	Quantity taken	Pharmacological properties
1	Ashwagandha powder	20 gm	Immunity boosting action
2	Vidhara powder	20 gm	Anti-stress action

Preparation method of Ashwagandha churna
The Ashwagandha herbs are washed and dried under direct sun. Once there is no moisture, they are powdered and powder of vidhara was taken. It was passed through sieve no. 100 to get a fine powder. The powders are then mixed together to form a homogeneous mixture and again sieved to remove any impurities or hard particles. Stored in airtight containers for future use.[6]

• Dosage
The dosage should be as per health condition, age and as suggested by the ayurvedic doctor or practitioner. It is usually taken as 3 grams, 2 to 3 times a day for adults. It can be consumed with warm milk and should be taken on an empty stomach in the morning or at night before going to sleep. It does not show any side effects when taken after proper consultation.[6]

Evaluation of Ashwagandha churna
1. Organoleptic characters
• Colour
The colour of Ashwagandha churna was determined by it's appearance.[7]

• Odour
The Ashwagandha churna was smelled individually. The time interval among two smelling was kept 2 minutes to nullify the effect of previous smelling.[7]

2. Bulk density
Bulk density also called apparent density or volumetric density, is a property of powders, granules, and other "divided" solids, especially used in reference to mineral components (soil, gravel), chemical substances, (pharmaceutical) ingredients, foodstuff, or any other masses of corpuscular or particulate matter (particles). Bulk density is defined as the mass of the many particles of the material divided by the total volume they occupy. The total volume includes particle volume, inter-particle void volume, and internal pore volume.[7]
• Bulk density = Mass / Bulk volume.

3. Tapped density
Tapped density of a powder is the ratio of the mass of the powder to the volume occupied by the powder after it has been tapped for a defined period of time. The tapped density of a powder represents its random dense packing. Tapped density values are higher for more regularly shaped particles (ie, spheres), as compared to irregularly shaped particles such as needles.[7]
• Tapped density = Mass / Tapped volume.

4. Hausner's ratio
The Hausner ratio is a number that is correlated to the flowability of a powder or granular material. It is named after the engineer Henry H. Hausner (1900–1995). The Hausner ratio is used in a wide variety of industries as an indication of the flowability of a powder.[7]
• Hausner ratio = Tapped density / Bulk density.

5. Carr's index
The carr's index or Carr's Compressibility Index is an indication of the compressibility of a powder. It is named after the scientist Ralph J. Carr, Jr. The carr's index is frequently used in pharmaceutics as an indication of the compresiblity of a powder. In a free-flowing powder, the bulk density and tapped density would be close in value, therefore, the carr's index would be small.[7]
• Carr's index = Tapped density – Bulk density / Tapped density ×100

6. Angle of repose

The angle of repose, or critical angle of repose, of a granular material is the steepest angle of descent or dip relative to the horizontal plane to which a material can be piled without slumping. At this angle, the material on the slope face is on the verge of sliding. The angle of repose can range from 0° to 90°. The morphology of the material affects the angle of repose; smooth, rounded sand grains cannot be piled as steeply as can rough, interlocking sands.[7]

• Tan θ = height of heap / Radius of heap.

Table 2: Relationship between flow properties with Hausner's ratio, Carr's index and Angle of repose.

Flow properties	Hausner's ratio	Carr's index	Angle of repose
Excellent	1.00 to 1.11	< 10	25-30
Good	1.12 to 1.18	11 to 15	31-35
Fair	1.19 to 1.25	16 to 20	36-40
Passable	1.26 to 1.34	21 to 25	41-45
Poor	1.35 to 1.45	26 to 31	46-55
Very poor	1.46 to 1.59	32 to 37	56-65
Very very poor	> 1.60	> 38	> 66

B. Ashwagandha syrup

Syrups are a popular delivery vehicle for anti-tussive drugs because they feel more soothing to swallow than a tablet or capsule, and the medication is more quickly absorbed. Due to various adverse effects of available synthetic cough syrup preparations, the present study was performed to develop herbal cough syrup containing natural ingredients having no side effects. Improved blood sugar, inflammation, mood, memory, stress and anxiety, as well as a boost in muscle strength and fertility.[8]

• Ingredients

Table 3: Ingredients of Ashwagandha syrup.

Sr.no.	Ingredients	Quantity taken	Pharmacological properties
1.	Ashwagandha decoction	20 ml	Anti-tussive and expectorant
2.	Simple syrup	100 ml	As a vehicle
3.	Methyl paraben	q.s.	Preservative

Preparation of Ashwagandha syrup

• Method of Preparation of Decoction

5 gm Ashwagandha and 5 gm Liquorice was taken and mixed with 100 ml of water. The mixture was boiled until total volume becomes one fourth of initial volume. Then the decoction was cooled and filtered. The obtained filtrate was taken to prepare final syrup.[8]

• Method of Preparation of Simple syrup

6.67 gm of sucrose was mixed with 100 ml of distilled water to prepare a concentrated solution of simple syrup.[8]

• Method of Preparation of Ashwagandha syrup

One part (20 ml) of decoction was mixed with five parts (100 ml) of simple syrup i.e (1:5). Sufficient quantity of methyl paraben was added as preservative, to the above mixture. Solubility was checked by observing the clarity of solution visually. The final Ashwagandha syrup as then subjected for evaluation.[8]

• Dosage

Take 5 ml of Ashwagandha syrup twice a day by proper guidance of a physician or Ayurvedic doctor.

Evaluation of Ashwagandha syrup

1. Organoleptic properties

• Colour

Five ml final syrup was taken in measuring cylinder. It was observed for its colour by naked eye. [9]

• Odour

Two ml of final syrup was smelled individually. The time interval among two smelling was kept 2 minutes to nullify the effect of previous smelling. [9]

• Taste

A pinch of final syrup was taken and examined for its taste on taste buds of the tong.[9]

• Determination of pH

Placed an accurately measured amount 10 ml of the final syrup in a 100 ml volumetric flask and made up the volume up to 100 ml with distilled water. pH was measured with the help of pH paper.[9]

RESULTS

The phytochemical screening of crude drug of Ashwagandha containing acetone extract, water extract and ethanol extract was found to contain carbohydrates, proteins, amino acid, steroids, glycosides, flavonoids, alkaloids and tannins & phenolic compounds.

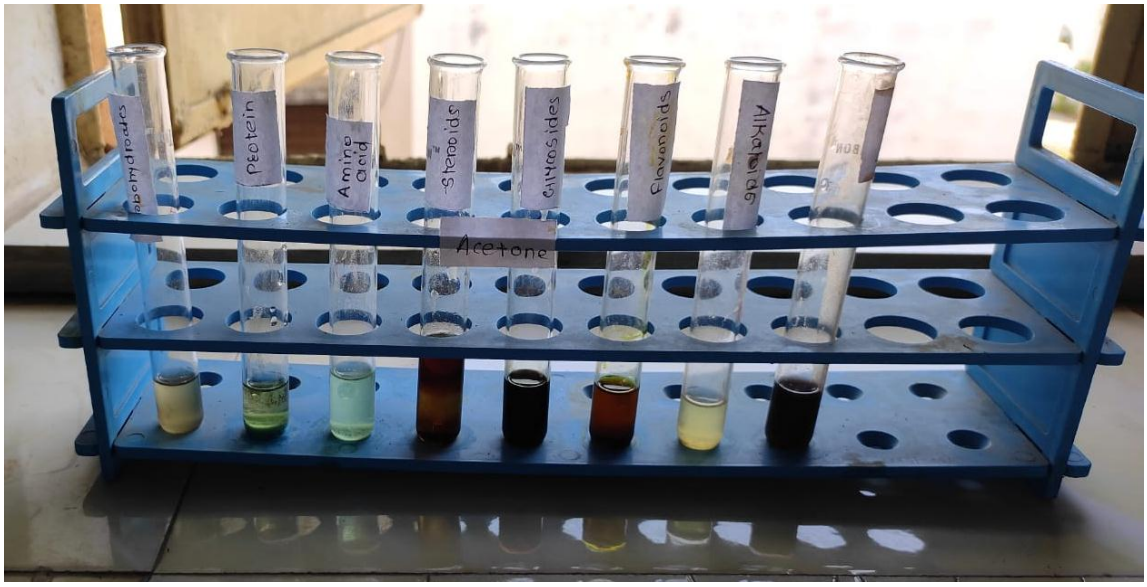

Figure 6: Phytochemical tests of acetone extract of Ashwagandha.

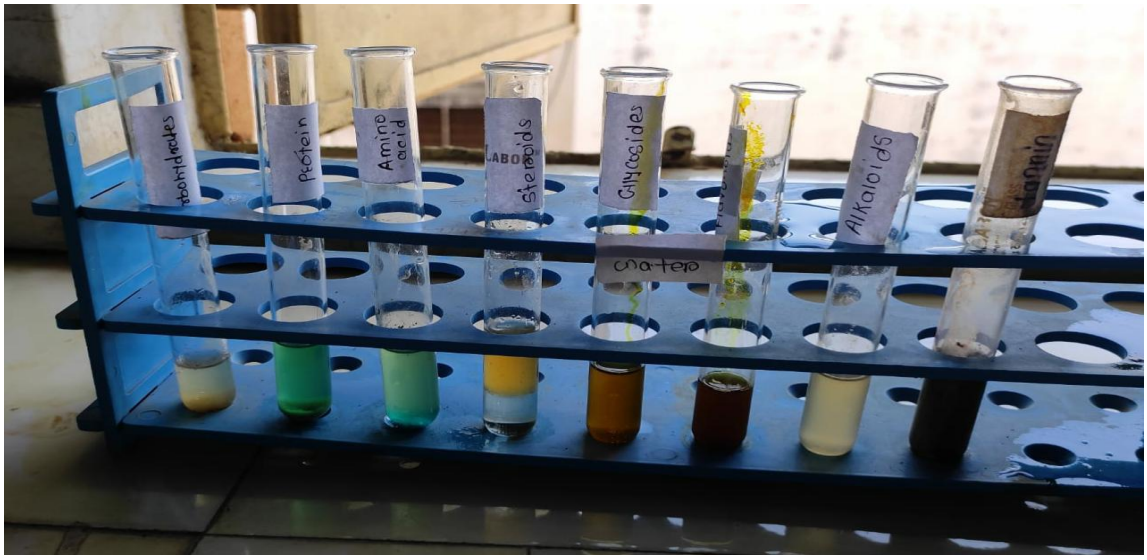

Figure 7: Phytochemical tests of water extract of Ashwagandha.

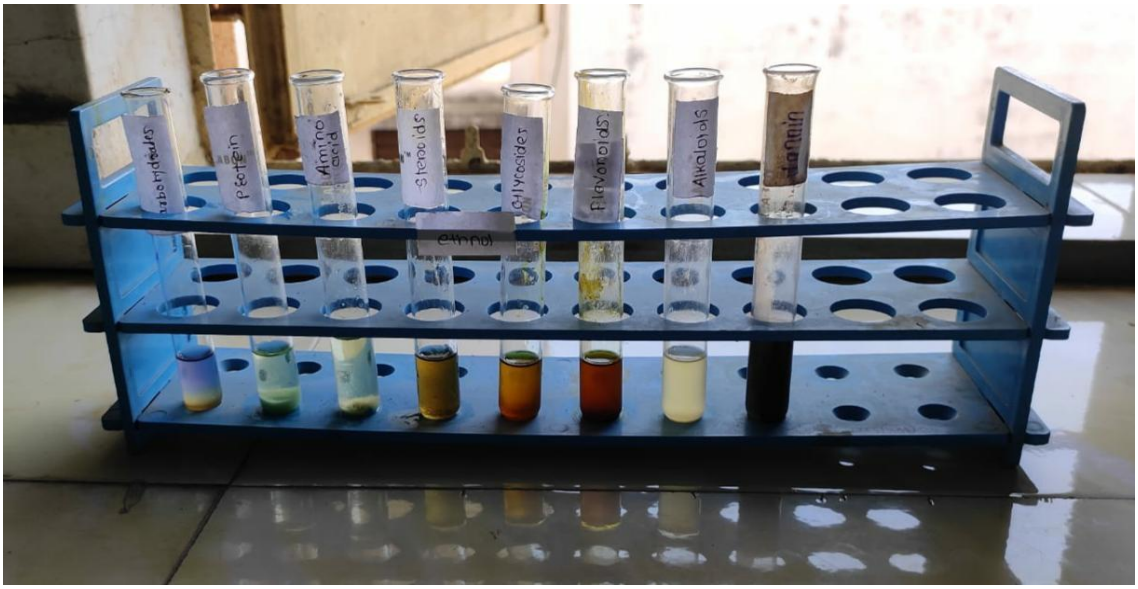

Figure 8: Phytochemical tests of ethanol extract of Ashwagandha.

The Ashwagandha churna & Ashwagandha syrup was successfully prepared.

Figure 9: Ashwagandha churna.

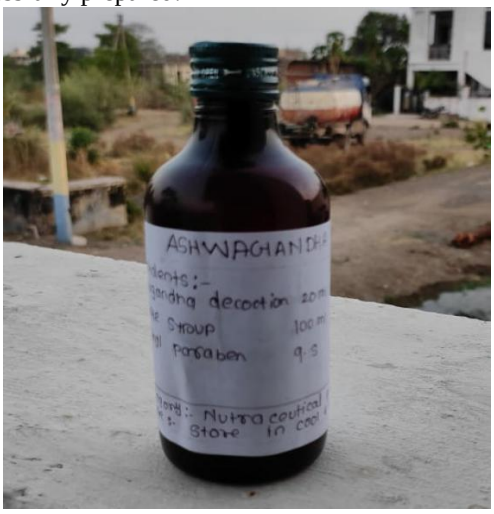

Figure 10: Ashwagandha syrup.

Evaluation of Ashwagandha churna

1. Organoleptic characters

• **Colour :-** Cream yellow

• **Odour :-** Pungent

2. Bulk density

• Bulk density = Mass / Bulk volume = 20/8.49 = 2.35 g/ml.

3. Tapped density

• Tapped density = Mass / Tapped volume = 20/6.92 = 2.89 g/ml.

4. Hausner's ratio

• Hausner's ratio = Tapped density / Bulk density =2.89 / 2.35= 1.22

• The value 1.22 implies fair flow ability.

5. Carr's index

• Carr's index = Tapped density – Bulk density / Tapped density × 100

• Carr's index = 2.89-2.35/ 2.89= 0.186 × 100 = 18.6

• The value 18.6 implies fair flow properties.

6. Angle of repose

•Tan θ = Height of heap / Radius of heap.

• $\theta = Tan^{-1}$ [Height of heap / Radius of heap]

• $\theta = Tan^{-1}[2 / 2.16]$

• $\theta = Tan^{-1}[0.925]$

• θ = 42° 76"

• The value θ = 42° 76" implies the churna have passable property.

Evaluation of Ashwagandha syrup

• Organoleptic characters

1. Colour

• The colour of Ashwagandha syrup was found to be Brownish.

2. Odour

• The Odour of Ashwagandha syrup was found to be pleasant.

3. Taste

• The taste of Ashwagandha syrup was found to be sweet.

4. pH determination

• The pH of Ashwagandha syrup was found to be 8.5.

DISCUSSION

Withania somnifera, best known as ashwagandha has been used for centuries for the treatment of vivid health disorders. Multiple health benefits featured in this herbal supplement makes it as a perfect rejuvenator of physical and psychological health. As per research, this medicinal herb is mainly found in the regions of North America and India. Powerful antioxidant compounds enriched in this herb scavenges free radicals and reduces aging impact on person. Apart from consuming this extract, diet taken by person plays an important role in increasing the level of antioxidants in body. In order to obtain good level of antioxidants, it is advised to include surplus amount of fruits and vegetables in diet. Apples, berries, onions and carrots are some among the top listed food items enriched with antioxidant compounds. The phytochemical constituents present in the Ashwagandha plays an important role in various diseases and disorders. More than 80% of the world's population in 2001 used herbal medicine for their primary health care.

CONCLUSION

The phytochemical screening of crude drug of Ashwagandha containing acetone extract, water extract and ethanol extract was found to contain carbohydrates, proteins, amino acid, steroids, glycosides, flavonoids, alkaloids and tannins & phenolic compounds. These constituents helps in treating various diseases. Withanolides, a group of steroidal lactone present in *Withania somnifera* roots attributed to pharmacological

effects of *Withania somnifera*. Ashwagandha is used for treatment of wounds, cough, asthma, diabetes, tumors, hemiplegia, dyspepsia, diarrhoea, rheumatoid arthritis, lumbago, stress, insomnia, sexual debility, menstrual problems, leucoderma, scabies and leucorrhoea. The plant is also used as a dietary supplement as it contains a variety of nutrients and phytochemicals.

The evaluation of Ashwagandha churna and syrup shows good results. Which implies as the prepared neutraceutical products are safe for use and does not causes any side effects. The proper amount of neutraceutical products must be taken under the guidance of physician.

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REFERENCES

1. Mukesh Sharma, Nisha Amit, Kushagra Nagori, SonamSoni. (Development of Quality Control parameters of an Ayurvedic Formulation: Ashwagandha Churna). Research Journal of Pharmaceutical Dosage forms and Technology, 2013; 5(2): 91-94.
2. Priya Mishra, Pawan Kumar Gupta and Pushpendra Kannojia. (Qualitative and Quantitative Evaluation of Ashwagandha Churna). International Journal of Pharmacognosy, 2018; 5(8): 526-531.
3. Pallav Sengupta, Ashok Agarwal, Maria Pogrebetskaya, Shubhadeep Roy choudhury, Damayanthi Durairajanayagam, Ralf Henkel. (Role of Withania somnifera (Ashwagandha) In the management of male infertility). Reproductive BioMedicine Online, 2017; 1-17.
4. Sonali A Barke, Sandesh R Wayal, Mukta M Abhyankar and Dr. RY Patil. (Preparation and pharmacognostic evaluation of Ashwagandha Mashi). Journal of Pharmacognosy and Phytochemistry, 2018; 7(3): 2499-2505.
5. R. Roghini and K. Vijayalakshmi. (Phytochemical screening, quantitative analysis of flavonoids and minerals in ethanolic extract of *Citrus paradisi*). International Journal of Pharmaceutical Sciences and Research, 2018; 9(11): 4859-4864.
6. Neeraj K. Sriwastava, C. S. Shreedhara, H. N. Aswatha Ram. (Standardization of Ajmodadi churna, a polyherbal formulation). Pharmacognosy Research, March 2010; 2(2): 98-101.
7. Namra Aziz, Ankita Wal, Pranay Wal, Rashmi Saxena Pal. (Preparation and evaluation of the polyherbal powder: the nature's pharmacy for the treatment of diabetes mellitus and its complications). Pharmacophore, 2019; 10(1): 60-70.
8. Pankaj Kumar, Anand Mohan Mishra, Prakash Kumar, Chandrabansh Kumar, Avinash Kumar, Rajan Kumar, Nitish Kumar. (Preparation And Evaluation of Syrup-A Review). The Pharmaceutical and Chemical Journal, 2025; 12(2): 117-122.
9. Krishna Suresh Gupta, Yatin Nitin Gorhekar, Pratiksha Subhash Gharat, Maheshwari Ashok Gawari, Saroj Changdev Firke. (Formulation and Evaluation of Herbal Syrup). International Journal of Research Publication and Reviews, June 2023; 4(6): 3300-3304.
10. Anisha Bano, Navdeep Sharma, Harcharan S. Dhaliwal and Vivek Sharma. (A Systematic and Comprehensive Review on Withania somnifera (L.) Dunal - An Indian Ginseng). British Journal of Pharmaceutical Research. 2015; 7(2): 63-75.
11. Umadevi M, Rajeshwari R, Rahale Sharmila C, Selvavenkadesh S, Pushpa R, Kumar Sampath K P, Bhowmik D. (Traditional and medicinal uses of *Withania somnifera*). The Pharma Innovation, 2012; 9: 102-110.
12. Srivastav Kumar A, Das P. (Phytochemical extraction and characterization of roots of *Withania somnifera* for its antibacterial, antioxidant, antiinflammation and analgesic activity). International Journal of Innovative Research and Development, 2014; 3: 22-33.
13. Jain R, Kachhwaha S, Kothari S.L. (Phytochemistry, pharmacology, and biotechnology of *Withania somnifera* and *Withania coagulans*: A review). Journal of Medicinal Plants Research, 2012; 6: 5388-5399.