International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 52-57 www.ijprajournal.com ISSN: 2456-4494

Formulation and Evaluation of Effervescent Tablets of Nyctanthes Arbor-Tritis

[1]Dr. Pushpa Yadav*, [2]Mr. Imtiyaz Ahmad, [3]Mr. Shailendra kumar Dwived
[1]*Associate Professor Nova College of Pharmacy, Lucknow, U. P. India*
[2]*Assistant Professor Nova College of Pharmacy, Lucknow, U. P. India*
[3]*Assistant Professor Nova College of Pharmacy, Lucknow, U. P. India*

Date of Submission: 05-07-2025 Date of Acceptance: 15-07-2025

ABSTRACT
Oral dosage products are still the most preferred mode of drug administration, even though there are some limitations compared to other forms, like slower drug absorption. This can be overcome by giving the drug in liquid form. Another method of increasing the velocity of disintegration and dissolution of the drug is the effervescent method, which is widely used in fast-release products. Effervescent tablets are designed to form solutions that, at the same time, release carbon dioxide. Effervescent tablets are usually produced by compressing the active ingredients. One of the main advantages of effervescent tablets is that they rapidly form a solution, thus facilitating the use of faster and more efficient absorption. The production and quality control of effervescent tablets are performed in the same way as the conventional tablet, involving physicochemical characteristics like hardness, weight variation, friability, dissolution time, and pH level.

I. INTRODUCTION

Traditional or herbal medicine, as defined by the World Health Organization, is the aggregate of skills, knowledge, and practices based on theories and beliefs that have been adopted by different cultures to prevent and treat diseases. An excellent example of the beautiful phenomenon of symbiosis is nature. Natural products from plants, animals, and minerals have long been the sources of treatments for human disease [1]. Effervescent powders, which were used as saline cathartics during the eighteenth century, were subsequently added to official compendia in the form of compound effervescent powders. Effervescent tablets, in recent years, have become very popular in various sectors, ranging from supplements to pharmaceuticals, due to the fact that they are convenient to swallow. They are designed to dissolve when they come into contact with a liquid, which could be water. The tablets are usually manufactured using a mixture of citric acid and tartaric acid instead of a single acid, since it may cause issues if one uses either one on its own[2].

Nyctanthesarbor-tristis, or Night Flowering Jasmine, Coral Jasmine, Tree of Sorrow, Queen of the Night, or Har-singar, is a member of the family Oleaceae. The plant is native to areas extending from Indo-China to the Himalayas, and from Sumatra to Java. It grows in dry deciduous forests and hillsides.

The plant Nyctanthesarbor-tristis is also referred to as "night-blooming sad tree." It reaches the size of a large shrub or small tree, depending on the manner of cultivation. Leaves are large, beautiful, coarse, and hairy. Flowers are scented, small, and have white petals with orange-red tubular centres, blooming well in the evening and perishing by the morning, casting a beautiful carpet of flowers on the ground.

In Ayurveda, Nyctanthesarbor-tristis is valued for medicinal purposes.It is used abundantly for its anthelminthic, anti-fungal, antioxidant, and anti-pyretic activities. It is also employed as a laxative and as an antidote for rheumatism, skin infections, and as a sedative. It is employed in the cure for malaria and other fevers, employed as an antidote for snake bites, and finds application in coughs, hair growth, blood pressure regulation, and anxiety[3].

The reaction between acid and Bicarbonate, which results in liberation of carbon dioxide, shown as follows:

A-COOH + B-HCO3 $\longrightarrow$ CO2+ H2O+ B-A-COO— (Acid) (Bicarbonate) (Acidic Salt of Base)

II. MATERIAL AND METHODS

Materials- 1- Ethyl Alcohol 2- Sodium Nitropruside 3- Sodium Hydroxide 4- Hydrochloric Acid 5- Sodium bicarbonate 6- Citric 7- Tartaric acid 8- Ferrous sulphate 9- Sulphuric acid 10-

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 52-57 www.ijprajournal.com ISSN: 2456-4494

Litmus paper 11- Ferric Chloride 12- Gelatine 13- Lead acetate 14- Talc 15- Starch 16- Magnesium Stearate 17- Calcium Carbonate 18- Saccharin Sodium 19- Fumaric acid 20- Crystalline Cellulose 21- Hydroxyl Propyl Methyl Cellulose.

Equipment- Friability apparatus, Disintegration apparatus, Pfizer/ Monsanto, Tablet punching machine, pH meter were the major equipment used for the study.

Leaves collection and extraction- Leaves were collected from the herbal garden of college campus Nova College of Pharmacy, Lucknow. After the collection of plant material (Leaves), it was dried in shade for 24-48 hrs. And the leaves were reduce in small size and pass through the sieve of No. 40. Around 25g of NyctanthesArbor-tristis leaves were soaked overnight for 24 hours in 3 solvents (Aqueous, methanol-aqueous and acetone-aqueous solvents). The solvents dissolve the active biomolecules. The leaves remain as precipitate and the active biomolecules were present in the solvent [4]. The respective supernatants were taken and the following phytochemical assays were conducted to test the presence of secondary metabolites. Phytochemical assays phytochemical analysis was carried out on different extract of the whole plant using standard procedure to identify the bioactive.

Test for Tannin – 5ml of plant extract was added with 5 drops of 10% lead acetate. Formation of a light-yellow precipitate indicates the presence of tannin.

Test for Saponin - 1ml of the extract was boiled in 10ml of distilled water and filtered with Whatman filter paper. 5ml of filtrate was mixed with 2 ml of normal distilled water and shaken vigorously. Occurrence of stable persistent froth indicates the presence of saponins.

Test for Flavonoids – To 1 ml of the extract, few drops of dilute sodium hydroxide were added. Presence of flavonoids is indicated upon production of an intense yellow colour in the plant extract which became colourless on addition of 2-3 drops of 50% dilute acid.

Test for Terpenoid-0.5 gm. of plant extract was mixed with 2 ml of chloroform and equal volume of concentrated sulphuric acid was added. Terpenoids presence is confirmed by a reddish-brown colouration of interface.

Test for Phenolic compounds-2 ml of plant extract was added with 5 drops of 1% ferric chloride and 1 ml of potassium Ferro cyanide, a bluish-green solution showed the presence of phenolic compound.

Test for reducing sugar-0.5 g of plant extract was dissolved with distilled water and filtered. The filtrate was boiled with 2 drops of Fehling's solution A and B for 5 minutes. An orange-red precipitate obtained indicates the presence of reducing sugar.

Test for Steroid-2 ml of plant extract was dissolved in 5 ml chloroform and then 5 ml of concentrated sulphuric acid was added. Formation of 2 phases (upper red and lower yellow with green fluorescence) indicates the presence of steroid.

Test for Alkaloids-5ml of plant extract was mixed with 3 ml of aqueous HCl on water bath and then filtered. 1 ml of Dragendroff's reagent was added in the filtrate. The occurrence of orange-red precipitate indicates the presence of alkaloids in the sample extract.

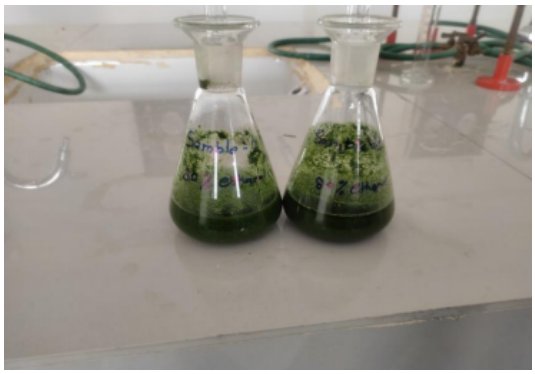
Test for Carbonyl-2ml of plant extract was added with 2 drops of 2, 4-dinitrophenyl hydrazine solution and thoroughly shaken, yellow crystal formation indicates presence of carbonyl compound [4-7].

(A)

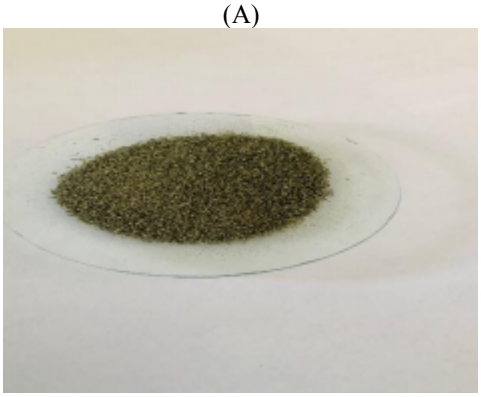
(B)

Figure 1-(A) Fresh leaves of NyctanthesArbor-tristis, (B) Dried leaves of NyctanthesArbor-tristis

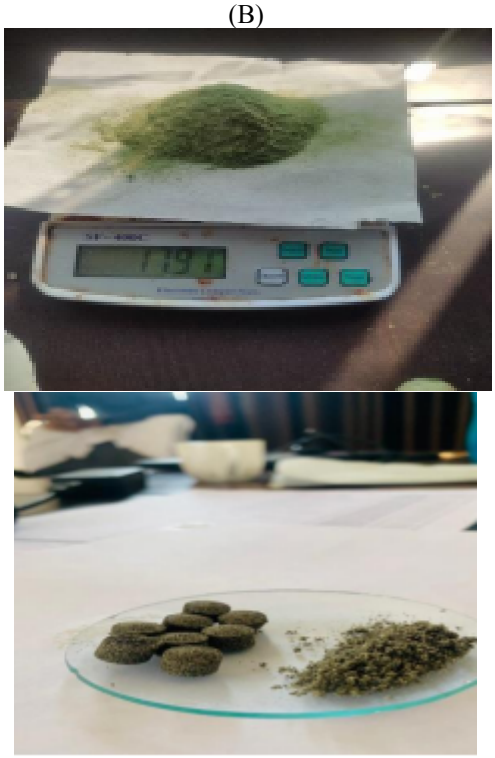
International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 52-57 www.ijprajournal.com ISSN: 2456-4494



(A)



(B)



(C)

Figure 2- (A) Extraction, (B) Dried powder (C) Compressed Effervescent tablets

FORMULATION OF EFFERVESCENT TABLET

The wet granulation method was used to prepare the effervescent granules of Nyctanthes Arbor-tristis[4]. According to geometrical dilution, all required ingredients of the formulation will be mixed thoroughly to maintain good distribution of the drug with other ingredients, the best effervescent vehicle ratio of citric acid, tartaric acid, and sodium bicarbonate is 1: 2: 3.44 and then pass the powder through sieve no 20 after that suitable amount of binding agent added the powder mixture to fabricate a moist mass. Then moisten mass was passed through sieve no. 20 to get granules [8]. These granules were being dried at 40 ^{o}C in a hot air oven and leading to tablet compression.

EVALUATION OF FORMULATED HERBAL EFFERVESCENT GRANULES

Angle of Repose- The angle of repose of the formulated granules was measured using a fixed funnel method. A funnel was fitted into a stand with its tip at 2.5 cm above a graph paper that is placed on a fat horizontal surface. The effervescent granules were carefully poured through the funnel until the apex of the conical pile touched the tip of the funnel. Then, the radius of the base of the conical pile was measured [9].

The angle of repose was finally calculated using the following formula:

Tan θ = h /r

where, θ = angle of repose, h = height of the pile cone, and r = radius of the cone base of the pile.

Table 1: Flow properties of the angle of repose

The angle of repose value	Flow properties
<20	Excellent
20-30	good
30-34	passable
>40	Very poor

Bulk Density- Formulated granules of 15 g were introduced into a dry 100 mL cylinder, without compacting. The level of the granules was carefully marked without compacting and the unsettled apparent volume.

The bulk density was calculated using the following formula:

BD=granules weight/ packing volume

Tapped Density- After carrying out the procedure as given in the measurement of bulk density, the

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 52-57 www.ijprajournal.com ISSN: 2456-4494

cylinder containing the sample was tapped. The tapped density was calculated –

TD= granules weight/ tapped volume of the packing

Carr's Index (%)- Carr's Index (compressibility index) is a measure of the propensity of a powder to be compressed. It was determined from the bulk and tapped densities using the following formula

Carr's Index = [(TD−BD) 100] /TD

Hausner Ratio-Hausner ratio is considered as the indirect index of ease of powder flow. It was calculated using the following formula

Hausner's ratio = tapped density/ bulk density

Table 2: Flow properties and compressibility index

Hausner ratio	Flow characters	Carr's index
1.00-1.11	Excellent	1-10
1.12-1.18	Good	11-15
1.19-1.25	Fair	16-20
1.26-1.34	Passable	21-25
1.35-1.45	poor	26-31
1.46-1.59	Very poor	32-37
>1.60	Very, very poor	>38

Effervescent Cessation Time-The effervescent Cessation time of NyctanthesArbor-tristis granules was measured by adding one dose of granules to a glass containing 250 ml of water when a clear solution is obtained the effervescent time will be recorded. The arithmetic mean of triplicate readings was recorded [10].

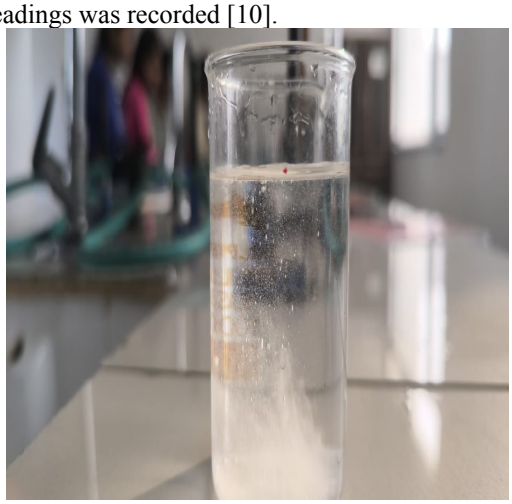


Figure 3- Effervescent Cessation observation

EVALUATION OF FORMULATED HERBAL EFFERVESCENT TABLET[11-15]

Physical appearance- To check the shape, colour and taste of the effervescent tablet of the NyctanthesArbor-tristis;

Hardness test- These are the hardness testing apparatus which are used to test the breaking point and structural integrity of a tablet under conditions of storage and before usage. In the Monsanto the effervescent tablet of the NyctanthesArbor-tristis put under the space between the screw thread and spring. Force was applied with a screw thread and spring until the tablet fractured and the hardness was read.

Friability-Dedust effervescent tablets of NyctanthesArbor-tristis and weigh accurately required number of tablets. Then place the tablets in drum and allow it to rotate for 100 times /revolutions at 25 rpm. After completion of revolutions, remove the tablets, dedust and weigh.

Disintegration test - Operate the apparatus, using water or the specified medium as the immersion fluid, maintained at 37°±2°. Observe the tablets; all of the tablets have disintegrated completely.

Weight variation test-The USP weigh variation test involves weighing 20 tablets individually, calculating the average weight, and ensuring that no more than 2 tablets fall outside the percentage limit. A test to ensure uniformity in the weight of tablets, involving the determination of the average weight from a sample of tablets [16-17].

III. RESULT AND DISCUSSION

Table 3- Chemical test to identify the bioactive

SR. NO.	TEST	OBSERVATION
1	Test for Tannin	Present
2	Test for Saponin	Present
3	Test for Flavonoids	Present
4	Test for Terpenoid	Present
5	Test for Phenolic compounds	Present
6	Test for Reducing sugar	Present
7	Test for Steroid	Present
8	Test for Alkaloids	Present
9	Test for Carbonyl	Present

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 52-57 www.ijprajournal.com ISSN: 2456-4494

Table 4-Observation of effervescent granules

SR. NO.	TEST /OBSERVATION	RESULT
1	Car's index	Good flow
2	Hausner ratio	Good flow
3	Angle of repose	Good flow
4	Effervescent cessation time	1 min 26 sec
5	Stability of granules at RT	Stable, Effervescent cessation time reduces (39 sec)

Table 5-Observation of effervescent tablet

SR. NO.	TEST /OBSERVATION	RESULT
1	Appearance	Round convex, Brownish, Rough, Slight bitter in taste
2	Hardness	4kg
3	Friability test	0.92%
4	Disintegration test	2mins 7 sec
5	Weight variation test	Pass
6	Effervescent time	2mins
7	pH	5

IV. CONCLUSION

Formulations made are likely to result in the formulation of a new herbal product line that possesses similar and reliable properties. It has been well established that medicinal plants are a treasure that can contribute to a healthy, disease-free life. NyctanthesArbor-tristis leaf extract was found to possess the following phytochemicals: tannins, saponins, glycosides, alkaloids, flavonoids, proteins, and carbohydrates, which serve as the active ingredients in drugs. Hence, it can be suggested that the herbal effervescent granules developed can function as a very effective substitute, showing great advantages in their curative activities.

REFERENCES

[1]. Thakur R, Puri HS, Husain A. Major medicinal plants of India. Lucknow: Central Institute of Medicinal and Aromatic Plants. 1989; 585.

[2]. Kokate CK. Practical Pharmacognosy. 4thed. New Delhi: Vallabh Prakashan1994;pp.4.

[3]. Harborne JB. Phytochemical methods - A guide to modern technique of plant analysis, 3rded. UK: Champan and hall 1998; pp. 1 5.

[4]. Baldi A, Hussain W, Tailor Y. Evaluation of in-vitro Cultured Cells of Withaniasomnifera for Antioxidant Activity. Current Trends in Biotechnology and Pharmacy, 2010; 4, 589-595.

[5]. Kulkarni U, Manthale D, Patil BS. Design and development of fast disintegrating tablets containing Ashwagandha by sublimation technique. Inter Jour of Pharm Res, 2011; 64, 82-94.

[6]. Alhakmani F, Kumar S, Khan SA. Estimation of total phenolic content, in vitro antioxidant and anti-inflammatory activity of flowers of Moringaoleifera. Asian Pac Jour Trop Biomed. 2013; 3(8): 623–627.

[7]. Sallam A, Bioequivalence of Two Oral Formulations of Modafinil Tablets in Healthy Male Subjects under Fed and Fasting Conditions. Journal of Bioequivalence Availability. 2015; 7:63-67.

[8]. Mohrle, R., Liberman, L,Schwartz L, Pharmaceutical Dosage Form, Vol. 1, Marcel Decker Inc., New York, 2005; 285-292.

[9]. Lachman L, Liberman HA, Kanig JL. The theory and practice of industrial pharmacy. 3rd ed. Philadelphia: lea and febiger; 1986.

[10]. Cremer K, Drug Delivery: Gastro-Remaining Dosage Forms, Pharm J, 1997; 259: 108.

[11]. Prajapati S and Dharamsi, A: Floating drug delivery for prolonging gastric retention of dosage form, Indian Journal of Novel Drug Delivery, 2013; 5: 15-27.

[12]. Aulton ME. Pharmaceutics: the science of dosage form design. 2nd ed. New York: Churchill Livingstone; 2002.

[13]. Hiola R, Tunadi R. Development of effervescent granules of corn milk supplemented with probiotic lactobacillus strain shirota. Int J Appl Pharm 2018;10:71-5.

[14]. Masaad AMA, Shayoub MEA, Maghrabi IA, Masaad NMA. In vitro-in vivo correlation study of a newly formulated effervescent ciprofloxacin tablets with reference tablets. Int J Curr Res Chem Pharm Sci 2016;3:1-12.

[15]. Jeena KJ, Joy KL, Kuttan R. Effect of PhyllanthusEmblicaPhyllanthusamarus and Picrorhizakurroa on nitrosodiethylamine induced hepatocarcinogenesis. Cancer Lett,1999; 136:11–16.
[16]. Raymond, M.; Lieberman HA; Lachman L; Schwartz TB (2008). Effervescent tablets: Pharmaceutical dosage forms, Marcel Dekker, Inc., New York, Vol. 2, 1, 285-328.
[17]. KhalifaK.l; et al, (2012). Design, Formulation, and Evaluation of Senna effervescent tablets, journal of forest products & industries, 1(2), 21-25.