iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** XII **Month of publication:** December 2021

DOI: https://doi.org/10.22214/ijraset.2021.39517

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 9 Issue XII Dec 2021- Available at www.ijraset.com

Formulation and Evaluation of Nutraceutical Tablet Using Clove Drugs by Wet Granulation Method

Kawade Swapnali[1], Prof. Akhare T. P.[2], Dr. Hingane L.D.[3]
[1, 2, 3]*Aditya Pharmacy College, Beed*

Abstract: ***The objective of present study was to formulate and evaluate the nutraceutical tablets with different combination of herbal drugs. Material and Method: The nutraceutical tablet containing lactose and mannitol as diluent and containing natural drugs like clove and cinnamon which was prepared by direct compression method. The compressed formulations were subject to several evaluation parameters like appearance, thickness, weight variation, hardness and friability. Results: The results of all evaluation parameters of nutraceutical tablet were within the acceptable limit. Pre-compression studies of nutraceutical tablet show satisfactory results. The thickness, hardness, weight variation, and friability of nutraceutical tablet were found to in acceptable range. The in-vitro drug release of eugenol from optimised nutraceutical formulation was found to be 90.23%. Significant results were obtained from present study. Discussion: The finding of current investigation clearly found that the health promotion of the body could be done by nutraceuticals.***
Keywords: Direct compression, Nutraceutical, Eugenol, In-vitro drug release

I. INTRODUCTION

The nutraceuticals normally contains required amount of lipids, protein, carbohydrates, vitamins, minerals and other necessary nutrients depending upon their emphases. Nutraceuticals in the market contains both traditional foods and non-traditional. When a supplement tablet is ingested, the body must digest and absorb the nutrients. Nutraceutical may include a whole area of products like isolated nutrients, dietary supplements, herbal products and other processed foods.

5} The growing disapproval among the patients about the synthetic therapeutic agents and affect about their toxicological profile gave birth to the "Dietary Supplements Health and Education Act" (DSHEA) in USA in 1994.

6) The concept behind the mode of action of nutraceutical dosage form is to provide functional benefits by enhancing the supply of natural building blocks. It works in to two ways that is to minimize diseases sign or to improve body performance. 2, 3Clove consists of dried flower buds of Eugenia caryophyllus, family Myrtraceae. The cloves on drying become perfectly crimson or brownish-black in colour. Clove is used as a dental analgesic, carminative, stimulant, flavouring agent an aromatic and antiseptic. Cinnamon consist of dried inner bark of shoots of coppiced trees of Cinnamon zeylancium Nees. Bark isused as carminative, stomachic and mild astringent.

7) It has been used as an expectorant and demulcent. It is also used as an antispasmodic. The major diseases for prevention and or treatment of which, nutraceuticals have been associated are heart diseases, cancer, hypertension and diabetes.



Fig 1: clove

©IJRASET: All Rights are Reserved



Fig 2: Cinnamon

II. MATERIALS AND METHOD

A. Materials

Clove, cinnamon were received from local market. All other ingredients such as gum acacia, mannitol, magnesium stearate and talc were purchased from Central Drug House (CDH) New Delhi, India. All ingredients used were of analytical grade. Method Nutraceutical tablets containing clove and cinnamon were prepared by wet granulation method. Other ingredients like lactose was used as diluent, magnesium stearate as lubricant and talc as glidant and gum acacia as binding agent . All the excipients along with API weighed as shown in Table 1 and passed through sieve no. 20. Then, all ingredients were mixed following geometric mixing excluding glidant and lubricant thoroughly for 15min.4 The powder blend was thoroughly mixed with talc and magnesium stearate after that gum acacia added in that mixture in proper manner and formulation of granules for proper compretion and that granules compressed into a 400mg tablet using single rotatory punching machine (KI-150, Khera Instruments Ltd. New Delhi, India)

Table 1: formulation tablet of neutricetical of 400mg

Ingredient (mg)	F1	F2	F3	F4
Clove	100	=	100	-
Cinnamon	-	100	=	100
Lactose	290	290	-	=
Mannitol	=	-	290	290
Sodium sachrine	2	2	2	2
Talc	4	4	4	4
Magnesium stearate	4	4	4	4



Fig 3: crushing of ingredient

©IJRASET: All Rights are Reserved

B. Clove

Clove

Fig4: flower of clove
toxonomy
Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Myrtales
Family: Myrtaceae
Genus: *Syzygium*
Species: *S. aromaticum*
Binomial name
Syzygium aromaticum (L.) Merr. & L.M.Perry
Synonyms
• *Caryophyllus aromaticus* L. • *Eugenia aromatica* (L.) Baill. • *Eugenia caryophyllata* Thunb. • *Eugenia caryophyllus* (Spreng.) Bullock & S.G.Harrison • *Jambosa caryophyllus* (Thunb.) Nied.

Cloves are the aromatic flower buds of a tree in the family Myrtaceae, ***Syzygium aromaticum***. They are native to the Maluku Islands (or Moluccas) in Indonesia, and are commonly used as a spice.[2] Cloves are available throughout the year owing to different harvest seasons in different countries.[3]

The clove tree is an evergreen that grows up to 8–12 metres (26–39 ft) tall, with large leaves and crimson flowers grouped in terminal clusters. The flower buds initially have a pale hue, gradually turn green, then transition to a bright red when ready for harvest. Cloves are harvested at 1.5–2 centimetres (0.59–0.79 in) long, and consist of a long calyx that terminates in four spreading sepals, and four unopened petals that form a small central ball.

Uses[



Fig 5: dried clove

1) Clove Tree Flowerbuds

Cloves are used in the cuisine of Asian, African, Mediterranean, and the Near and Middle East countries, lending flavor to meats, curries, and marinades, as well as fruit (such as apples, pears, and rhubarb). Cloves may be used to give aromatic and flavor qualities to hot beverages, often combined with other ingredients such as lemon and sugar. They are a common element in spice blends, including pumpkin pie spice and speculoos spices.

In Mexican cuisine, cloves are best known as *clavos de olor*, and often accompany cumin and cinnamon.[4] They are also used in Peruvian cuisine, in a wide variety of dishes such as *carapulcra* and *arroz con leche*.

A major component of clove taste is imparted by the chemical eugenol,[5] and the quantity of the spice required is typically small. It pairs well with cinnamon, allspice, vanilla, red wine, basil, onion, citrus peel, star anise, and peppercorns.

C. Non-culinary

The spice is used in a type of cigarette called *kretek* in Indonesia.[1] Clove cigarettes have been smoked throughout Europe, Asia, and the United States. Since 2009, clove cigarettes have been classified as cigars in the US.[6]

Because of the bioactive chemicals of clove, the spice may be used as an ant repellent.[7]

Cloves can be used to make a fragrant pomander when combined with an orange. When given as a gift in Victorian England, such a pomander indicated warmth of feeling.



Fig 6: drying of clove in sunlight

1) Potential Medicinal Uses And Adverse Effects

Long-used in traditional medicine, there is evidence that clove oil containing eugenol is effective for toothache pain and other types of pain,[8][9] and one review reported efficacy of eugenol combined with zinc oxide as an analgesic for alveolar osteitis.[10] Studies to determine its effectiveness for fever reduction, as a mosquito repellent, and to prevent premature ejaculation have been inconclusive.[8][9] It remains unproven whether blood sugar levels are reduced by cloves or clove oil.[9] Use of clove for any medicinal purpose has not been approved by the US Food and Drug Administration, and its use may cause adverse effects if taken orally by people with liver disease, blood clotting and immune system disorders, or food allergies.

2) Traditional Medicinal Uses

Cloves are used in traditional medicine as the essential oil, which is used as an anodyne (analgesic) mainly for dental emergencies and other disorders.[11] The essential oil is used in aromatherapy.[8]

Adulteration

Clove stalks are slender stems of the inflorescence axis that show opposite decussate branching. Externally, they are brownish, rough, and irregularly wrinkled longitudinally with short fracture and dry, woody texture.

Mother cloves (anthophylli) are the ripe fruits of cloves that are ovoid, brown berries, unilocular and one-seeded.

Blown cloves are expanded flowers from which both corollae and stamens have been detached.

Exhausted cloves have most or all the oil removed by distillation. They yield no oil and are darker in color.

History

Evidence of cloves has been found at Terqa, Syria dating to 1720 BCE but these have since largely been discredited as misidentifications.[13] [14] In the third century BC, Chinese emperors of the Han Dynasty required those who addressed them to chew cloves to freshen their breath. Cloves reached the Roman world by the first century AD, where they were described by Pliny the Elder. By 176 AD, cloves had reached Egypt.

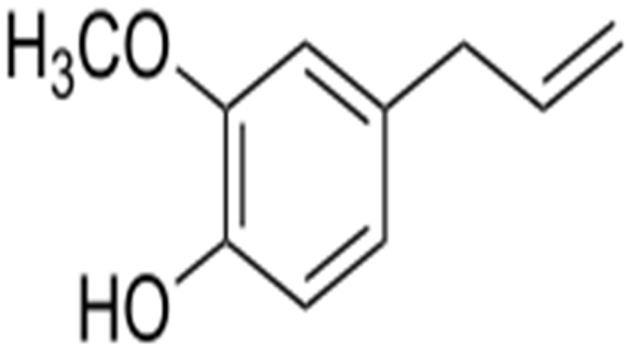
The first clearly dated archeological find of a clove is substantially later than the written evidence, with two examples found at a trading port in Sri Lanka, dated to around 900-1100 AD

Cloves were traded by Omani sailors and merchants trading goods from India to the mainland and Africa during the Middle Ages in the profitable Indian Ocean trade.[*citation needed*]

Until modern times, cloves grew only on a few islands in the Moluccas (historically called the Spice Islands), including Bacan, Makian, Moti, Ternate, and Tidore.[18] In fact, the clove tree that experts believe is the oldest in the world, named *Afo*, is on Ternate; the tree is between 350 and 400 years old.[19] Tourists are told that seedlings from this very tree were stolen by a Frenchman named Pierre Poivre in 1770, transferred to the Isle de France (Mauritius), and then later to Zanzibar, which was once the world's largest producer of cloves.[19]

Until cloves were grown outside of the Maluku Islands, they were traded like oil, with an enforced limit on exportation.[19] As the Dutch East India Company consolidated its control of the spice trade in the 17th century, they sought to gain a monopoly in cloves as they had in nutmeg. However, "unlike nutmeg and mace, which were limited to the minute Bandas, clove trees grew all over the Moluccas, and the trade in cloves was beyond the limited policing powers of the corporation

D. Chemical Compounds



Structure of clove

Eugenol comprises 72–90% of the essential oil extracted from cloves, and is the compound most responsible for clove aroma.[5][21] Complete extraction occurs at 80 minutes in pressurized water at 125 °C (257 °F).[22] Ultrasound-assisted and microwave-assisted extraction methods provide more rapid extraction rates with lower energy costs.[23]

Other important essential oil constituents of clove oil include acetyl eugenol, beta-caryophyllene, vanillin, crategolic acid, tannins such as bicornin,[5][24] gallotannic acid, methyl salicylate (painkiller), the flavonoids eugenin, kaempferol, rhamnetin, and eugenitin, triterpenoids such as oleanolic acid, stigmasterol, and campesterol and several sesquiterpenes.[25] Eugenol has not been classified for its potential toxicity.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 9 Issue XII Dec 2021- Available at www.ijraset.com



Fig 7: punching of clove tablet

III. TABLET MANUFACTURE BY WET GRANULATION METHOD

Granulation is a unit operation in which small powder particles are gathered together to form agglomerates called granules. To achieve cohesion between the powders, it is necessary to include adhesive substances called binders or granulating agents within the formulation. It is a common practice to make use of a granulation solution since it is more effective in comparison with the same quantum of the dry powder binder. Powder mixing, in conjunction with the cohesive properties of the binder, enables the formation of granules which when duly compressed using tablet press forms tablets with the desired properties.

A. Reasons for Granulation

There are several reasons for converting powders or blends of powders into granules and they include:

1) To enhance the flow properties of powder mix.
2) To prevent segregation of powder components during tabletting or storage.
3) To reduce the incidence of dust production.
4) To reduce cross-contamination and hazard associated with the generation of toxic dust that may arise during manufacturing processes.
5) To improve the compression characteristics of drug substances.
6) To improve the appearance of the final product.

B. Ideal Characteristics of Granules

For a successful manufacture of tablets, the granules must possess the following characteristics:

1) All formulation ingredients should be uniformly distributed in the granules.
2) A good granulation should be as near spherical in shape as possible to ensure reproducible flow which in turn ensure constant tablet weight throughout the batch.
3) Granules of different sizes or density must not separate in the hopper as a result of machine vibration.
4) Granules should possess good disintegrating properties and lubrication to reduce die-wall friction.
5) The granules should have sufficient fines to fill empty spaces between coarse granules for better compression characteristics.
6) A tablet granulation should have sufficient physical strength to form strong tablets when compacted.

C. Manufacture Of Tablets By Wet Granulation Method

Wet granulation method is a process of size enlargement in which fine powder particles are agglomerated or brought together into larger, strong and relatively permanent structure called granules using a suitable non-toxic granulating fluid such as water, isopropanol or ethanol (or mixtures thereof). The granulating fluid can be used alone or as a solvent containing binder or granulating agent. The choice of the granulating fluid depends greatly on the properties of the materials to be granulated. Powder mixing, in conjunction with the cohesive properties of the granulating agent, enables the formation of granules. The characteristics and performance of the final product, greatly depends on the extent to which the powder particles interact with each other to form aggregates (granules).

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

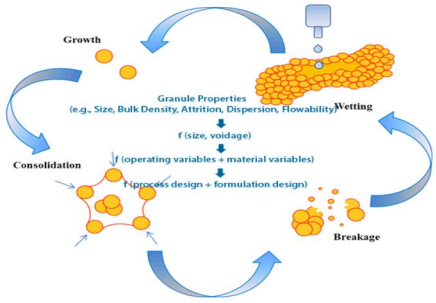


Fig 8:granulation for tablet prepration

D. Mechanisms Of Granule Formation In Wet Granulation

Mechanisms of granule formation in wet granulation, Image source: gruppotpp

The four key mechanisms of granule formation as originally outlined by Ennis include:

E. Wetting and Nucleation

This is the first and an important phase in granule formation. It involves the initial wetting of powder bed and existing granules by the granulating fluid to form nuclei. This step is largely influenced by spray rate or fluid distribution as well as feed formulation properties, in comparison with mechanical mixing. It is worth noting that the nucleation process, that is, the initial coalescence of primary particles in the immediate vicinity of the larger wetting drop is strongly linked with the wetting stage.

F. 2.Coalescence or Ball Growth

In the coalescence or ball growth stage, partially wetted primary particles and larger nuclei come together to form granules composed of several particles. The more general term of coalescence refers to the successful collision of two granules to form a new, larger granule.3. Consolidation

As granules increase in size, they are consolidated by compaction forces due to bed agitation. The extent of the consolidation depends on the agitation in the granulation equipment and the resistance of the granules to deformation. This phase in granule formation controls internal granule porosity, and therefore final properties of the granules e.g., granule strength, hardness, or dissolution.

G. 4. Attrition or Breakage

At this stage, formed granules break into fragments which bind to other granules forming a layer of material over the surviving granule. The above mechanisms can occur simultaneously in all processes of wet granulation. However, certain mechanisms may dominate in a particular manufacturing process depending on the type of equipment used.

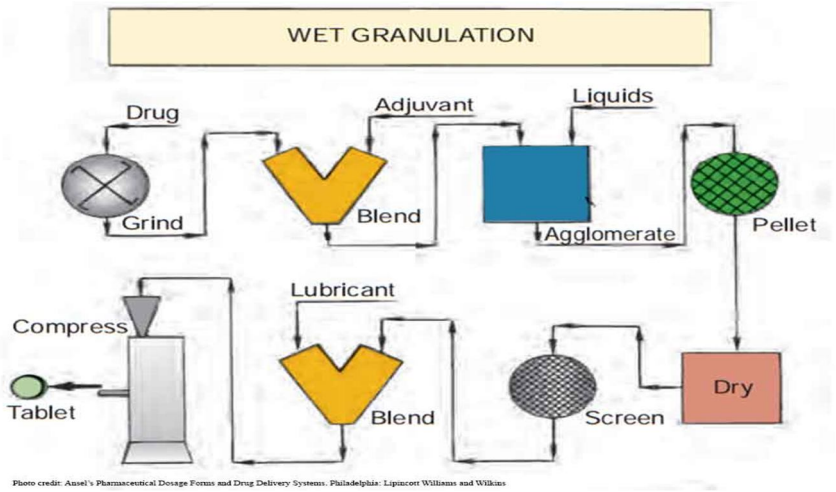


Fig 9: wet granulation method

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 9 Issue XII Dec 2021- Available at www.ijraset.com

Wet granulation method of tablet production involves the following processing steps:

1) Step 1: Weighing And Mixing Of Formulation Ingredients

This step involves the weighing, sifting and introduction of specified quantities of drug substance(s), bulking agent, filler or diluent, and disintegrant into a powder mixer. These ingredients are mixed using either a planetary bowl mixer, ribbon/ trough mixers, rotating drum mixer or high-speed mixer until a uniform powder mix is achieved. The mixing efficiency can be enhanced by the use of powders that have similar average particle size, although this is often not the case in many mixing operations.

There are many diluents available in commerce but those used in wet granulation method include lactose, microcrystalline cellulose, starch, powdered sucrose, mannitol, fructose, sorbitol, calcium phosphate and calcium sulphate. Among these diluents, the most widely used are lactose, because of its low cost, solubility and compatibility with most drug substances and excipients and microcrystalline cellulose, because of its easy compaction, compatibility with most formulation ingredients and consistent uniformity of supply. Diluents are usually selected based on the manufacturer's experience with the material, its relative cost, and its compatibility with the drug and other excipients.

Disintegrants used in wet granulation include croscarmellose, sodium starch glycolate, sodium carboxymethylcellulose, polyvinylpyrrolidone (PVP), crospovidone, cation exchange resins, corn and potato starches, alginic acid and other materials that counteract the effect of binders and the physical forces of compression used in forming the tablets. Croscarmellose (2%) and sodium starch glycolate (5%) are often used because of their high water uptake and rapid action.

2) Step 2: Preparing The Damp Mass

Here, the binder solution is mixed with the powder mixture to form an adhesive mass which can be granulated. The amount of binding agent used as well as the quantity of fluid required to form a damp and coherent mass is part of the operator's skill; however, the resulting binder-powder mixture should compact when squeezed in the hand. The use of insufficient binder tends to poor adhesion, capping and soft tablets.

Excessive binder solution yields hard tablets with slow disintegrating properties.

Among granulating agents are solutions of povidone, an aqueous preparation of cornstarch, molasses, methylcellulose, carboxymethylcellulose, glucose solution and microcrystalline cellulose.

Dry binder or nonaqueous solution may be used for drug substances that are adversely affected by aqueous solution. Colourants or flavouring agents may be added to the binding agent to prepare a granulation with an added feature.

3) Step 3: Wet Screening/ Screening The Dampened Powder Into Pellets Or Granules

The wet massed powder blend is screened using 6- to 12- mesh screen to prepare wet granules. This may be done by hand or with suitable equipment that prepares the granules by extrusion through perforations in the apparatus. The granules formed are spread evenly on trays and dried in an oven.

4) Step 4: Drying Of Moist Granules

The screened moist granules are dried in an oven at a controlled temperature not exceeding 550C to a consistent weight or constant moisture content. The drying temperature and the duration of drying process depend on the nature of the active ingredient and the level of moisture required for the successful production of satisfactory tablets. Shelf or tray drier and fluidized-bed drier can be used for this purpose.

5) Step 5: Sizing The Granulation By Dry Screening

The dried granules are passed through a screen of smaller size than that used to prepare the moist granules. The size of the final granules is dependent on the size of the punches (and hence the final tablet size). Screens of 14- to 20- mesh size are generally used for this purpose.

6) Step 6: Lubrication of Granules

the lubrication tablet is important because of the partical in tablet collapse with each other the lubricating agent oppose this defect there are so many lubricating agent in market but for clove neutraceutical tablet can be use

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

7) Step 7: Compression of Granules into Tablets

Here, the mixed granules are compressed in a single punch or multi-station tablet press fitted with the appropriate punches and dies. Compressed tablets may be coated if there is need to mask the taste of unpleasant drugs, increase the aesthetic appeal of uncoated tablets, modify or control the release of therapeutic agents from tablets. This is achieved by enclosing or covering the core tablet or granules with coating solutions.

IV. EVALUATION OF NUTRACEUTICAL TABLETS

Tablets Pre-compressional studies of powder blend:

In development of new dosage form preformulation study is the prior step in the potential drug development. It is the principal investigation in the drug development to obtained information on the known properties of compound and the proposed development schedule. So, this preformulation investigation may merely confirm that there are no significant barriers to compound development. Following pre-compressional parameters were studied like angle of repose, bulk density, tapped density, compressibility indices etc.

A. Angle of Repose

It is the maximum angle that can be obtained between the freestanding surface of powder heap and the horizontal plane. It was determined by using fixed funnel method. Specified amount of powder drug was transfer to the funnel keeping the orifice of the funnel blocked by thumb.When powder was cleared from funnel then measured its angle of repose and measured in θ 7 . Angle of repose (θ) = tan-1 h/r

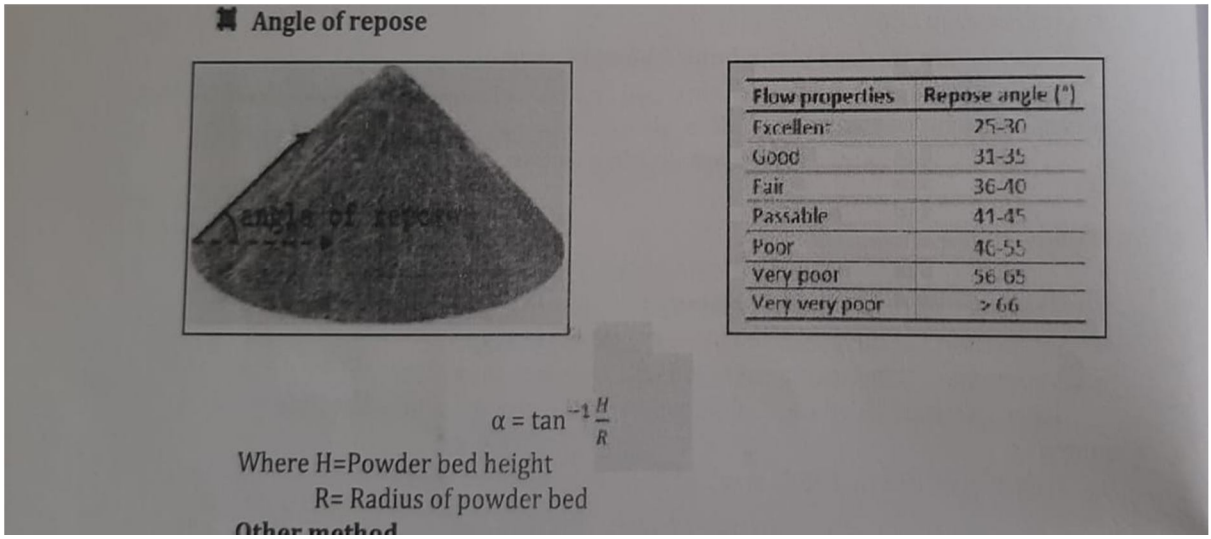


Fig 10 :Formula of angle of repose

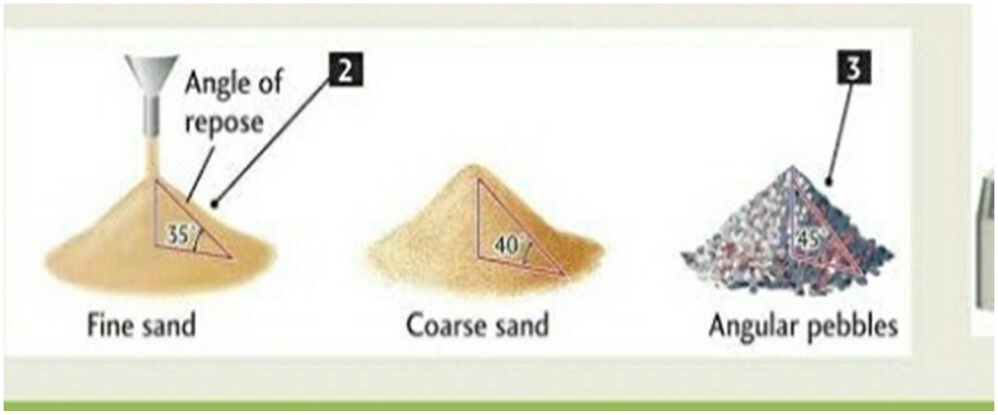


Fig 11: flowability of tablet

B. Bulk Density

It is the ratio of bulk mass of powder to the bulk volume. It is denoted by ρb. Bulk density is used to find out homogenecity .

Bulk density (ρb) = M/Vb

Where, M is the mass of the sample, Vb bulk volume

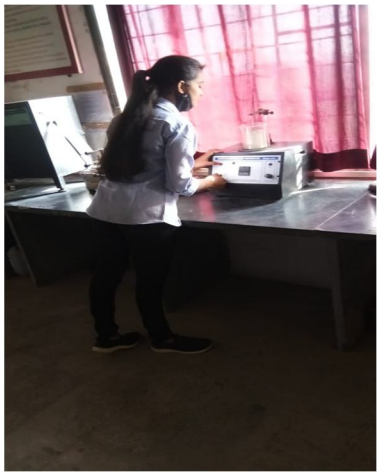


Fig : Bulk density testing

C. Tapped Density

It is the ratio of the weight of powder to the minimum volume occupied in measuring cylinder. Tapped density is determined by placing a graduated cylinder containing known mass of drug or formulation on a mechanical tapper apparatus which is operated at fixed no. of taps (1000) until the powder bed reached a minimum volume.

Tapped density (ρt) = weight of powder blend/Minimum volume occupied by cylinder

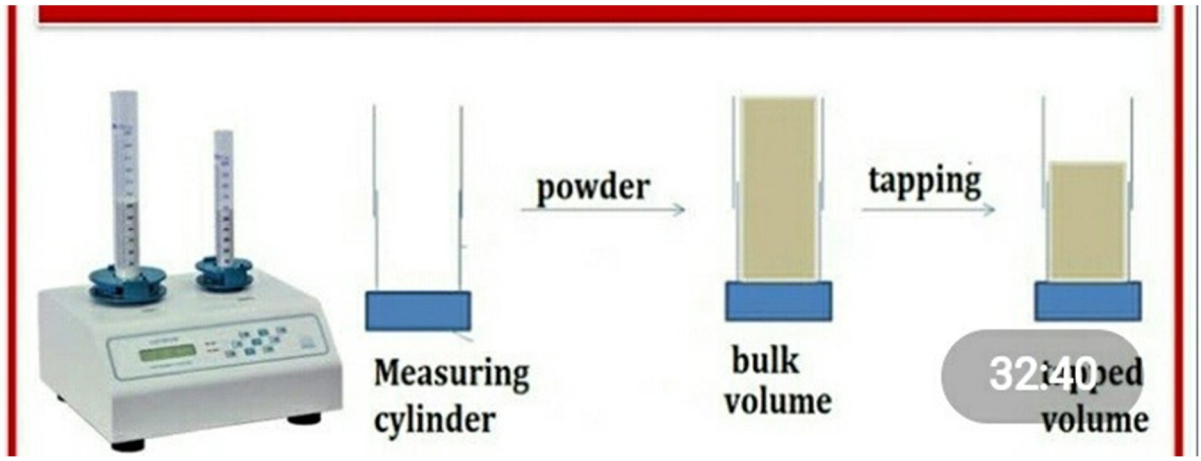


Fig 12: tapped density

V. COMPRESSIBILITY INDICES

1) *Carr 's Index:* Based on the apparent bulk density and the tapped density, the percentage compressibility of the powder mixture was determined by the following formula.

Carr's index = Tapped density-Bulk density × 100/ Tapped Density

2) *Hausner's Ratio:* It is an indirect index of ease of measuring of powder flow. Lower Hausners ratio

Hausner"s ratio = Tapped density/ Bulk density

A. Post-Compressional Studies Of Prepared Nutraceutical Tablet

The neutracetical were evaluated for various parameters after consideration of preformulation to overcome errors during formulation preparation. These are like appearance, thickness, weight variation, hardness and friability. All the evaluation parameters of all formulations are given in Table 2.

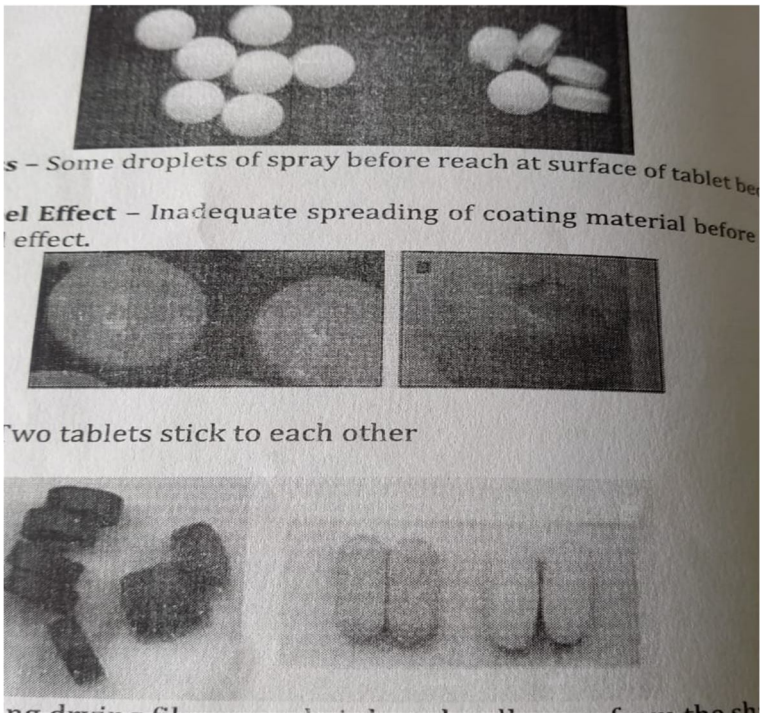


Fig 13: evaluation of tablet

B. Physical Appearance

The general appearance of tablet was studies visually in shape, color, texture and odour.

C. Thickness

The tablet thickness was calculated by Vernier calipers. Tablet was put in between two jaws vertically and measured thickness and 6 tablets were used for this test and expressed in mm.

D. Weight Variation

Weight variation test is run by weighing 20 tablets individually, calculating the average weight and comparing individual tablet weight to the average. The weight variation test would be a satisfactory method of determining the drug content uniformity of tablets



Fig 14: defect in tablet

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 9 Issue XII Dec 2021- Available at www.ijraset.com

E. Hardness

Hardness also termed as tablet crushing strength. The tablet hardness was determined by Monsanto hardness tester. The tablet was placed lengthwise between upper and lower plunger and force applied by turning a threaded bolt until the tablet fractures and measured hardness of tablet in Kg/cm2

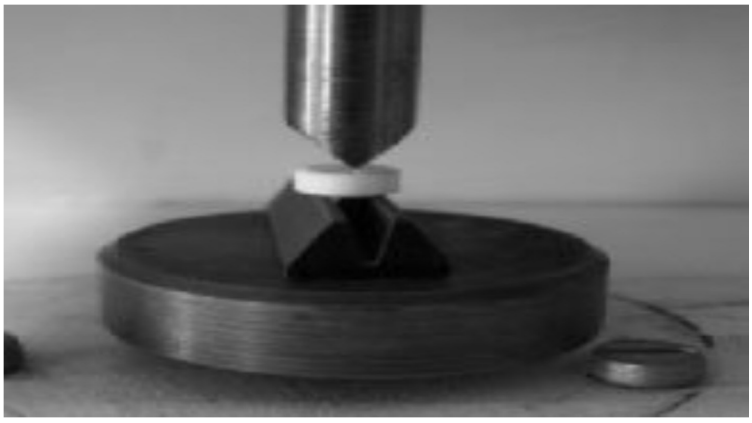


Fig 15:hardness tester

F. Friability

It is determined by Roche friabilator, subjects a number of tablets to combined effects of abrasion and shock by utilising a plastic chamber that revolves at 25 rpm, dropping tablet from inches distance operated for 100 revolutions. Preweighed tablets were dusted and reweighed and according to standard limit friability should be less than 1%. It is calculated by formula-

% Friability = Initial weight – Final weight / Initial weight



Fig 16: friability tester

G. In-vitro drug release

Dissolution profile of eugenol was determined at 37 ± 0.5°C at a stirring rate of 100 rpm using the USP dissolution apparatus II in 900 ml of simulated gastric fluid (0.1 N HCl) . Various aliquot samples were withdrawn with replacement simulated fluid of same amount at 5, 10, 15, 30, 45, and 60 min respectively. Samples were filtered using whatmann filter paper and taken absorbance at wavelength of 366 nm by UV spectrophotometer.



©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 9 Issue XII Dec 2021- Available at www.ijraset.com

VI. RESULTS AND DISCUSSION

The nutraceutical tablet of clove and cinnamon was formulated by direct compression method. This technique was used for conventional from nutraceutical tablet which minimize processing steps and eliminated wetting and drying process. The physiochemical property show satisfactory results by nutraceutical tablet which are within the range of prescribed standards required for investigation of present study.

A. Pre- Compression Studies of Powder

The powder blend was evaluated for various parameters and their results are shown in Table 2. The evaluation parameters such as angle of repose, bulk density, tapped density, Carr‟s index and Hausner‟s ratio were found to be 21.12±0.11 to 27.46±0.12 (Θ),0.4071±0.21 to 0.4741±0.32 g/ml, 0.4132±0.17 to 0.4965±0.028 g/ml, 11.00±0.12 to 14.17±0.39, 1.11±0.012 to 1.17±0.13 respectively. After evaluation of preformulation parameters it showed that there is no presence of moisture in power and showed uniformity of powder blend 11. After study of flow rate it conclude that powder blend exist optimum proportion that leads to maximum flow rate. So the result showed that the powder have good flowing property which does not cause affect the process of tablet punching



Fig 17: clove and its crushed powder

Table 2: Pre compression studies of nutraceutical tablet containing clove and cinnamon

Post compressibility parameter	F1	F2	F3	F4
Thickness (mm)	1.2±0.1	1.2±0.21	1.2±0.21	1.2±0.21
Hardness (kg/cm)	5.5±0.2	4.8±0.11	4.31±0.21	5.21±0.033
% weight variation	0.399±0.021	0.399±0.034	4.31±0.21	5.21±0.019
% friability	0.23±0.023	0.31±0.012	0.045±0.14	0.22±0.011
% in- vivo drug release	90.23	86.88	88.64	8534

Table 3:post compression studies of nutracetical tablet containing clove anr cinnamon

Pre-compression parameter	F1	F2	F3	F4
Angle of repose	21.12±0.11	24.32±0.12	27.46±0.12	22.14±0.17
Bulk density (g\ml)	0.4649±0.12	0.4541±0.21	0.4741±0.32	0.4071±0,21
Tapped density(g/ml)	0.4262±0.08	0.4587±0.023	0.4132±0.17	0,4965±0.028
Carrs index	12.19±0.14	13.04±0.16	11.00±0.12	14.17±0.39
Hausner ratio	1.14±1.16	1.11±0.012	1.16±0.021	1.17±0.13

Table 4: carrs index as an indication od powder flow

Carrs index %	Flow ability
5-15	Excellent
12=16	Good
18-21	Pair to passable
23-35	Poor

©IJRASET: All Rights are Reserved

Table 5: Angle of repose of nutraceutical tablets

Angle of repose	Type of floe
<20	Excellent
30=40	Good
>40	Very passable

B. Thickness

The thickness of clove and cinnamon containing nutraceutical tablet was found to be 1.2± 0.1cm. It is depends upon the size of die and punches or a function of die fill and compration and weight variation

C. Weight and Variation

The weight of 20 tablets was measured and it was found to be 0.397±0.012 to 0.399±0.034 for all formulations respectively. All the nutraceutical tablet containing clove and cinnamon passed weight variation test as the average percentage weight variation was within the USP limits of ±5%



Fig : weight variation

D. Hardness

The hardness of conventional nutraceutical tablet was found to be 4.31±0.21kg/cm2 to 5.21±0.033 for clove and cinnamon containing formulations. Mannitol containing formulation code showed more friable and less hardness than lactose as diluent. It is depend upon the compression force of punching machine and showed that it is sufficient for tolerating mechanical strength.Tablets showed sufficiently hard to resist breaking during packaging, shipment, and normal handling.

E. Friability

Friability of all formulations was found to be0.14±0.045 to 0.31±0.0.12 %.The friability of clove and cinnamon containing tablet was found to be in acceptable limit i.e. less than 1%. There no capping problem occurs in the tablets so it could be considered for commercial use. It produced no loss during shipping process

F. In-vitro Drug Release

The in-vitro drug release of eugenol from all nutraceutical tablets in 0.1 HCL was found to be 85.34 to 90.23%respectively in 1 h. The release of eugenol as a therapeutic agent from nutraceutical tablet is produce maximum release in F1 formulation due to presence of more amount of eugenol

VII. CONCLUSION

From the above study, we conclude that the nutraceutical tablets were prepared by wet granulation method and gave satisfactory and acceptable result. Conventional tablet of nutraceutical shows immediate drug release due to direct compressed tablet. The formulation containing clove could be more beneficial as an analgesic due to the presence of eugenol than cinnamon containing tablet. From the above research work it was concluded that herbal nutraceutical tablet prepared in the form of cost effective tablet to minimize patients compliance in regarding supressing side effects and enhancing positive

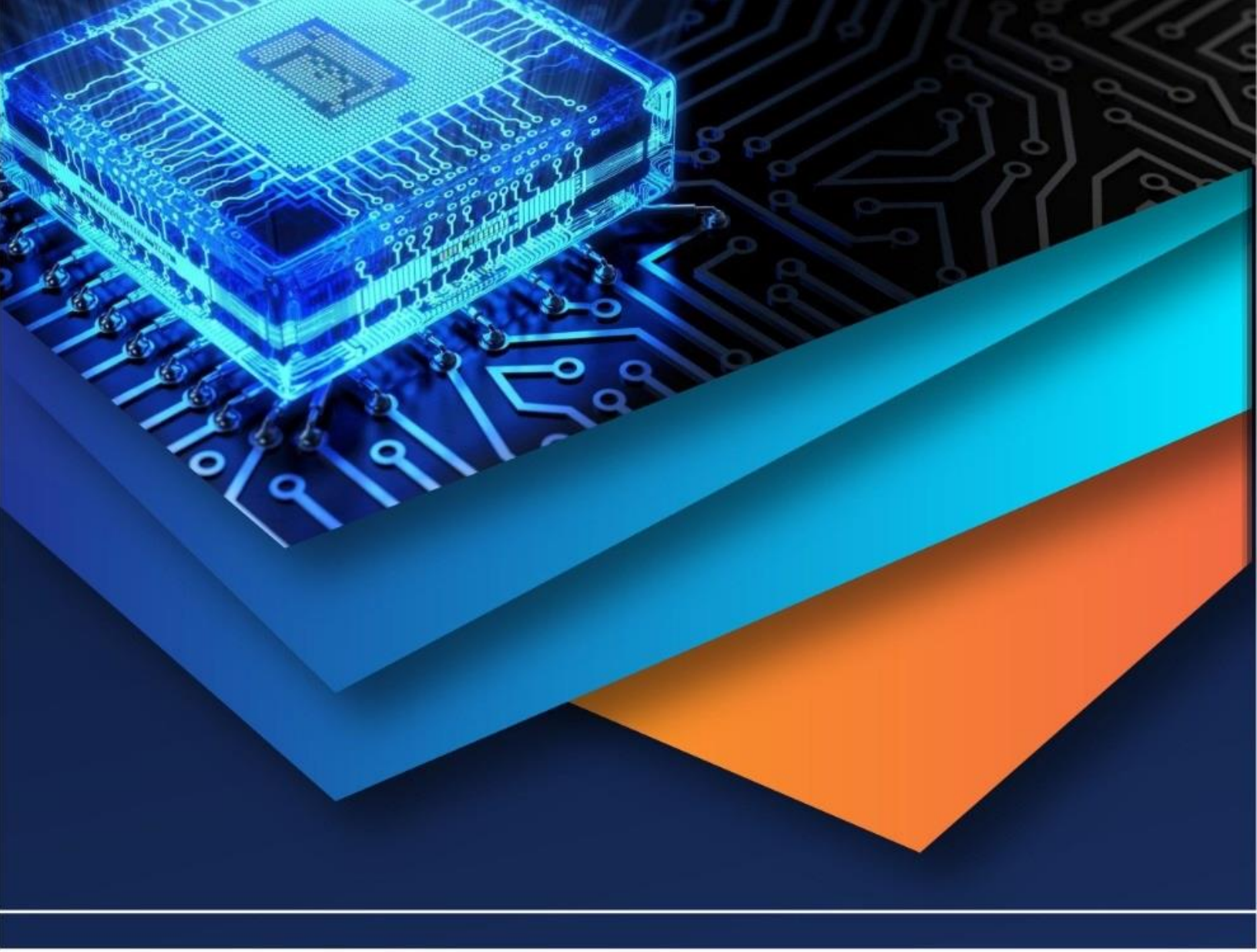
©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

REFERENCES

[1] Tamilvanan S,Sa B.In Vitro and In Vivo Evaluation of SingleUnit Commercial Conventional tablet and Sustained-Release Capsules Compared with Multiple-UnitPolystyrene microparticles Dosage Forms of Ibuprofen.AAPS PharmSciTech 2006; 7 (3):E1-E9.
[2] Chauhan B, Kumar G, Kalam N, Ansari SH. Current concepts and prospects of herbal nutraceutical: A review.J Adv Pharm Technol Res. 2013 Jan-Mar; 4(1): 4–8.
[3] Deng R . A review of the hypoglycaemic effects of five commonly used herbal food supplements. Recent Pat Food Nutr Agric. 2012 April 1; 4(1): 50–60.
[4] Cencic A, Chingwaru W . The role of functional food nutraceutical and food supplements in intestinal health.Nutrients. 2010 June; 2(6): 611–625.
[5] Pandey MM, RastogiS, Rawat AKS. Indian traditional Ayurvedic system of medicine and supplementation. Evid Based Complement Alternat Med. 2013; 2013: 316-327.
[6] Kokate CK, Purohit AK, Gokhale SB. Pharmacognosy. Nirali Prakashan .Forty sixth edition.2010:1.46-1.48,1.84-1.87, 8.52- 8.56
[7] Lachman Leon, Lieberman Herbert A, Kanig Joseph L.The theory and practice of industrial pharmacy.3rdedition Varghese publishing house.2009:182-184,296-303.
[8] Aulton ME: Pharmaceutics the science of dosage design. Churchill Livingstone. Second edition 2002; 134.
[9] Indian Pharmacopoeia: Ministry of Health and Family Welfare, Government of India. Published by the Indian Pharmacopoeial commission: Ghaziabad. 2010, II: 751-753.
[10] Bhope SG, Nagore DH, Kuber VV, Gupta PK, Patil MJ. Design and development of stable polyherbal formulation based on results of studies. Pharmacognosy Res. 2011 Apr-Jun; 3(2): 122–129.
[11] Krupa A,Jachowicz R, Pedzich Z, Wodnicka K. The influence of the API properties on the ODTs manufacturing from the coprocessed excipient systems. AAPS PharmSciTech. 2012 December; 13(4): 1120–1129.
[12] Patrício JPH, Santos C, Cerdeira R. In vitro dissolution profile of two commercially available iron preparations. Drugs R D. 2012; 12(1): 35–40.
[13] Pramod K, Ansari SH, Ali J. Development and validation of UV spectrophotometric method for the quantitative estimation of eugenol. Asian J. Pharm. Ana. 2013; 3(2):
[14] Gallo L, Ramirez-Rigo MV, Pina V, Palma S, Allemandi M, Bucala V.Valeriana officinalis Dry Plant Extract for Direct Compression: Preparation and Characterization. Sci Pharm. 2012; 80(4): 1013–1026
[15] Athawale RB, Regee SS, Tawade V. Formulation and evaluation of herbal neutraceutical

Thank you

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)