Formulation and Evaluation of Memory Booster Tablets

Salonee S. Bangar[1], Sanika R. Toshniwal[2] , Rameshwar D. Borkar[3], Dr. Swati P. Deshmukh[4]

[1,2]Student, Shraddha Institute of Pharmacy Washim-444505
[3]Assistant Professor, Shraddha Institute of Pharmacy Washim-444505
[4]HOD, Shraddha Institute of Pharmacy Washim-444505

Abstract:
Reminiscence is the ability of an organism to keep, hold, and in the end recollect records. Reminiscence enhancers are the compounds which enhance or beautify the reminiscence. The compounds, enhance reminiscence are known as nootropics. Some physiological situations consisting of pressure, anxiety affect the reminiscence. Memory loss can be age associated and due to a few ailment circumstance like Alzheimer's disorder, Parkinson's sickness and so on. There are numerous nootropics advertised such as torental, duxil however those merchandise has facet effects like vascular dementia related to lacunae or to more than one infarcts, or leucoaraiosis and drug related amnesia. Herbal nootropics mainly act through one of a kind approaches like via increasing and replenishing neurotransmitter at excessive attention in mind, by anti-depression, adaptogenic and temper stabilization, by way of improved oxygen supply and brain power, via improved attention, stamina, and focus, with the aid of reminiscence enhancement and getting to know development, through nerve increase stimulation and brain mobile protection. Memory is the most vital function for effectual survival of people. Reminiscence is the capacity of an personage to record the in series and bear in mind it whenever wanted. Traditionally herbal tablets have been used to enhance cognitive functions. There are some drugs like shankhpushpi, (*Convolvulus pluricaulis*), bramhi (*Bacopa monnieri*) and so forth which act as memory enhancer dementia and allows to growth concentration .These herbs beautify the memory as well as boom blood flow inside the brain.

Keywords: Reminiscence, nootropics, memory enhancer, adaptogenic, brain.

Introduction:

Nootropics, popularly referred to as "smart drugs," are substances which enhance human cognitive competencies (the functions and capacities of the mind. The phrase nootropic is derived from the Greek words noos or thoughts and tropos, a growth. Normally, nootropics paintings with the aid of increasing the mind's deliver of neurochemicals (neurotransmitters, enzymes, and hormones), by improving the mind's oxygen deliver, or via stimulating nerve increase. With some high-quality exceptions, nootropics have very low or no toxicity, making overdose unlikely. Most nootropics are nutrients or plant components (herbs, roots, beans, bark, and so forth.), available over-the-counter at fitness meals and grocery stores, and are used as nutritional dietary supplements. Some nootropics are pills, used to treat retardation, neural degradation (Alzheimer's and Parkinson's), and for instances of oxygen deficit to prevent hypoxia. Those tablets have a sort of human enhancement programs as properly, are advertised closely on the sector extensive internet, and are used by many humans in personal cognitive enhancement regimens.

We summarized specific herbs like Convolvulus pluricaulis (shankhpushpi), Bacopa monnieri (Bramhi) are tested. Shankhpushpi (Convolvulus pluricaulis) is known as a Medhya (brain tonic) Rasayana in the Indian traditional system. The medicinal herb is considered to enhance certain aspects related to intellect and memory improvement. Shankhpushpi is a Sanskrit word that means "the plant with flowers shaped like a conch. It is a perennial herb which seems like morning glory. The shankha is one of Lord Shiva's sacred instruments. It consists of various phytochemical constituents mainly in the form of proteins, amino acids and the alkaloids convolvine. Bacopa (Bacopa monnieri) is a plant that has been used for centuries in traditional Ayurvedic medicine. It is sometimes called Brahmi. Bacopa might increase certain brain chemicals that are involved in thinking, learning, and memory. It might also protect brain cells from chemicals involved in Alzheimer disease. Bacopa is commonly used for Alzheimer disease, memory and thinking skills, anxiety.

Tablet:

Tablets are the solid dosage form containing medicament or medicaments, usually circular in shape and may be flat or biconvex.

Types of Tablets:-

1. Tablets ingested orally – The tablets which are usually intended to provide rapid disintegration and are administered orally.
2. Tablets used in oral cavity -
3. Tablets administered by other routes.
4. Tablets used to prepare solutions.

Advantages of Tablets:

- The tablets are easy to administered.
- They are easy to be dispensed.
- These are more stable dosage form.
- They maintain the accuracy of dosage form.
- These are an economical dosage form.
- Bitter and nauseous substances can be given easily in tablet form, after giving a suitable coating to the tablets.
- They are the lightest dosage form.
- They are the most compact of all dosage form.
- They are easiest and cheapest regarding packing and transport.
- They are better suited to a large scale production as compared with any other unit oral dosage form.

Disadvantages of Tablets:

- They causes ergonomic discomfort.
- They are difficult to sallow in case of children and unconscious patients.
- Some drug resist compression into tablet form due to the amorphous nature or low density character.
- Drugs with poor wetting are difficult to convert into tablets.
- Drugs with slow dissolution properties are difficult to convert into tablets which provide full drug bioavailability.
- Bitter tasting drugs, drugs with objectionable odour or drugs that are sensitive to oxygen or atmospheric moisture may require encapsulation or special type of coating which may increase the cost of the finished tablets.

Following Ingredients are used in herbal tablets:

1. Shankhpushpi:

Synonym: Shankhwel, Shankhphuli, Shankhavali, Mangala Kusuma.

Biological source: It consist of whole parts of *Convolvulus pluricaulis.*

Family: Convolvulaceae.

Chemical Constituents: Shankhpushpi is found to contain triterpenes, alkaloids and xanthones. It also contains Shankhpushpine, convoline, D-glucose, rhamnose, volatile oil.

Properties: Antidepressant, anticonvulsant, antiulcer, antianxiety, brain tonic.

2. Bramhi:

Synonym: water hyssop, herb of grace,[2] and Indian pennywort.[2]

Biological source: It consist of fresh or dried leaves and stems of *Bacopa monnieri.*

Family: Scrophulariaceae.

Chemical Constituents: The leaves are used medicinally and contain triterpenoid saponins, alkaloids like Bacoside A, bacoside B, Brahmine, nicotine.

Properties: Anti-inflammatory, anticonvulsant, antidepressant, antineoplastic, immuno-stimulatory.

- **Pre-formulation Studies:-**

1. Organoleptic properties:

A sample consists of studied via organoleptic belongings of the drug. Shade, odour and flavor visible inspection.

2. Loss of drying:

Process: For willpower of lack of drying (LOD) appropriately weight oil of powder and dry it at 105 ℃ for 3- 4 hrs, in hot air oven withdraw from oven and funky for 30 ± 5min.

Standard: 8- no longer more than zero.5% w/w of its weight". On Calculate LOD with the aid of the use of following system: lack of crying (% w/w). = W1-W2 X100

Where, W1 = weight of empty dried weighing dish at the side of pattern.

W2 = weight of pattern and weighing dish after drying.

W3= weight of empty weighing dish.

3. Solubility:

Procedure :- preforming upload 25 mg the water solubility test 1 drop of a liquid pattern or approximately of a solid pattern to 0.5ml of distilled or deionized water in a test tube tap of the tube together with your finger to mix a or stir gently with glass stirring rod report the pattern or insoluble.

4. Angle of repose:

Angle of repose is defined as the maximum attitude possible among the floor of pile of powder and the horizontal aircraft.

$$\tan\theta = h/r$$

5. Bulk Density:

Bulk density of a powder is defined because the ratio of the mass of the powder and it's bulk quantity.

By using the formula,

Bulk density = mass of powder/ bulk quantity

6. Tapped density:

The tapped density is an elevated bulk density attained after mechanical tapping of field the pattern. The inter-unique interaction have an effect on bulking houses and interface with powder float

By using the formula,

Tapped density = mass of powder/ tapped volume

7. Porosity :-

Whether the powder is porous or non-porous the whole porosity expression for the calculation stays identical.

The percent porosity is express as,

% porosity = (bulk quantity - tapped quantity) x100/ Bulk quantity.

8. Carr's Index:

Carr's Index an indication of the compressibility of a powder. It is calculated through the method:

Carr's index = (tapped density - bulk density - tapped density) x100

Carr's using Index & system,

Carr's Index = (tapped density – bulk density) tapped density

9. Hausner Ratio:

The Hausner Ratio is various that is correlated to the flowability of a powder or granules material.

The Hausner Ratio is calculated by way of the method,

$$H = ϱT/ϱB$$

Wherein, ϱB= Bulk density of the powder.

ϱT= Tapped density of the powder.

- **Formulation:**

The following steps are involved for the duration of the manufacturing of compressed tablet:

I. Instruction of granules for compression: it includes -

a) Weighing the elements

b) Mixing the powdered elements and excipients.

c) Coverting the blended components into granules.

II. Compression of granules into tablets.

I. Instruction of Granules for Compression:

The subsequent steps are worried at some stage in the preparation of granules:

a) Weighing of the substances:

The substances have to be weighed as it should be the usage of a balance of precise fine. There must be a double check on the weighing so that you can rule out any human error.

b) Mixing the powdered ingredients and excipients:

The principle objective of mixing the medicaments and excipients is to put together homogeneous mass, so that uniform capsules can be manufactured. Blending of ingredients need to be carried out in an ascending order in their weight.

c) Changing the combined ingredients into granules:

The crystalline medicament can be compressed to get precise first-rate compressed tablets. In case the medicaments alongwith excipients are in powder from it cannot be compressed as such into tablets.

Formulation table:

Sr. No.	Ingredients	F1	F2	F3	F4	F5
1	Shankhpushpi	3 gm.	3 gm.	3 gm.	3 gm.	3 gm.
2	Bramhi	1 gm.	1 gm.	1 gm.	1 gm.	1 gm.
3	Acacia	0.06 gm.	0.04 gm.	0.07 gm.	0.03 gm.	0.05 gm.
4	Lactose	1.8 gm.	1.82 gm.	1.79 gm.	1.83 gm.	1.81 gm.
5	Starch paste	Q.S	Q.S	Q.S	Q.S	Q.S
6	Magnesium stearate	0.06 gm.	0.07 gm.	0.08 gm.	0.05 gm.	0.04 gm.
7	Talc	0.06 gm.	0.05 gm.	0.04 gm.	0.07 gm.	0.08 gm.

Factor = Quantity required/Quantity given

The granules can be prepared by the following method:

Wet Granulation method:

Pass all the ingredients through sieve no. 80

Mix Shankhpushpi, Brahmi, Acacia & Magnesium stearate

Prepare separately starch solution with water (Q.S.)

Add the starch solution to the mixture to form a damp coherent mask

Pass the coherent mass through sieve no. 12 to form granules.

Dry the granules at 50-60 °C for 1 hour in hot air oven.

.

II. Compression of granules into tablets:

The dried granules are compressed into tablet in a device referred to as a tablet making machine. The subsequent gadget are used for this reason

- **Single punch tablet system:**

The single punch pill device has the following most important components as shown in Fig.

(a) Hopper shoe: To supply the granules to the die and remove the pill after its compression.

(b) Upper punch

(c) Lower punch

(d) Capacity regulator: To modify the location of the lower punch to accommodate the required amount of granules through the die.

(e) Ejection regulator: To modify the placement of the decrease punch, so that its highest function is at par with the floor of the die.

(f) Die: It lets in the higher punch and the decrease punch to come close collectively to compress the granules.

(g) Driving wheel: It enables in the movement of lower punch, the higher punch and the hopper shoe and also test their moves.

Working of tablet making device:

Numerous actions takes place at a time to form a tablet in a tablet making device.

1. The upper punch rise up to allow the hopper shoe to move over the disc.
2. The higher punch drops and the granules feed from the shoe into the die. The shaking motion of shoe facilitates within the go with the flow of granules.
3. The shoe moves apart and the higher punch drops, hence compressing the granules into a tablet.
4. The upper punch arise upward and the decrease punch rises upto the floor of the dies to eject the tablet.
5. The hopper shoe again actions forward over the dies, pushing aside the newly shaped tablet.
6. The decrease punch drops and the cycle is restarted.

The tablet making system is adjusted for ejection of tablets, capability and compression. When these adjustments are executed, the adjusting screws are locked in role. The machine is then ready for compression of granules into tablets, it is necessary to test the ordinary periods the placing of tablet making gadget during the route of compression of granules into tablets on a big scale manufacturing.

- **Evaluation Parameters:**

The following assessments have to be carried to hold the best manage of drugs:

1. Shape of tablets
2. Appearence
3. Content of active ingredient in tablets
4. Uniformity of weight
5. Disintegration test for tablets
6. Dissolution test for tablets
7. Mechanical strength.
8. Friability test

1. Shape of tablets:

Inside the pharmacopoeia the form of a tablet is described as circular with flat or convex faces.

2. Appearance:

When a damaged phase of an uncoated tablet is tested under a lens, either a surprisingly uniform texture (single-layer tablets) or a stratified shape (multi-layer capsules) is visible. There should be no signs of coating. Coated capsules have a smooth and frequently colored surface.

3. Content of active ingredient in tablets:

The quantity of active factor in pill is determined with the aid of doing the assay as stated inside the monograph. Commonly 20 capsules or such different variety as may be indicated in the monograph are used within the assay. The end result lies within the range for the content of energetic ingredient stated within the monograph. Where 20 tablets cannot be received, a smaller number, which have to not be less than 5, can be used. In such cases, the limits precise in the monograph can be relax to the extent

4. Uniformity of weight:

It's far appropriate that every man or woman pill in a batch need to be uniform in weight, but a small variant the weight of the person pill is vulnerable to arise. Therefore a lit variation is authorized within the weight of a pill through the pharmacopoeia. The following percentage deviation in weight version is permitted. Weigh 20 capsules decided on at random and decide their common weight. Not greater than 2 of the individual weights may additionally deviate from the average weight by way of more than the proportion deviation given in the desk 14-3 and none need to deviate with the aid of greater than two times that percentage.

Weight variations = 100%. (Iw-Aw)/Aw.

Where,

Iw = person weight of tablet.

Aw = average weight of tablet.

5. Disintegration test:

Disintegration of a pill way to break the pill into smaller debris after swallowing. The time required to crumble the pill is referred to as “Disintegration Time”. The rate of disintegration relies upon the type of the tablet. The capsules re dissolved by way of sluggish solution in the mouth or chewed or are to which can be be dissolved in water earlier than administration, do not need a disintegration take a look at. The check of disintegration is needed in capsules which are swallowed. The rate of disintegration differs from pill to tablet due to the fact the nature of the drug. In a few cases the disintegration time is as brief as one minute and in other cases it may be so long as 30 mts. In standard, Pharmacopeia prescribed a limited of 15 mts. For most of the tablets, until otherwise indicated within the monograph.

6. Dissolution test:

The check is completed for measuring the amount of time required for a given percentage of the drug substance in a tablet to go into answer below detailed circumstance in vitro. The apparatus used for the take a look at is as in keeping with specification given in IP.

Apparatus- It includes the subsequent components:

1. A cylindrical blanketed vessel manufactured from or different transparent glass fabric having one thousand ml capability. The vessel is fitted with a lid having four holes, one for having the shaft of the stirrer, second for putting the thermometer and ultimate for disposing of the pattern.

2. An electric powered motor that's capable of rotating the basket within the vessel at varied speed between 25 and a hundred and fifty revolutions according to minute. The shaft is so adjusted that it allows the basket to revolve smoothly without a whole lot wobble.

3. A cylindrical stainless steel basket made of woven twine material having an aperture length of 425 µm. for use with dilute acid media, the basket can be lined with gold. The top of the basket is hooked up to the disc at the using shafter.

4. The vessel is geared up with an appropriate tool for the withdrawal of the samples of the dissolution medium. The technique of sampling have to not intervene excessively with the normal pattern of go with the flow of the dissolution medium in the apparatus.

5. The vessel should be securely clamped in a water bathtub maintained at 37°±0.5° having an arrangement for clean movement of water in the course of the take a look at.

7. Mechanical strength:

The Pharmacopoeia has no longer constant any trendy for the mechanical power or hardness of capsules. The producers have employed their personal exams to make sure that their capsules will resist the regular hazard of managing and transportation.

The following gadgets are normally used by manufacturers to find out the mechanical strength of pills:

(1) Monsanto hardness tester

(2) Pfizer pill hardness tester

(1) Monsanto hardness tester:

The Monsanto Chemical Cot Lad had designed spring-strain tool to test the hardness of a tablet. It has a graduated scale which offers the studying in Kg/sq cm. The pill to be tested is placed between the spindle and the anvil. The desired strain had to hold the tablet in position is carried out via shifting the screw knob in clockwise path. The size is moved so that the indicator is constant at 0. The pressure is then implemented until the tablet breaks. The analyzing is mentioned, which indicates the pressure which is wanted to break the tablet.

(2) Pfizer tablet hardness tester:

It is bases on the precept of an ordinary plier Pfizer tablet hardness tester is a plier fitted with a stress dial. The pill is located among the jaw of the plier and pressure is applied by using urgent the handles with hand unit until the pill breaks. The studying of the dial suggests the pressure needed to break the tablet

8. Friability test:

Usually at some stage in the course of compression of tablets an enough stress is implemented at the granules, in order that the tablet can resist the wear and tear during transportation and coping with. However inspite of staring at all the precautions, the capsules show sizable powdering after regular managing, giving an unwanted appearance. Friability test is finished to assess the ability of the pill to withstand put on and tear in packing, coping with and transporting. The apparatus used to carry out this take a look at is referred to as “Friabilator” The apparatus includes a plastic chamber, that's divided into elements and it revolves at a pace of 25 r.p.m. 20 drugs are weighed and located inside the plastic chamber. The chamber is circled for 4 mins or 100 revolutions. All through every revolution the tablet falls from a distance of 6 inch. The pills are removed for the chamber after a hundred revolutions and weighed. Loss in weight shows the friability. The tablets are taken into consideration to be of top high-quality if the loss in weight is less than 0.8%.

Conclusion:

I have been conclude, that herbal drugs should be used rather than synthetic drugs which may have various side effects. Shankhpushpi herb and bramhi leaves extract was found to possess various beneficial constituent like alkaloids, phenolics and flavonoids together with iso-flavonoids. The antidepressant, anticonvulsant, antianxiety and antioxidant activities are observed in both the herbal drugs. This could be due to presence of above described various active compounds.

Pre-formualtion studies on the powder included measuring its angle of repose, bulk density etc. The findings confirmed that the particles were not freely flowing. So the compression of drugs was executed by using wet granulation method. The tablets hardness, weight variation, friability, disintegration time and dissolution were all evaluated. The findings confirmed that formulations were employed effectively inside the clinical method of rapid-dissolving drugs. Magnesium stearate become the fine remarkable disintegrant for the formulation of shankhpushpi and bramhi tablets. Further experiment on evaluation of different extraction methods in order have herbal drugs like shankhpushpi and bramhi have been used to treat various diseases.

From this study, I came to know the various therapeutic activities and health benefits of shankhpushpi and bramhi and also the technique of performing pre-formulation, formulation and evaluation studies of shankhpushpi tablets.

References:

1. Dr. D. Mukkerji Second edition of Indian Pharmacopoeia Volume II page no. 1118 -1121.
2. R. M. Mehta Published by M .K. Jain for vallabh Prakashan of Pharmaceutics -I. Page no 253-280.
3. Adams M., Gmunder F., Hamburger M. (2007). Plants traditionally used in age related brain disorders. A survey of ethno botanical literature.*J.Ethnopharmacol.*113,363–381. 10.1016/j.jep.2007.07.016.
4. Agarwal P., Sharma B., Fatima A., Jain S.K.(2014).An update on Ayurvedic herb Convolvulus pluricaulis Choisy. *Asian Pac. J. Trop. Biomed.*4,245–252.10.1016/S2221-1691(14)60240-9 .
5. Agarwal P., Sharma B., Alok S.(2014). Screening of anti-inflammatory and anti-analgesic activity of Convolvulus pluricaulis choisy.*Int.J.Pharm.Sci.Res.*5,2458–2463.10.13040/IJPSR.0975-8232.5(6).2458-63 .
6. Dr P.V Kasture, Pharmaceutics.1st year diploma in pharmacy, 22nd Ed. Nirali Prakashan.
7. Ayurvedic Pharmacopoeia of India. Part 1 Vol 7. 1st ed. Delhi, The controller of publications; 2007.
8. Acharya Sidhinandan Mishra, Bhaishajya Kalpana Vigyan. Varanasi, Choukhambha Surbharati Prakashan. 2016.
9. Dr. Devendra Joshi. Quality control and standardization of Ayurvedic medicine. 1st Ed. Chaukhambha Orientalia. 2011.
10. Amin H., Sharma R.,Vyas M.,Prajapati P.K.,DhimanK. (2014).Shankhapushpi(Convolvulus pluricaulis Choisy):Validation of the Ayurvedic therapeutic claims through contemporary studies.*Int.J. Green Pharm.* 8,193 200.10.4103/0973-8258.142666 .
11. Aggarwal B. B., Prasad S., Reuter S., Kannappan R., R Yadav V., Park B., et al. (2011). Identification of novel anti-inflammatory agents from Ayurvedic medicine for prevention of chronic diseases: "reverse pharmacology"and "bedside to bench" approach. *Curr. Drug Targets* 12, 1595–1653. 10.2174/138945011798109464 .
12. Aleebrahim-Dehkordy E., Tamadon M. R., Nasri H., Baradaran A., Nasri P., Beigrezaei S. (2017). Review of possible mechanisms of analgesic effect of herbs and herbal active ingredient. *J.Young Pharm.* 9,303–306.10.5530/jyp.2017.9.
13. Fatima A, Agrawal P, Singh PP. Herbal option for diabetes: an overview. Asian Pac J Trop Dis 2012; 2(suppl1): S536-S544.
14. Agarwal P, Alok S, Fatima A, Singh PP. Herbal remedies for neurodegenerative disorder (Alzheimer disease): a review. Int J Pharm Sci Res 2013; 4(9): 3328-3340.
15. Abdolshahi, A., Naybandi-Atashi, S., Heydari-Majd, M., Salehi, B., Kobarfard, F., Ayatollahi, S. A.,Sharifi-Rad, J. Antibacterial activity of some Lamiaceae species against Staphylococcus aureus in yoghurt-based drink (Doogh). Cellular and Molecular Biology (Noisy-le- Grand, France), 2018. 64(8), 71–77.
16. Mishra, A., Saklani, S., Salehi, B., Parcha, V., Sharifi-Rad, M., Milella, L., Srivastava, M. Satyriumnepalense, a high altitude medicinal orchid of Indian Himalayan region: Chemical profile and biological activities of tuber extracts. Cellular and Molecular Biology (Noisy-le- Grand, France), 2018. 64(8), 35–43.
17. Salehi, B., Valussi, M., Jugran, A. K., Martorell, M., Ramírez-Alarcón, K., Stojanović-Radić, Z.Z., Sharifi-Rad, M. Nepeta species:From farm to food applications and phytotherapy. Trends in Food Science & Technology, 2018. 80, 104–122.
18. Prakash, A. M., Sharifi-Rad, M., Shariati, M., Mabkhot, Y., Al-Showiman, S., Rauf, A., … Sharifi-Rad, J. Bioactive compounds and health benefits of edible Rumex species-A review. Cellular and Molecular Biology (Noisy-le-Grand, France), 2018. 64(8), 27–34.
19. Sharifi-Rad, J., Sharifi-Rad, M., Salehi, B., Iriti, M., Roointan, A., Mnayer, D. Afshari, A. In vitro and in vivo assessment of free radical scavenging and antioxidant activities of Veronica persicaPoir. Cellular and Molecular Biology (Noisy-le-Grand, France), 2018. 64(8), 57–64.

20. Dr. Sudheer, Dr. V Honwad. A hard book of standardization of ayurvedic formulation. 1st Ed. Chaukhambha Orientalia; 2012.
21. Dr. Ravindra Angadi, A text book of Bhaishajya KalpanaVigyan: pharmaceutical science, 2nd Ed. Chaukhambha Publishing house. 2016.
22. https://prezi.com/v4lm0etmed6h/tablet-hardness-thicknessand-diameter-test.