WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 6.805
Volume 5, Issue 8, 1330-1335. Research Article ISSN 2277– 7105

# FORMULATION AND EVALUATION OF CHEWABLE TABLET USING *AMORPHOPHALLUS CAMPANULATUS* DECNE TUBER EXTRACT

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Article Received on
13 June 2016,

Revised on 03 July 2016,
Accepted on 23 July 2016

DOI: 10.20959/wjpr20168-6827

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## ABSTRACT

The main objective of present work is to formulate and evaluate chewable tablet of *Amorphophallus campanulatus* decne tuber extract. Initially dried powder of *Amorphaphallus campanulatus tubers* were extracted with ethanol. Granules were prepared with help of extract by using wet granulation technique and evaluated by different methods i.e. Physical appearance of granules, Flow ability, Fines, Loss on drying, Bulk density, Tap density, Hausner ratio, Carr's index, Angle of repose. Finally chewable tablet was formulated and evaluated by using different methods like Physical appearance of tablets, Thickness of tablets, Weight variation, Hardness, Friability.

**KEYWORDS:** *Amorphophallus campanulatus,* Ethanolic extract, Chewable tablet, Evaluation.

## INTRODUCTION

A*morphophallus paeoniifolius or Amorphophallus campanulatus* is also known as Elephant foot yam, it is a perennial, terrestrial underground hemispherical depressed dark brown corm of approximately 20-25 cm in diameter which bears flowers and fruits in the month of April – May.[1,2] It is an important tuber crop of sub-tropical and tropical countries because of its yield potential and culinary properties.[3] Elephant foot yam is widely grown and consumed in south eastern countries like India, Philippines, Malaysia, Indonesia, In India, it is cultivated in Andhra Pradesh, West Bengal, Gujarat, Kerala, Tamil Nadu, Maharashtra, Uttar Pradesh and Jharkhand.[4,5] *Amorphophallus* is a good source of energy, sugar, starch, proteins as well as minerals.[6] The tuberous roots of the plant posses blood purifier properties and have been

used traditionally for the treatment of piles, abdominal disorders, tumors, enlargement of spleen, asthma and rheumatism.[7,8] Arthralgia, elephantiasis, inflammations, hemorrhoids, hemorrhages, vomiting, cough, bronchitis, anorexia, dyspepsia, flatulence, colic, constipation, helminthiasis hepatopathy, amenorrhea, dysmenorrhoea, seminal weakness, fatigue, anemia and general debility.[9]

## MATERIALS AND METHODS

The crude *Amorphophallus campanulatus* Decne tubers were procured from Rithu bazar market, Mehdipatnam, Hyderabad, Telangana, India. The tubers were authenticated by Botanical survey of India, Deccan regional centre Hyderabad-500048, Telangana, India, with reference number BSI/DRC/2015-16/Tech./735. The *Amorphophallus campanulatus* tubers were cut into proper size and dried in shade with proper care. The dried plant tuber was blended in to coarse powder.

### Preparation of sample extract

The coarse powder of *Amorphophallus campanulatus* tubers were subjected to maceration and transferred in a stoppered flask and treated with pure ethanol until the powders are fully immersed. The flask was shaken every hour for the first six hours and then it was kept aside and again shaken after 24 hours. This process was repeated for 72 hours, followed by exhaustive maceration for 48 hours by using solvent ethanol. The solvent was decanted and filtered with filter paper and recovered with help of rotary vacuum evaporator. The extract was dried under desiccator. The final extract was then subjected to formulation.

### Preparation of tablet

Chewable tablet containing known quantity of extract and selected excipients. Granules were prepared by wet granulation technique and tablets were punched by using a 16 station tablet punching machine. The quantity of extract and the excipients used for formulating one tablet is tabulated below.

### Formula for chewable tablet

| | | |
|---|---|---|
| *Amorphophallus campanulatus* Extract | - | 100mg |
| Colloidal silicon dioxide | - | 19.5mg |
| Sodium sacchrin | - | 20mg |
| Mannitol | - | 493.52mg |
| Purified talc | - | 4.88mg |

| | | |
|---|---|---|
| Magnesium stearate | - | 4.88mg |
| Polyvinylpyrolidone | - | 6.5mg |
| Methyl paraben | - | 0.65mg |
| Propyl paraben | - | 0.07mg |
| Isopropyl alcohol | - | (q.s) |

**Preparation of granules and punching of Tablet**

Granules were prepared by wet granulation method. All the solid fractions and excipients were passed through British standard sieves (BSS) 80 prior to use. Required quantities of extract was weighed accurately using an electronic balance and mixed with the diluents Colloidal silicon dioxide and mannitol to make it to dry powder form and then passed through 60 mesh. The Polyvinylpyrrolidone paste was prepared by adding Isopropyl alcohol (q.s). The wet coherent mass was prepared by using polyvinylpyrrolidone paste then passed through sieve no. 10 and dried at 40ºC for 30 minutes in tray dryer. The dried granules were passed again through sieve no. 22. The granules were finally lubricated with purified talc and magnesium stearate then characterized for the fines, angle of repose, bulk density and tap density. Round and biconvex shaped tablets, with average weight of 650mg were compressed using a Rotary tablet punching machine (RSP 16) and evaluated.[10]

**EVALUATION OF GRANULES**

**a) Organoleptic properties**

The colour and odour of the fractions were evaluated on visual and sensual basis.

**b) Loss on drying**

A well mixed granules (1g) was transferred into a dried, glass stoppered, shallow weighing bottle. The contents were distributed evenly and placed in the drying chamber (Sartorious moisture balance), the stopper was removed from the bottle and the contents were dried for a specified time to constant weight. The experiment was repeated for three times and loss in weight (% w/w) resulting from water or volatile matter was then calculated using the following formula.

$$\text{Loss on drying (\%)} = \frac{\text{Initial weight - Final weight}}{\text{Initial weight}} \times 100$$

**c) Fines**

A 100 gm mass of the combined granules after lubrication was passed through BSS # 80. The amount of sample passed through was considered to be fines and its weight was noted. The following formula was used for determining the amount of fines in percentage.

$$\text{Fines} = \frac{\text{Weight of fines}}{\text{Total weight of granules}} \times 100$$

**d) Tapped density, Hausner ratio & Carr's Index**

(Vijay Kumar et al. 2002; Carr 1965, Hansuner, 1967)

Weighed quantity of powder was taken in a graduated cylinder and the volume (Vo) was measured. The graduated cylinder was fixed in density determination apparatus and tapped for 250 times and again subjected to 500 steps till the constant reading was obtained (Vf). The volume was then observed and the bulk density, tapped density, hausner ratio and compressibility index were calculated using the following formula;

Bulk density = W/ Vo

Tapped density = W/ Vf

Hausner ratio = Vf / Vo

$$\text{Compressibility index} = \frac{Vf - Vo}{Vf} \times 100$$

**e) Angle of repose**

15 gm of granules were allowed to pass through a funnel from a particular height (2cm) on to a flat surface until it formed a heap, which touched the tip of the funnel. The height and the radius of the heap were measured. The experiment was repeated thrice and the angle of repose (tanθ) was calculated using the formula.

$$\text{Angle of repose, } \theta = \tan^{-1}(h/r)$$

**EVALUATION OF HERBAL TABLETS**

**a) Weight variation test[11]**

Weight variation test was done by weighing 20 tablets individually, calculating the average weight and comparing the individual tablet weight to the average weight.

**b) Friability[11]**

Roche friabilator was used to determine the friability. Pre weighed tablets were placed in friabilator and rotated at a speed of 25 rpm for 4 minutes or up to 100 revolutions. The tablets

are dropped from a distance of 6 inches in each revolution. The tablets were then reweighed after removal of fines and the percentage of weight loss was calculated.

$$\% \text{ friability} = \frac{\text{Weight before friability - Weight after friability}}{\text{Weight before friability}} \times 100$$

**c) Hardness**[12]

Hardness of the tablet was determined using the Monsanto hardness tester. The lower plunger was placed in contact with the tablet and a zero reading was taken. The plunger was then forced against a spring by tuning threaded bolts until the tablet fractured. Then the final reading was recorded. The hardness was computed by deducting the initial pressure from the final pressure.

## RESULTS AND DISCUSSION

**Table 1: Evaluation of granules**

| S.No. | Evaluation | Observation/ Results |
|---|---|---|
| 1. | Physical appearance of granules | Brownish colour |
| 2. | Flow ability | Free flow |
| 3. | Fines | 21% |
| 4. | Loss on drying | 1.5% |
| 5. | Bulk density | 0.484gm/cc |
| 6. | Tap density | 0.576gm/cc |
| 7. | Hausner ratio | 0.96 |
| 8. | Carr's index | 15.88 |
| 9. | Angle of repose of granules | 26.10 |

**Table 2: Evaluation of Tablets**

| S.No. | Evaluation | Observation/ Results |
|---|---|---|
| 1. | Physical appearance of tablets | Brownish colour |
| 2. | Thickness of tablets | 1.40±0.01cm |
| 3. | Weight variation | 650 ± 5 mg |
| 4. | Hardness | 5.5kg/cm² |
| 5. | Friability | 0.48% |

## CONCLUSION

In conclusion, the *Amorphophallus campanulatus* chewable tablet method was found to be specific and accurate and can be used for other herbal chewable tablet preparation.

## ACKNOWLEDGEMENT

I wish to express my sincere thanks to Mr. Parwez alam Research scholar School of pharmacy and medical sciences, Singhania University, Pacheri Bari, Jhunjhunu, Rajasthan, India for helping to carry out research work.

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