

MALLAREDDY PHARMACY COLLEGE

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INTRODUCTION

Hen eggshell, a waste material from domestic sources such as hatcheries, poultry farms, egg product factories, homes and restaurant, has been a serious matter as global awareness regarding organic waste materials and pollution problems was increased¹. The egg-breaking industry spent up to \$ 100,000 a year to dispose of eggshells in landfills, many of which are reaching capacity. Additionally, landfills do not want eggshells because the protein-rich membrane which adheres to the shell attracts rats and other². In 1997, the same industry consumed about 50 million cases of egg, producing more than 120,000 tons of unprocessed eggshell waste with disposals costs between \$ 25,000 and \$ 100,000 per year³. In Taiwan, for example, the annual generation of eggshell waste from the food processors was estimated to be over 1.3×10^4 ton on the basis of 7.1×10^9 of pieces of hen eggs⁴. Most eggshell waste is discarded without further processing by sending to landfill at a cost more than \$ 40 a ton depending on the location of the landfill.

It is necessary to find an alternative method which would transform the waste eggshells into a valuable item; giving financial benefits to the competitive egg processing industry. Apart from giving manufacturers a new profit stream, it would help overcome the high disposal costs and environmental

concerns^{3,5}. The waste eggshells are sometimes spread on land as a fertilizer source.

Many Original Article Mahidol University Journal of Pharmaceutical Sciences 2012; 39 (3-4), 32-38 M. M. Than et al. 33 studies have looked for ways to utilize the eggshell waste by, for example, using eggshell powder as a stabilizing material for improving soil properties⁶, as coating pigments for ink-jet printing paper⁷, as food additive⁸ and as a source of calcium in animal and human nutrition.

The chemical compositions (by weight) of by product eggshell are as follows: calcium carbonate (94%), magnesium carbonate (1%), calcium phosphate (1%) and organic matter (4%)⁴. As the major component of the eggshell is calcium carbonate, it may be used to replace calcium carbonate, which is used as pharmaceutical excipient, in solid dosage forms. In addition, calcium carbonate from eggshell has an advantage for not containing toxic elements like calcium carbonate from oyster shells which contains lead vestige among the others potential toxic elements such as aluminum, cadmium and mercury¹². We have performed a study on preparation and characterization of eggshell powder. The results of our work show that eggshell powder has appropriate physical properties for use as an excipient in solid dosage form¹³. Therefore further study on application of the eggshell powder in tablet formulation has been carried out. The main objective of this study was to develop the eggshell powder for use as a pharmaceutical excipient in tablet dosage form. It is hoped that this alternative application of eggshell would help overcome global eggshell waste problem.

AIM :

OBJECTIVE :

- The main objective of the study is to develop the egg shell powder for used as a pharmaceutical excipient in the tablet dosage form.

- It is hoped that this alternative application of egg shell would help overcome global egg shell waste problem.

LITERATURE

Sl no	TITLE	AUTHORS	YEAR	APPLICATIONS
1.	Antibacterial and Antibiofilm activity of calcitate[caco3] Nanoparticals Synthesized from chicken Eggshell.	Mundher H. Al-Azzawi* and Esam J. Al-Kalifawi.	Received: 22/09/2022 Accepted: 25/11/2022	study Shows the efficiency of CaCO ₃ NPs to prevent the biofilms of Gram negative and Gram-positive isolates.
2.	Recycling of Chicken Egg Shells into Nanopowder: Synthesis, and its Properties	Saffanah Khuder Mahmood1* Ghada Abdulrhman Sultan1 Shahbaa Khalil Ebrahim2 Ammar Ghanim Mohammed Alhaaik1	1/8/2022	Resource of calcium carbonate

3.	Treatment of biowaste to pharmaceutical excipient.	Shebina P. Rasheed and M. Shivashankar and Sanal Dev and A.K. Azeem	2019	The egg shell CaCO_3 was subjected to several chemical processes and recycled into pure CaCO_3 . The purity of the prepared calcium carbonate was within the pharmacopoeial limits and the findings indicated that it can be used as an alternative pharmaceutical excipient
4.	Utilization of Eggshell Powder as Excipient in Fast and Sustained Release Acetaminophen Tablets	Than, Myint and Lawanprasert, P and Jateleela, Somboon	2018	Used as tablet excipient and untreated egg shell powder suitable for fast release formulation while treated egg shell powder was suitable for sustained release formulations

5.	Egg Shell Powder as a Potential Direct Compression Excipient in Tablet Formulation	Osonwa, Uduma.	2017	Egg shells powder used as pharmaceutical excipient
6.	In vitro Antimicrobial Potential of Coturnix japonica Egg Shell and Membrane Powder	Irokanulo EO1*, Nwonuma CO2And Chukwudi FC1	December 20, 2017	Used as natural product for use in the treatment of skin infections resulting from bacterial and fungal agents
7.	New Approach for Sustained Release Dosage Form Design: Aceclofenac	Md. A. Habib ¹ , Md. F. Mahmud ¹ , Md. T. Islam ¹ , M. Hasan ¹ , S. Koushik Ahamed ^{2*} , Md. M. Billah ^{1*} , P. Arefin ³	2015	This study suggests that using treated eggshell powder as an inexpensive pharmaceutical excipient instead of commercial expensive release retardant polymer to control the drug release from the tablet.

8.	In Vitro Dissolution of Calcium Carbonate from the Chicken Eggshell: A Study of Calcium Bioavailability	Łukasz Szeleszczuk ¹ , Dariusz Maciej Pisklak ¹ , Marzena Kuras ² , and Iwona Wawer ¹	2015	Good dissolution (after 30 min both types of eggshells were dissolved in over 75%) oof The chicken eggshell and the presence of other valuable microelements (boron, strontium) make this biomedical an excellent source for dietary supplements production.
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MATERIALS AND METHODS

Materials :

- Egg shell powder
- Lactose
- MCC
- Model drug
- Talc
- Mg. stearate
- Starch
- HPMC

Methodology:

- Eggshell particles preparation
- Treated eggshell particles preparation
- Preparation of tablets with egg shell powder

Pre formulation studies:

- Bulk density
- Tapped density

- Carr's index (CI) and Hausner's ratio
- Angle of Repose (ϕ)
- Percent Fines

Evaluation of tablets

- Appearance
- Hardness
- Friability test
- Weight Variation
- Disintegration time
- In-Vitro dissolution study

Uses

- Egg shell powder used as fertilizer for plants
- Eggshell powder used as calcium supplement
- It is also used for treatment of wounds or any kind of irritation like eczema, black spots
- It can be used as laundry whitener

- Eggshell powder is also used in cosmetic preparation
- It can be used as powerful cleanser for vessels and pots

Pharmaceutical uses

- It is used as excipient in tablet formulation
- Used as excipient in fast and sustained release tablets
- It shows Antibacterial and antibiofilm activity