

# **Applications of Chicken Eggshell in Different Fields**

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# INTRODUCTION



## **Chicken eggs are:**

**an essential  
source of  
nutrients**

**yield a large  
quantities of  
shells that  
result in an  
environmental  
pollution  
owing to  
microbial  
action.**

**Bio-  
degradation  
and microbial  
action on  
these waste  
produce odor  
as well as  
change the  
quality of soil**





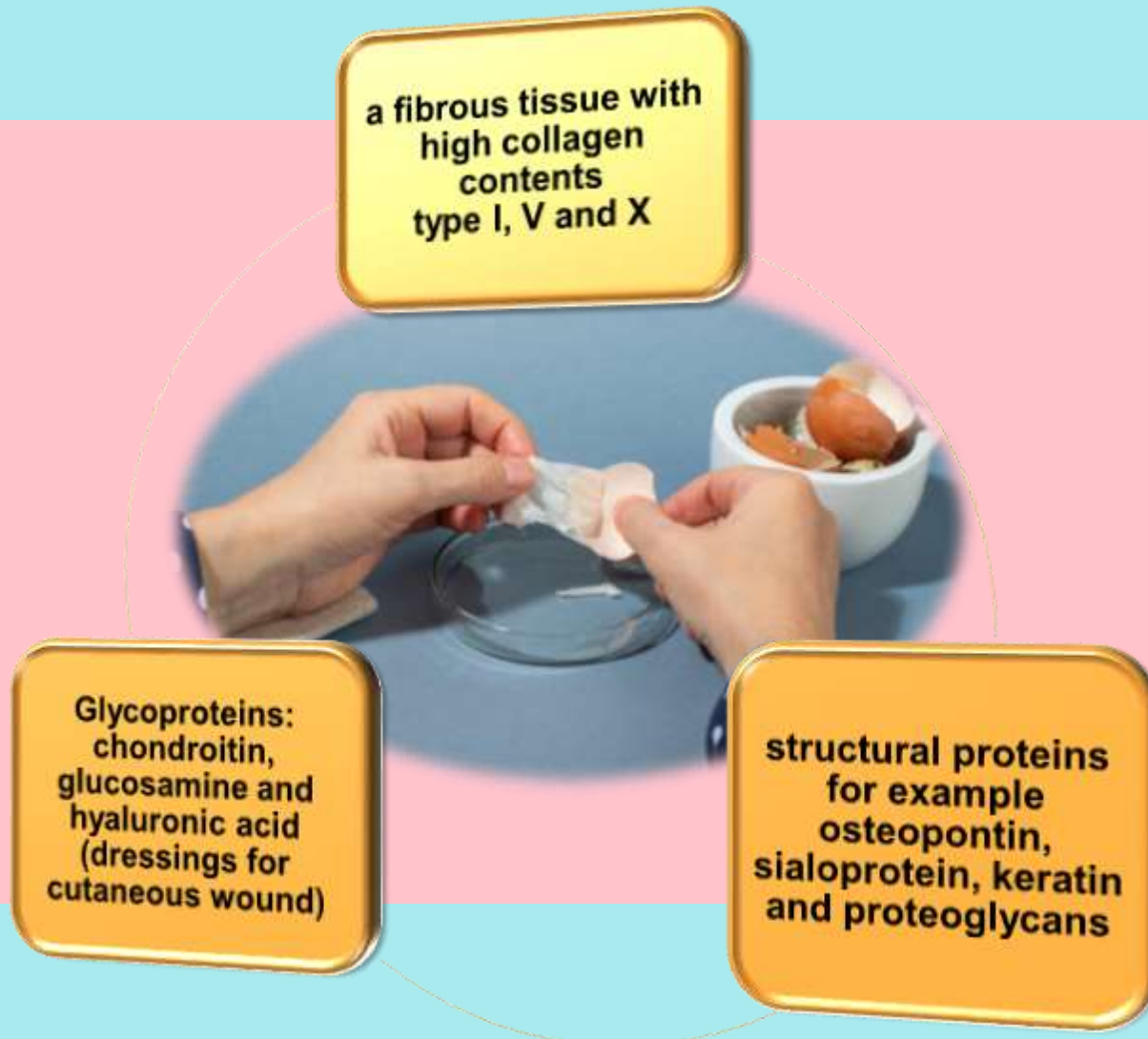
**The external crust of chicken egg is a non-palatable product, commonly discarded as a waste. It is a natural bio-ceramic substance which generally has been studied since 1969.**

**ES is a rich source of calcium which can positively affect dental health and bone metabolism.**

**It is a natural source of calcium carbonate, calcium oxide and calcium hydroxide**

**94% calcium carbonate  
1% calcium phosphate  
1% magnesium carbonate  
4% organic matter & a low concentration of fluoride and strontium**

# Eggshell Membrane (ESM)



# **Applications of Egg shell Powder**

# 1. Dietary calcium supplement

## Biomin H



is a bio-preparation  
considered as a  
natural, rich  
calcium source.

1 gm  
of Biomin H  
contains 370mg  
Ca, 0.6mg P,  
5mg Mg

- ✓ enhances the  
differentiation  
of  
chondrocytes  
and  
cartilaginous  
growth
- ✓ decreases pain  
and  
osteoresorption

- ✓ improves mobility,  
enhances bone  
density or arrests  
its loss
- ✓ appropriate in the  
prevention and  
management of  
osteoporosis



## 2. Bone substitute

The results of several studies revealed that ES can be used as an alternative to bone grafts for bone regeneration owing to its safety, biocompatibility and cost-effectiveness .

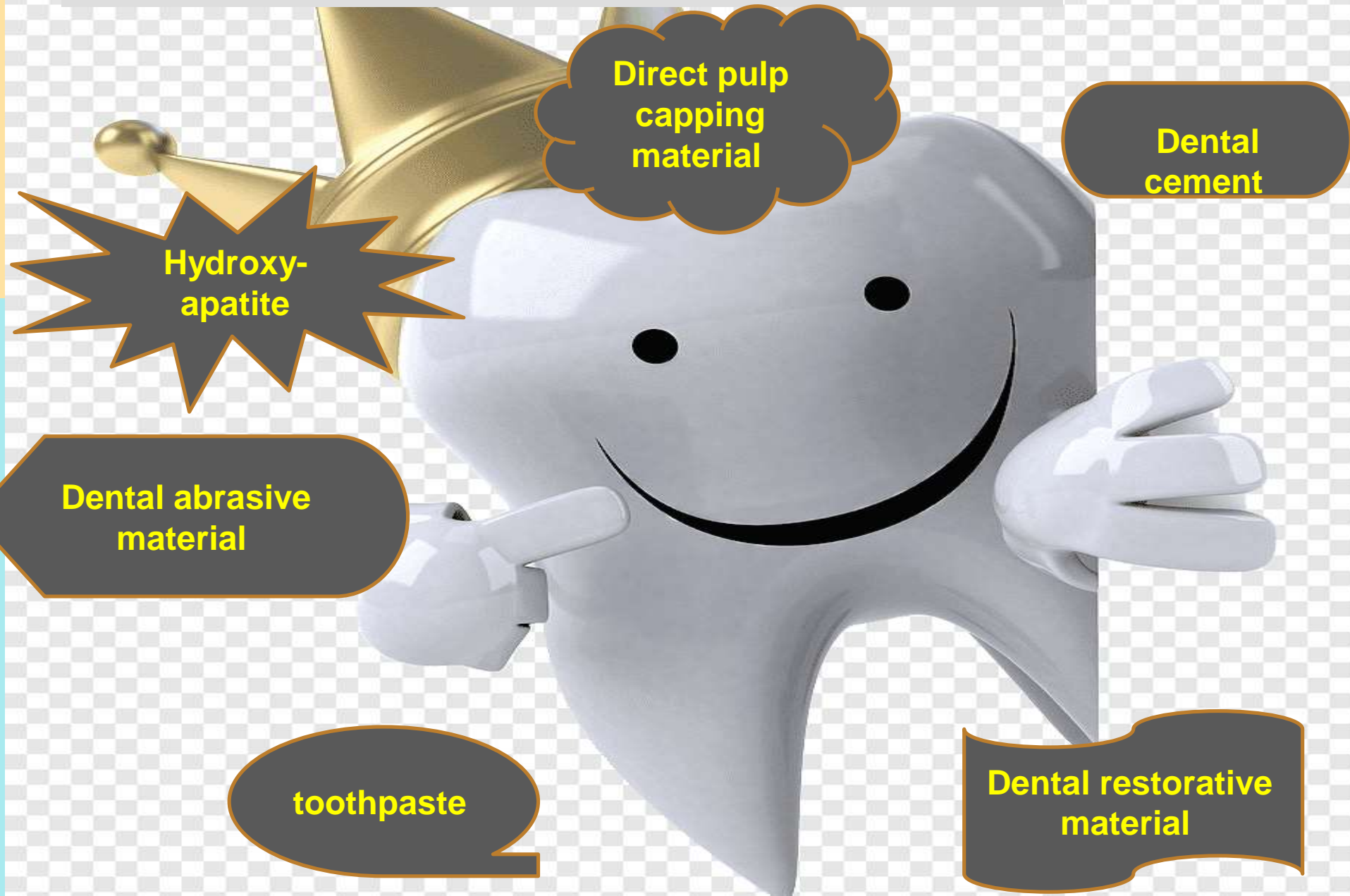
**An Iraqi study used egg shell powder as bone graft around titanium implant have shown that it worked successfully with nano calcium sulfate coating material to promote and enhance osseointegration and increase the amount of new bone formation around dental implant**



### 3. Teeth remineralization



## 4. Synthesis of experimental dental materials



# Applications of Eggshell membrane (ESM)

**healing of tissues affected  
by burns, injuries or ulceration**

**Decrease pro-inflammatory cytokines  
interleukin-1 beta and tumor necrosis  
factor-alpha**

**management of osteoarthritis**

**clinical, cosmetic, nutritional, pharmaceuticals  
& nanotechnology applications.  
Film Emulsions**

- \*Skin Grafts**
- \*Cornea Repair**
- \*Angioplasty  
Sleeves**
- \*Dental Implants,**
- \*Plastic Surgery**
- \*Osteoporosis**

## Other Applications of Eggshell



**filler in animal  
feed**

**glaze decoration &  
tiles**

**source of calcium  
oxide or calcite**

**starting materials of  
dielectrics and as bio-  
catalysts**

**printing  
ink &  
paper**

# Conclusion

Chicken eggshell, which is considered as a useless waste-product to the environment, contains a high percentage of calcium, and many studies have proven that it can be used in various dental, medical and industrial fields.



