

# Application of Nanotechnology for Cleaning of Teeth and Shining it.

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## Abstract

This research includes the using of Powder Of Snail Shell's *Rostellaria* speices For cleaning, and remove Staining of Teeth as well as shining it. As an alternative of a Conventional pumice when dentists and technicians in dental laboratories. It was powder processing on two types : **First** – it provides as a small size particles,with added of some rate of florid.it used by dentists, to clean the natural teeth. **Second** – it provides as a large size particles, it used by owners of dental laboratories, to clean the fixed and mobile sets of teeth. And making it easier for the possibility of the application of this powder as ananopowder. they contain of a three-layer cover,resistant to external conditions.That'smaking constant hardness powder , it range between (4 – 3) , Unlike other types of pumice Available in the market.In addition to the containment of this crust of the fixed elements and chemical compositions such as : ( Cao , Sio<sub>2</sub> , AL<sub>2</sub>O<sub>3</sub> , Fe<sub>2</sub>O<sub>3</sub> , Mgo , So<sub>3</sub> ) ,In the proportions:(52.70 , 20.40 , 0.68 , 0.44 , 1.5 , 0.28 ) respectively.

## INTRODUCTION

The basic idea of nanotechnology, used in the narrow sense of the world, is to employ individual atoms and molecules to construct functional structures (1). Novel mechanical properties of nanobiomaterials are the subject of nanomechanics research. Catalytic activities also reveal new behavior in the interaction with biomaterials (2). In dentistry field, conversely, nanotechnology is the formation of a structure through a “bottom-up” process, starting at the molecular level and using atoms or molecular scale materials, which results in the desired structure (3). Nanotechnology allows the production of nano-sized filler particles that are compatible with dental composites; therefore, a greater amount of filler can be added into the composite resin matrix(4). In comparison to the same material in bulk (macro or micro), nano particles can be easily arranged in a number of packing configurations due to their high surface to core ratio, making them easily manipulated and utilised in various applications(5).

The tooth color plays an important role in the attractiveness of an individual's smile(6). Therefore, dental stains can cause a major esthetic problem for patients. Any change in the coronal tooth structure (enamel, dentin, or pulp) can alter the appearance of the tooth, caused by its light transmitting and reflecting properties(7). The discoloration located on the outer surface of the tooth's structure is defined as extrinsic discoloration(8). Although researchers have examined intrinsic tooth discoloration, the mechanism of how extrinsic stains form on the tooth surface is still not fully understood. Some investigators have shown that anionic polyphenols, found in highly pigmented foods/beverages such as red wine and black tea, react with cationic salivary pellicles, forming thickened layers of stained material that adheres to the tooth surface(9). The particle size of snail shell is especially important because a reduction in particle size provides a greater surface area (10). A great number of these natural products have come to the market from the scientific study of remedies traditionally used by various cultures around the world(11). Zootherapy is defined as healing human diseases using animals or animalderived products (12). Pumice is volcanic based alumina silica which is mainly composed of SiO<sub>2</sub>.

Pumice has porous structure and its porous structure is formed by dissolved gases precipitated during the cooling as the lava hurtles through air. Due to its porous structure it has low density and high thermal insulation. It also has high temperature resistance and chemical resistance, for these reasons it increasingly became preferable material at industrial applications (13, 14).

## MATERIALS AND METHODS

- 1 - Snail shell *Rostallria*.
- 2 - Distilled water.
- 3 - Pail collection.
- 4 - Microwave device.
- 5 - Private Mills.
- 6 – Standard Sieves.
- 7 - Mesh Sieves.
- 8 - Micro hardness device.
- 9 - FTIR 8400s-shimadzu /Japan device.

Gathering snail shells of *Rostellaria* species from the shores of the seas or lakes, then thoroughly washed with distilled water , to separate the impurities. And are filtered and purified, and then left to dry out, and then sterilized in microwave device.Then grind in balls mills and tubular mills , this milling achives through fall of the steel objectes through continuous mill rotation. Transforms the mixture into fall positions into powder increased accuracy with continuing precipitation and circulation.

Then sifts the powder by Standard sieves known as mesh sieves, which is the number of wires per Alang. These holes are ranging between (0.1 – 0.4) and (0.4 – 0.8) ml. And as has been measured hardness ratio , that is by the use of screening hardness device (Micro hardness ) .

$$Hv = 1.8540 \frac{p}{d^2}$$

p = Overhead hanging.

d = The arithmetic average of the diagonal polygon quartet (mm<sup>2</sup>).

The calculate ratio of elements and compounds in this powder is shown in the table (1) :-

Type of powder	Conventional powder	Nano powder
Hardness(mohs scale) <sup>(9)</sup>	6-5	4-3
Appearance	White powder	White powder
CaO	1.36	52.70
SiO <sub>2</sub>	<1.20	2.40
Al <sub>2</sub> O <sub>3</sub>	92%	0.68
Fe <sub>2</sub> O <sub>3</sub>	<0.25	0.44
MgO	0.12	1.5
SO <sub>3</sub>	0.18	0.28

Table 1

**RESULTS AND DISCUSSION**

After the laboratory tests that achieved on the *Rostellaria* shell powder to know the components and elements that contained , as well as some of the physical characteristics that found ,it has possesses number of common traits as compare with the conventional powder which used for cleaning teeth and shining it , and it has the best rates , because they perform the diserd function. Where was comparison between two types of powder ( nano-powder and conventional powder ) , through the following results , as shown in the table above:-

Here the hardness of nanopowder does not effect on the tooth surface , because it has the hardness less than the tooth hardness. There fore it is warking on the keep of its colour and stongth.

So through the comparison between nanopowder and conventional powder we considered on the following traits :-

-The ratio of CaO ranging between:  
 - (52.70) in nanopowder. But - ( 1.36) in conventional powder.

This high percentage of calcium oxide is very useful because calcium oxide is not only useful to clean the surface of the tooth, but useful for other uses in the field of dentistry. Therefore it working on increase the friction

force. In vitro studies have established that CaO root fillings are biocompatible (15).

- The ratio of SiO<sub>2</sub> in nanopowder greater than conventional powder , and the polishing of teeth by silicon particles protect it from the bacterial damage.

The ratio of bacterial growth is less when the SiO<sub>2</sub> is used for the teeth polishing.

So we can say that the nanopowder is prevent the bacterial growth a long time on the teeth.

-there are oscillatory ratios of all FeO<sub>3</sub> , AlO<sub>3</sub> and MgO , but not effect on the teeth polishing.

- It has been observed through the graphic illustrate the ratio of So<sub>3</sub> , I which acts for :

- killing of microbs.and

-sterilised.

-the *Rostellaria* shell powder is not effect on the health . So

*Rostellaria* snails are considered food source for human.

That most of the components of the crust is calcium and sodium (as carbonate) , oxides , and silica, show figer (1) and figer(2).

- We added 1 : 8 of fluoride.It acts on rmoval of :

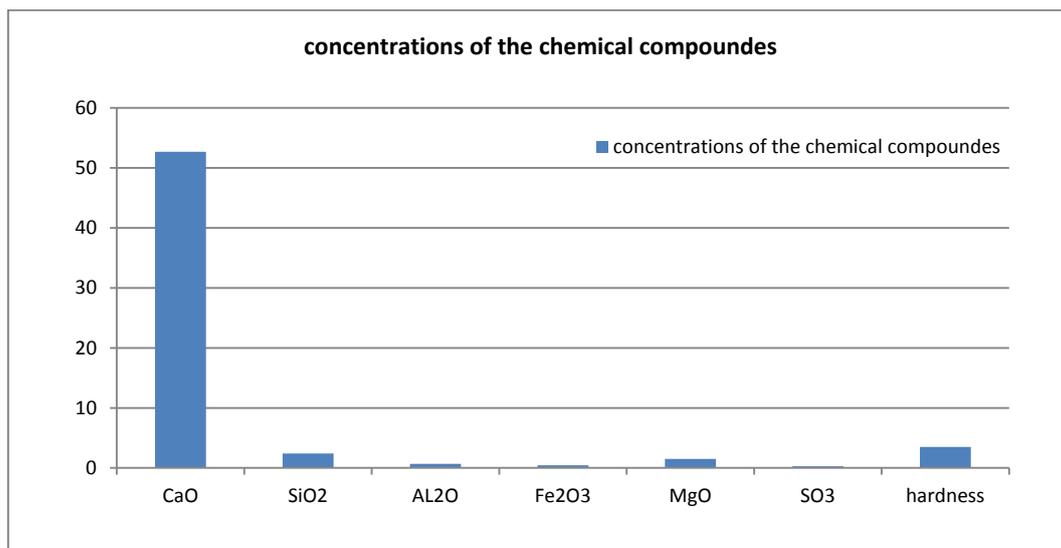
-Nodules mutant. and

-Bacterial plaque.\*( KennethJ,Anusavice(1996) Philips' science of dental materials .wbsaunders(philadelphia).318 )

- It was taking the infrared spectrum to nanopowder by (FTIR 8400s-shimadzu /Japan device), that's is shown in figure (3), and compared with the infrared spectrum of the conventional powder that shown in figure (4).

-there is a great similarity between them , and the convergence of the spectrum absorbed ratiosbetween them.

-The spectrum shows that the absorption package , due to the vibration of the expansionist bond in the element or compound.(Saeed, Ali Abdul-Hussein (2003) Modern Physics, University Book House -alaan United Arab Emirates p 150).



Figur(1):- Explains the proportions of chemical elements and compounds present in the snail shell powder.

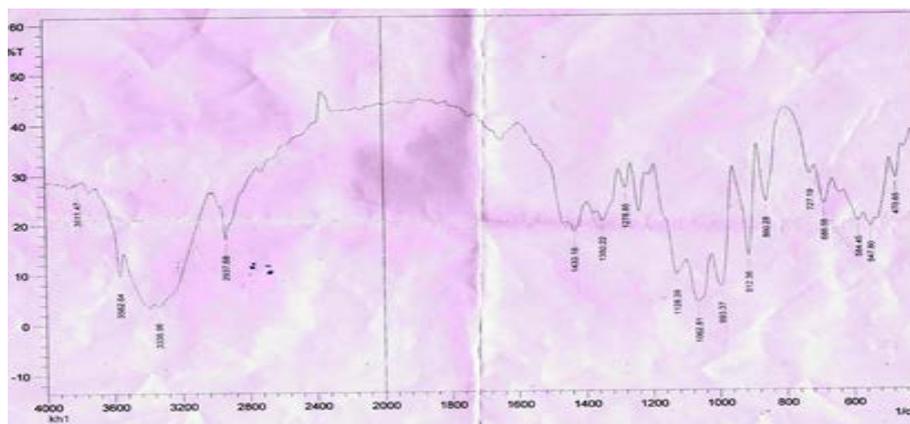
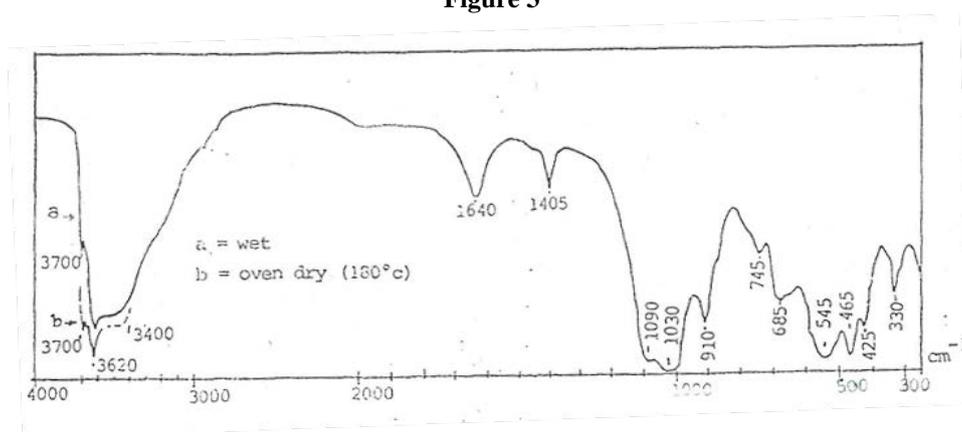


Figure 3



Figur 4

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