

# The Development of Nanoparticles with a Variety of Chemical Compositions

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## Introduction

Chemical preservatives like benzoate, propionate, sorbate, nitrate, nitrite, and sulfites are often used as antimicrobials. However, these additives can have long term negative health effects like damage to the liver, asthma, many allergic reactions, and even cancer, which is why natural antimicrobials should be used more often. Natural antimicrobial substances are thought to come primarily from animals, plants, and microorganisms. Includes active ingredients like 3-phenylprop-2-enal and 5-isopropyl-2-methylphenol, among others. That demonstrates a potent antimicrobial property. The development of nanoparticles with a variety of chemical compositions and sizes, as well as their utilization for human benefit in health science, is the focus of the emerging field of nanotechnology. Using the brine shrimp lethality assay, we examined the mouthwash's cytotoxicity as well as its antimicrobial activity against oral pathogens. Eco-friendly environmental decisions are now much easier to make, and the current trend is to live a life that respects the earth by using eco-friendly products. Interestingly, consumers have begun to notice an increase in the use of synthetic based antimicrobials in consumer products [1].

## Description

In order to study the structural properties and phase identification, TiO<sub>2</sub> Nano powder was analyzed using PANalytical X'Pert Pro MPD diffract meter with Cu K $\alpha$  radiation ( $\lambda=1.5418 \text{ \AA}$ ) for X-Ray Diffraction (XRD) measurements recorded in the 20 $^{\circ}$ -85 $^{\circ}$  2 $\theta$  range at room temperature with an incidence angle of 0.05. From XRD patterns, average crystal sizes were calculated using Scherrer's formula. The thermal stability of the nano-TiO<sub>2</sub> was studied by DTA and TG analysis. The DTA and TG analyzes were performed in an atmosphere from ntemperature to 800 $^{\circ}$ C with a heating rate of 20 $^{\circ}$ C/min. For the analysis, it was used approximately 10 mg of sample Cinnamon is a tropical Asian spice that comes from the inner bark of several trees in the genus *Cinnamomum*. It is a Sri Lankan native plant. There are many different species of cinnamon, all of which are common spices that are used in both traditional and modern medicine all over the world. Zaika first demonstrated cinnamon's potent antimicrobial properties against a

variety of microorganisms in 1988. On the other hand, clove (*Syzygium aromaticum*) is a plant that is widely grown in the spice Islands, Indonesia, Pemba, and Zanzibar. However, the plant was originally grown in China. Due to its antimicrobial properties, clove contains eugenol, oleic acids, and lipids [2,3].

Poly Methyl Methacrylate (PMMA) is a straightforward thermoplastic polymer. It is comprised of methyl methacrylate monomer. It was initially found in 1930's. It is a lightweight polymer with a thickness of 1.2 gcm<sup>-3</sup>. PMMA shows atacticity, isotacticity, and syndiotacticity in its design. PMMA is an optically straightforward polymer and has been oftentimes utilized as inorganic glass. PMMA has a refractive record of 1.49. PMMA has a formless nature, compound obstruction, climate insubordination, and consumption opposition properties. The warm steadiness of PMMA has been broadly pondered. PMMA has a glass progress temperature in the scope of 100 $^{\circ}$ C-130 $^{\circ}$ C. Utilizing the methyl methacrylate monomer, the arrangement, mass, suspension, emulsion, free extremist, molecule move revolutionary, and anionic extremist chain polymerization techniques have been utilized to shape the PMMA spine. Nonetheless, flawless PMMA doesn't have sufficient warm/mechanical steadiness to meet a scope of specialized requests. In such manner, elite execution PMMA based nanocomposites have been accounted for different nanofillers utilized inside the PMMA network are graphene, Carbon Nanotube (CNT), fullerene, layered silicate, silica, alumina, polyhedral oligomeric silsesquioxane, and metal nanoparticles. PMMA has been applied in various applications including car parts, coatings, added substances, neutron plugs, bundling, and the nanocomposite business [4,5].

## Conclusion

It was discovered that as the temperatures rose, the volume thickness of the froths decreased. The increased cell thickness of the froth at a higher temperature was probably the cause of this decrease in volume thickness. The design's rising PMMA layers increased the multi facet foam's compressive strength from 11.84 MPa to 20.27 MPa. The 80 multi facet PMMA sheet achieved the highest compressive strength. The multi-facet PMMA structure was taken into consideration to improve cell nucleation and growth in the polymer grid.

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