Science Proceedings Series (SPS)
www.readersinsight.net/SPS

MODIFICATION OF THE NANO TITANIUM BAND GAP REACTIONS OF SOLID DIOXIDE WITH (ANTIMONY) STIBIUM S AND ITS DETERMINATION PHOTOCATALYTIC ACTIVITY

Moatasem Al-Salih*

Faculty of Science and Mathematics,
University Pendidikan Sultan Idris(UPSI),
Malaysia

Syakirah Samsudin

Faculty of Science and Mathematics,
University Pendidikan Sultan Idris(UPSI),
Malaysia

Siti Suri Arshad

Faculty of Veterinary Medicene
University Putra Malaysia
Country Malaysia

***Corresponding author's Email:** wmutasim@gmail.com*

Author's Biography

Citizenship IRAQ

Bachelor Degree	*University of Basra*	*1997*	*General biology*
Master of Science	*Thi –Qar University*	*2013*	*Immunology*
Doctor of Philosophy	*UPSI university*		*Biotechnology*

International Academy of Science

Engineering and Technology	:	*Certificate The Best Paper*	*2016*
MPACT Journals	:	*Certificate Of Best Paper*	*2016*
Transstellar Journals	:	*Certificate Of Best Paper*	*2015*
Scientific Conference	:	*Certificate Of Best Participate*	*2014*
Educational Conference	:	*Certificate Of Best Participate*	*2014,2015,2016.*

Project / Emphasis: The effect of nanoparticles and abate in Aedes aegypti's to evaluate the antioxidant, oxidative stress markers and its fecundity.

Science Proceedings Series (SPS)
www.readersinsight.net/SPS

RESEARCH HIGHLIGHTS

This study includes preparation of nanoparticles of titanium dioxide using the sol-gel method and then, the band gap was modified by solid-state reaction with (Antimony) Stibium Sb reductive compounds. Modification reduced the band gap separating energy levels between valance band (VB) and conduction band (CB), therefore; facilitating the transfer of excited electrons from (VB) to (CB). Absorption of the energy from incident photons having the same or larger energy than the energy of the band gap promote the formation of the couple (electron-hole). The resulting (e--h+) couple acts to produce (OH.) radicals. OH. radicals having a high capability to inhibition of glutathione S-transferase activity in *Aedes aegypti*, mosquitoes that adsorbed on the surface of the photocatalytic TiO_2 as a new model of eco-friendly insecticide.

Key words: *Aedes aegypti*, glutathione S-transferase, nanoparticles.

GRAPHIC

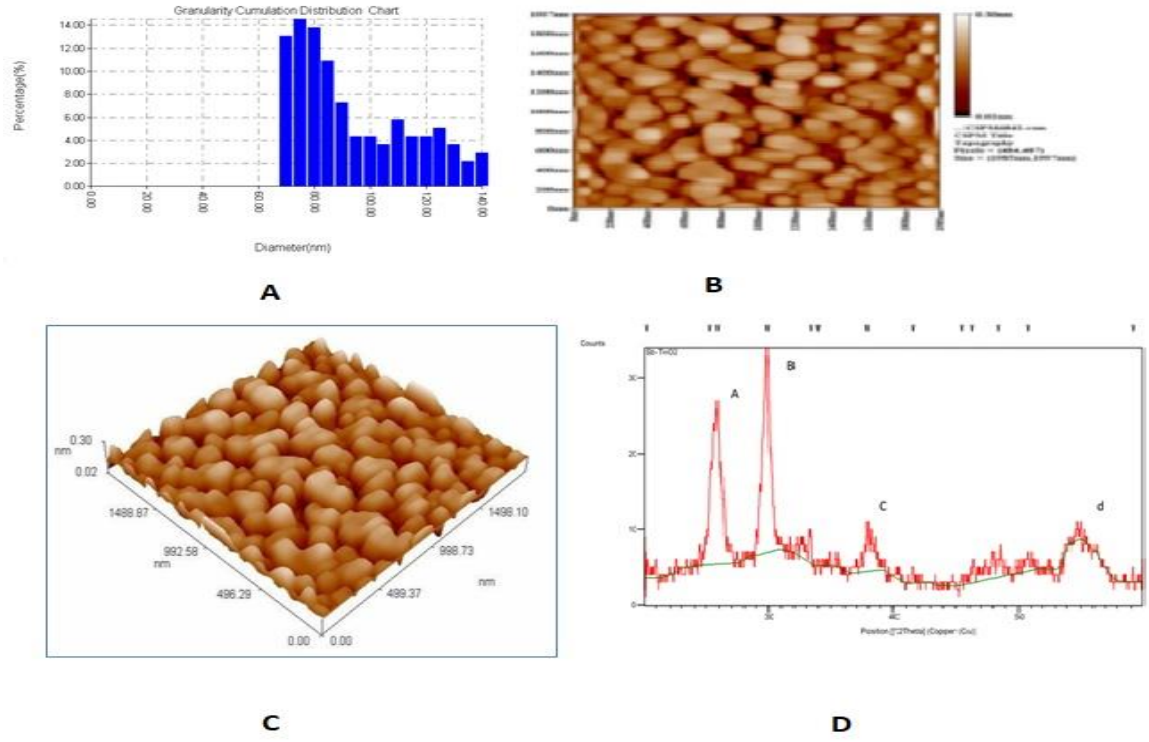

Fig. 1: X-ray diffractogram and AFM of Sb -TiO_2 (Anatase)

RESEARCH OBJECTIVES

Purpose of this study that the synthesis new model of nanocomposite by modify titanium dioxide with Sb be easily synthetic insecticides to control vector mosquitoes for using and clearly observed as well as low-cost and eco-friendly revealed the presence of the "knock-down" resistance and how the combination of nanoparticles increase the anti-GST activity.

The aims of this work represented by:

1- Preparation of nano-powders of (TiO_2) from titanium tetraisopropoxide by sol-gel method.

2. Modification of the band gap of nano-titanium dioxide by solid-state reaction with Sb stibium

Studying crystallite size, particle size average diameter, and studying surface properties of the nanostructures samples prepared.

Science Proceedings Series (SPS)
www.readersinsight.net/SPS

3. The photogenerated was of oxidative stress of *Aedes aegypti* different life stages. under UV radiation and catalysts prepared and studying order reaction and activation energy of the photocatalyst process.
4. To determine the effects of nanoparticles (TiO_2) and Abate on oxidative stress of *Aedes aegypti* different life stages.
5. To determine a relationship between the GST levels and the fecundity of *Aedes aegypti*.

MATERIALS AND METHODS

Photocatalysts, Sb-doped TiO_2, were prepared by the sol-gel method. Initially, 5.00 ml of Sb_2O_3 solution as a stibium source was continually added into 10.00 ml titanium(IV) tetraisopropoxide as a titania precursor under the constantly stirring rate (400 rpm) at 303 K. In the first ten minutes of the addition.(1, 2). XRD: a Holland Philips Xpert X-ray powder diffraction (XRD) diffractometer using monochromatic high-intensity Cu K, radiation (λ = 0.154056 nm), at a scanning speed of 2"/min from 10" to 60" [2θ] (1, 2). AFM: It is an apparatus which use to determine or take a picture to the particles, and it uses to determine the volume of the particle in three-dimension x, y and z (2). The sample contains one hundred of Treatment Group and control group which its represent a total of numerous of a group of an adult which subdivide into 50 male and 50 female which exposure of nanoparticles and abate in different concentrations and parameters (3). The assessment of the lipid peroxidation process is achieved via the determination of the by-product; Malondialdehyde will be determined by the modified procedure described by (4). After that evaluation and determination of Glutathione-S-Transferase (GST) Activity levels) (5)

RESULTS

XRD diagrams (fig.1.D) show that the four synthesized samples have the highest diffraction peak in the crystalline plane (A) (2θ = 29.9202) and that the other diffraction peaks coincide with the crystalline phases of (B) (25.9348), (C) (25,3439) and the smallest vertex of E (33,9715). These results have shown that we can clearly see that the crystalline phase of each sample is manly in anatase form. this result correspondence with (1, 2). AFM spectra indicated (fig 1.A, B) the minute size distribution between (60-135 nm) for TiO_2 (anatase) and the minute size distribution between (50-150 nm), for TiO_2 doped with sb prepared at 873k. The results show that the TiO_2 doped with sb has the largest surface area, followed by TiO_2 (anatase) which has a smaller surface area compared to the decrease in particle size D Avg = 91.24nm and the dimer fig (1.C) high Z = 0.30 nm between the particles is 0.30 nm[1] found out goes with(1-3). The results also showed that a very significant difference between the groups studied ($P < 0.000$) showed that a high concentration in women was much higher than in the male, which confirms that the existence of the effect is generally an increase in the concentration carried out by exposure to nanoparticles. the result also showed that differences were found between the treatment group and the control group so that this finding agree with (3-5).

FINDINGS

Preparation method used led to getting titanium dioxide nanoparticles dimensions. modifying the band gap led to getting a smaller band gap (2.0eV) TiO_2- Sb. XRD, AFM crystal size, surface morphology and particle size and surface topography properties to all sample were proved the successful sights of the prepared compounds. The oxidative stress seems to be an associated feature in exposure by nanoparticles. The shift in the oxidant /antioxidant balance

Science Proceedings Series
(SPS)
www.readersinsight.net/SPS

with a high rate of account for the tissue damage observed in *Aedes aegypti*. Oxidative stress status was not affected by any of the mentioned control types.

REFERENCES

1. Wang T, Zhu YC, Sun ZX, Wu LG.(2015) Preparation of weak light-driven TiO_2 multi-composite photocatalysts via adsorption phase synthesis PAMAM templated N, Pt co-doped TiO2 for visible light photodegradation of brilliant black.
2. Wanazelee Wan Abu Bakar and Rusmidah Ali (2016) Optimization of photocatalytic degradation of polybrominated diphenyl ether on trimetallic oxide Cu /Ni /TiO_2 /PVC catalyst using response surface methodology method. Journal of the Taiwan Institute of Chemical Engineers. 62 (2016) 283–296
3. López-Muñoz D, Ochoa-Zapater MA, Torreblanca A, Garcerá MD.(2019) Evaluation of the effects of titanium dioxide and aluminium oxide nanoparticles through tarsal contact exposure in the model insect Oncopeltus fasciatus. Sci Total Environ. 2019 May 20;666:759-765.
4. Al-Salih, M, Ali Naeem, Raid, M. (2015) The Role of Oxidative Stress in Inflammation in Patients with Rheumatoid Arthritis in Thi-Qar Province. IMPACT: International Journal of Research in Applied, Natural, and Social Sciences ISSN(E): 2321-8851; ISSN(P): 2347- 4580 Vol. 3, Issue 12.
5. Han-Dong Wu and Qi-Zhi Liu (2012) Antioxidative responses in Galleria mellonella larvae infected with the entomopathogenic nematode Heterorhabditis sp. beicherriana
Biocontrol Science and Technology, Vol. 22, No. 5, 601606.