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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : JURNAL ILMIAH

Judul Karya Ilmiah (Artikel) : Synthesis and Characterization of Fe₃O₄ Nanoparticles from Iron Sand with Sonochemical Method

Jumlah Penulis : 6 orang

Status Pengusul : ~~Penulis pertama/ Penulis ke-4/ Penulis Korespondensi~~ **

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Semarang, 26 Mei 2022

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Data-data hasil yang diperoleh dalam penelitian ini baik dan didukung metodologi yang tepat dengan jumlah referensi kurang dari 5 tahun sejumlah 28.

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Semarang, 7 Juni 2022

Reviewer 2



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Synthesis and characterization of Fe₃O₄ nanoparticles from iron sand with sonochemical method

[Hidayanto F.^{a, b}](#); [Sutanto H.^{a, b}](#) ; [Priyono P.^a](#); [Hidayanto E.^a](#); [Wibowo A.A.^{a, b}](#); [Triadyaksa P.^a](#)

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^a Department of Physics, Faculty of Science and Mathematics, Diponegoro University, Semarang, 50275, Central Java, Indonesia^b Smart Materials Research Center (SMARC), Central Laboratory for Research and Services Diponegoro University (CORES DU), Diponegoro University, Semarang, 50275, Central Java, Indonesia1 39th percentile
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This study conducts Fe₃O₄ nanoparticle synthesis by the sonochemical method with varying its sonication duration. The Fe₃O₄ nanoparticles were made from natural abundance iron sand using a polyethylene glycol-4000 template. The ultrasonic irradiation was carried out in five different durations and characterized by X-ray Diffractometer, scanning electron microscope, Fourier transforms infrared spectrophotometer and vibrating sample magnetometer. At an optimum sonication time of 150 minutes, the sonochemical method produces the minimum size of the Fe₃O₄ nanoparticles. Extending the sonication process from its optimum time yields a crystalline agglomeration that expands the size of the nanoparticles. The magnetic properties test of Fe₃O₄ nanoparticles shows its superparamagnetic properties with low coercivity and remanent magnetization. © RASĀYAN. All rights reserved.

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ACUTE TOXICITY OF TEBUCONAZOLE 80%WP IN FRESHWATER FISH (*Oncorhynchus Mykiss*) FOLLOWED BY METHOD VALIDATION INCLUDING STABILITY AND DOSE VERIFICATION

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ABSTRACT

Freshwater fish, *Oncorhynchus mykiss* (Rainbow trout) were exposed to five different concentrations of (0.8, 1.6, 3.2, 6.4 and 12.8 mg/L) tebuconazole WP 80%, concurrently a control and solvent control group (Acetone 0.1 ml/L) each containing ten fish was also maintained. During the main experiment, physicochemical parameters such as pH, temperature, dissolved oxygen, hardness and conductivity were analyzed in the exposure water. The temperature of the controls and test item concentrations maintained at 14.7°C during the 96 hour exposure period. After exposure on day 0 the fish were observed at approximately 3 hours and 6 hours for signs of mortality and toxicity, and then at 24, 48, 72 and 96 hours once daily. Fish was considered dead if there was no visible movement. No mortality in control was observed at the end of 96 hours., solvent control, and 0.8 mg/L whereas, 10 %, 50 %, 90 % and 100 % mortality was observed in 1.6, 3.2, 6.4 and 12.8 mg/L respectively. Dose verification of the test item in the exposure medium samples was carried out in the test item concentrations of 0.8 mg/L (low), 3.2 mg/L (intermediate) and 12.8 mg/L (high). The samples at 0 hours and 96 hours were analyzed by HPLC. The mean recovered concentrations were 0.76, 3.11 and 12.05 ppm at 0 hours and 0.72, 3.04 and 11.36 ppm at a 96 hour exposure period.

Keywords: Tebuconazole, *Oncorhynchus mykiss*, Acute Toxicity, HPLC, LC50.

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INTRODUCTION

Aquatic toxicity has become a vital part of evaluating environmentally unsafe pollutants. The capacity effect of pollution is generally more for aquatic organisms.¹ The synthetic chemical compounds together with pesticides, insecticides and herbicides are used in contemporary agricultural production to control pests or weeds to produce more food and to control public health. Dependence on pesticides for the manipulation of pests has increased because of the onset of an inexperienced agricultural revolution. This phenomenon is especially visible in tropical regions, where agriculture has increased dramatically over the past few years.² More than 1,000 insecticides currently used in as many countries as possible accidentally produce aquatic ecosystems.³ These insecticides, even in restricted areas, are washed away and over-excited by the use of floods and rain in the nearby aquatic system, thus posing a risk to aquatic biota, specifically fish, which is critical due to its excessive human intake of nutrients⁴. A classic experiment used to calculate the pesticide in fish consists of exposing a fish test group to a constant concentration of water pesticides until a balance is reached between concentrations of fish and water pesticides-this is the phase of accumulation. Thereafter, the fish pesticide elimination phase in which contaminated fish are transferred to clean water and the concentrations of fish pesticide are monitored. Tebuconazole is a systemic fungicide in the triazole class with a wide range in action. This class of fungicides are preventing fungal growth by inhibiting ergosterol biosynthesis^{5,6}. Tebuconazole is increasingly present in stream water.⁷ This fungicide is harmful to species and may cause adverse effects in the aquatic environment following chronic exposure.⁸ This fungicide is essentially used to target plant-infecting fungi, but it has other complex effects on ecosystems, such as affecting the

SYNTHESIS OF EFFECTIVE ENVIRONMENTALLY FRIENDLY ADDITIVES FOR AUTOMOTIVE FUELS

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ABSTRACT

One of the pressing problems when using internal combustion engines is the formation of harmful gas emissions. The synthesis of environmentally friendly additives to automotive fuels is one of the most important directions in the development of the oil refining and petrochemical industries. The greatest distribution among additives increasing the octane number, alkyl tert-butyl ethers (ATBE) received. This study aimed to develop a synthesis technology for several promising tertiary esters with the number of carbon atoms in a molecule of 6-8: ethyl tert-butyl (ETBE); isobutyl-tert-butyl (IBTBE) and iso-propyl-tert-amyl (IPTAE). To prepare ethers, the process of interaction of isobutylene (i-C₄H₈) with aliphatic alcohols on acid catalysts is carried out. The synthesis of additives was carried out according to 2 schemes. As catalysts, standard gel sulfocationites and catalysts prepared based on the systems heteropoly acid (HPA) - aluminum oxide and HPA – natural zeolite were tested. It was found that the selectivity of the synthesis of ATBE on catalysts with HPA increases with an increasing number of carbon atoms in alcohol. The amount of gasoline additives varied from 1 to 12%. It was shown that the additives synthesized allowed to increase the octane number by several points, in some cases up to 20. The results obtained show a good acceptance of the studied base gasoline to the components of the prepared composite additives.

Keywords: Automotive Fuels, Additives, Octane Number, Shankanai Natural Zeolite, Heteropoly Compounds.

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INTRODUCTION

The formation of harmful gas emissions is one of the urgent problems when using internal combustion engines.¹⁻⁵ Many studies have been done around the world to reduce gas emissions while maintaining engine performance. The functioning of modern cars requires the application of high-octane fuel with anti-knock properties characterized by motor octane numbers 92, 95 and 98. High anti-knock characteristics are achieved either by deep modification of gasoline using the processes of alkylation, isomerization and catalytic cracking or by introducing special high-octane additives into the fuel. Fuel producers have to take into account the fact that the requirements for fuel quality (total sulfur content, combustion completeness, lubricating properties of the fuel, and the content of aromatic compounds) are becoming more stringent.⁶⁻¹⁰ Also, the raw material base of oil refineries is deteriorating due to an increase in the share of heavy, sour crude oils in the total volume of refined oils. Poor quality raw materials need to be processed at various purification and catalytic processing plants.¹¹⁻¹⁴ Therefore, the production of effective additives to improve fuel performance is becoming particularly relevant at present.