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

Judul Karya Ilmiah (Artikel)	:	Characteristic of natural rubber as bolus material for radiotherapy		
Jumlah Penulis	:	7 orang		
Status Pengusul	:	~~Penulis pertama~~/ Penulis ke-3/ ~~Penulis Korespondesi~~ **		
Identitas Jurnal Ilmiah	:	a. Nama Jurnal	:	Materials Research Express
		b. Nomor ISSN	:	2053-1591
		c. Volume, Nomor, Bulan, Tahun	:	Vol. 5 , No. 9, Agustus 2018
		d. Penerbit	:	IOP Publishing
		e. DOI artikel (jika ada)	:	https://doi.org/10.1088/2053-1591/aad5ca
		f. Alamat web jurnal	:	https://iopscience.iop.org/article/10.1088/2053-1591/aad5ca
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Semarang, 26 Mei 2022

Reviewer 1

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Reviewer 2

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NIP. 197203171998021001
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Semarang, 26 Mei 2022
Reviewer 1

Prof. Dr. Drs. Wahyu Setia Budi, M. S.
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2. **<u>Ruang lingkup dan kedalaman pembahasan:</u>**
   Paper ini membahas tentang karakterisasi materiasl bolus dari bahan karet alami. Bolus dikarakterisasi menggunakan CT-Scan untuk mengukur relative electron density (RED). Bolus dipapar radiasi berkas elektron dengan energi 8 dan 10 MeV dengan Linear Accelerator (LINAC) untuk mengukur persentase nilai surface dose (PSD). Hasil menunjukkan terjadi peningkatan PSD dengan penggunaan bolus, meskipun belum 100%. Bahan karet alami ini menjadi bahan alternatif untuk bolus karena mirip dengan jaringan lunak dan membantu meningkatkan dosis pada permukaan kulit.
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Reviewer 2

Prof. Dr. Kusworo Adi, S.Si., M.T. NIP. 197203171998021001
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Characteristic of natural rubber as bolus material for radiotherapy

Supratman, Astri Suppa[a] ; Sutanto, Heri[a]; Hidayanto, Eko[a]; Jaya, Gede Wiratma[a]; Astuti, Santi Yuli[a]; Budiono, Tris[b]; Firmansyah, Muhammad Agus[b]

Save all to author list

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Abstract

Bolus is material similar to tissue and is placed directly on skin surface during radiotherapy with electron beam. This research has successfully developed bolus using Natural Rubber (NR) organic polymer. The bolus produced has a dimension of 11 × 11 × 0.5 cm^3. This bolus has also undergone characteristics testing using CT-Scan to measured relative electron density (RED). The mass attenuation coefficients (MAC) testing was calculated using software XCOM Version 3.1 and effective atomic number (EAN) testing was calculated using Auto Zeff Version 1.7. Bolus was exposured to electron beam radiation with energy 8 and 10 MeV using Linear Accelerator (LINAC) to measure the percentage of surface dose (PSD) value. Results show that the bolus has RED value of 0.893, which is nearly the same as that of soft tissues such as Lung, Fat, and Liver. For MAC calculation result is similar with water and soft tissue (lung), and for EAN calculation result is under water and soft tissue. The Percentage of

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Dr Judy Wu is a Distinguished Professor of Physics at the University of Kansas. She received her PhD from the University of Houston. She is an experimental condensed matter physicist and is specialized in fabrication, characterization and device applications of thin films and nanostructures. Her current research focuses on understanding the interfaces in ultrathin metal-insulator-metal tunnel junctions including Josephson tunnel junctions, magnetic tunnel junctions, memristors for quantum and neuromorphic computing, and in graphene-based heterostructures nanohybrids quantum sensors including photodetectors, strain/bio/gas/chemical sensors.

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PAPER

Structure and properties of flat cocoon silk after silk reeling

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Abstract

Silk is obtained mostly from oval cocoons. In this paper, the flat cocoons were obtained by changing the silking environment of *Bombyx mori* silkworms. Then the appropriate method was used to reel the flat cocoons. The structure, thermal and mechanical properties of flat cocoon silk (FCS) after silk reeling and degumming were studied. The experimental results have shown that flat cocoon silk has the same main composition and similar thermal performance as that of common cocoon silk (CCS), but the sericin distribution on the surface of FCS is more uniform, the crystallinity degree of the FCS (53.77%) is slightly higher than that of the CCS (50.02%), and the cross-sectional areas of the FCS before and after degumming are smaller than those of the CCS. Before degumming, the stress of FCS is about 1% higher than that of CCS, the initial modulus is about 4.7% higher, and the strain is about 10.7% lower. After degumming, the stress of FCS is about 2.7% higher than that of CCS, the initial modulus is about 7.8% higher, and the strain is about 31.3% lower. The results have shown that FCS after silk reeling has application performance close to or even better than that of CCS.

1. Introduction

Beside the traditional textile industry, silk has become a new material that can be used in many high-tech industries [1–5]. Results of proteomic studies show that silk is a complicated protein complex, and contains many biologically active protein components besides fibroin and sericin. Natural sericin protein has good biocompatibility, and has been used in beauty, skin care, anti-inflammatory and health care products. Sericin films, tissue engineering scaffold materials, etc made from sericin protein have also been used in the field of biomedicine [6]. Modification of sericin can improve the properties of sericin films and further increase their applicability [7–11].

Fibroin, of which is in high concentration in silk, also has a wide range of applications. Fibroin protein has long been used in the field of cosmetics. Fibroin protein is also a good optical material, and its immobilized enzyme can be used to make enzyme sensors. Fibroin can be widely used in the field of medicine and the preparation of biological materials [12, 13]. Fibroin protein can also inhibit the growth of microorganisms [14].

Mature *Bombyx mori* silkworms spin silk in a three-dimensional space, forming oval cocoons. Silk is obtained mostly from oval cocoons. However, due to the differences in varieties of *Bombyx mori* silkworms, the amount of silk production will be different. The way of body movement and the change of place during silk spinning will have an impact on the shape and the properties of cocoons [15–18]. If the silking place is limited to two-dimensional space, mature *Bombyx mori* silkworms can hardly find the best place of cocooning and will spin out a piece of silk on a flat surface, which is the so-called flat cocoon. After silk spinning, *Bombyx mori* silkworms will transform into pupa above the flat cocoons. Van Der Kloot, W G *et al* systematically studied the rule of silk spinning of the Cecropia silkworms and found that the silkworms spin silk into outer, middle and

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PAPER

Syntheses, characterization, and suppression efficiency of silver & silver iodide nanoparticle for proliferation, migration, and invasion in follicular thyroid carcinoma cells

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Abstract

In this study, a chemical co-precipitation method has been employed, silver iodide (AgI NPs) and silver nanoparticles (AgNPs) have been synthesized. UV–vis, FTIR, x-ray diffraction, FESEM, TEM, and other techniques have been used to examine the optical and structural properties of AgNPs and AgI NPs. The UV–vis absorption spectra gave the highest peak at 400 nm for AgNPs and AgI NPs at 434 nm. The x-ray data showed that the prepared AgNPs and AgI NPs were nanocrystalline cubic structures with crystallite sizes of 18 nm and 51 nm, respectively. The FESEM results show that synthesized AgNPs and AgI NPs agglomerate and aggregate. TEM data revealed that AgNPs have a quasi-spherical shape and Gaussian size distribution type. TEM analysis of AgI NPs with different magnifications revealed primarily spherical and well dispersed AgI NPs. TEM histogram shows that the particles were highly monodispersed AgNPs and AgI NPs with an average diameter of 11.5, 24.28 nm, respectively. According to the MTT assay results of FTC133cells, the cytotoxic action IC50 of AgNPs was (52.74 μg ml^{-1}) and for AgI nanoparticles was (95.22 μg ml^{-1}). It has been found that FTC133 cellular uptake was concentration, size- and time-dependent for both AgNPs and AgI NPs. The migrated FTC133 cell rates were reduced following AgNPs treatment to 75.7% and for AgI NPs treatment to 60% compared with the control group. Furthermore, Invasive FTC133 cell rates were reduced by 60% in the AgNPs treatment group and by 55.71 percent in the AgI NPs treatment group compared to the control group.

1. Introduction

Thyroid cancer is a common type of cancer in the head and neck area. Most thyroid cancer cases are differentiated thyroid carcinoma, including papillary thyroid carcinoma and follicular thyroid carcinoma [1]. Follicular thyroid cancer (FTC) is the second furthermost common differentiated thyroid cancer and credits for about 10%–15% of all thyroid cancers. The relative rate of FTC is higher in iodine-deficient areas, accounting for up to 40% of all cases of thyroid cancer disease [2]. The initial treatment of thyroid cancer was surgical and depended, for the most part, on the extent of the local condition. The nanomaterials have wide biomedical applications such as photothermal therapy [3], photodynamic therapy [4], a drug targeted delivery [5], genetic therapy [6], immunotherapy [7], etc.

Due to their availability, material characteristics, and capacity to improve drug specificity against cancer cells, metallic nanoparticles have been established as diagnosing markers or drug delivery systems in cancer therapy [8]. In addition, they can easily infiltrate the cellular environment due to their small size. Furthermore, NPs can target specific cancer cells both actively and passively [9]. Silver nanoparticles (AgNPs) are among the most promising metal nanoparticles due to their exceptional antibacterial and confined surface plasmon resonance capabilities. These qualities include broad-spectrum antimicrobials, ground Raman spectroscopy, chemical/biological sensors and biomedical materials, biomarkers, and so on [10]. Moreover, the toxicity of