**DOSIMETRIC CHARACTERIZATION OF CUSTOMIZED PLA PHANTOM FOR RADIOTHERAPY**

***Nur Emirah Mohd Zain1, Umairah Jais 1, Reduan Abdullah1,2 and Wan Nordiana Wan Abd Rahman1***

1School of Health Sciences, Universiti Sains Malaysia, Health Campus,

16150 Kota Bharu, Kelantan, Malaysia.

2 Nuclear Medicine, Radiotherapy and Oncology Department, Hospital Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia.

Correspondence author: [wandiana@usm.my](mailto:wandiana@usm.my)

***ABSTRACT***

*The purpose of this study was to assess the dosimetric properties of PLA (polylactic acid) phantom in comparison to solid water phantom for photon and electron beam radiotherapy. The standard solid water and PLA phantom were characterized for their uniformity and Hounsfield Unit (HU) using SOMATOM computed tomography (CT) scanner. Ionization chamber and Gafchromic EBT3 films were used to measure the dose delivered at the depth of maximum dose in the solid water and PLA phantom. The dose prescribed during the irradiation with photon and electron beams were set from 50 to 1000 cGy. The results show the percentage dose difference measured using ionization chamber for 6 and 10 MV photon beams between solid water and PLA phantom was less than ± 4%. Meanwhile, for 6 and 12 MeV electron beams, the percentage dose differences measured for both phantoms was within ±2%. Measurement using Gafchromic EBT3 films also agreed with ionization chamber results with percentage dose differences between solid water and PLA phantom less than ± 4%. In conclusion, the PLA phantom could potentially be applied for routine quality assurance check and dosimetry confirmation in radiotherapy as an alternative to standard solid water phantom.*

**Keywords**: Gafchromic EBT3, markus ionization chamber, polylactic acid, polylactic acid, solid water phantom

**INTRODUCTION**

The aim of radiotherapy is to treat cancer using high doses of radiation in the form of photon and electron beam. Radiation is known to cause damage to biological materials in which the requirement for accurate dosimetry is very crucial in radiotherapy. Therefore, tissue equivalent phantom is fundamentally important in radiation dosimetry to replace human for quality assurance and quality control in radiotherapy. Commercial radiotherapy phantoms are available in many different types and shapes such as slab phantom, water phantom, anthropomorphic phantom, and organ-specific phantom. Basic phantom such as bolus plays an important role in sparing the skin effect (Kim et al., 2014).

**MATERIALS AND METHODS**

**Materials**

The material supplied by company, country. These materials were used as received.

**RESULTS AND DISCUSSION**

Units, Symbols, and Abbreviation

**CONCLUSION**

**ACKNOWLEDGEMENTS**

**REFERENCES**

APA Style (The list of references should be arranged alphabetically according to the surname of the first author )

* Setting paper A4
* Margin (top/down/left right) = 2cm @ 0.79”
* Font = Times New Roman
* Size = 12
* Spacing = single spacing
* Teks : Justify