**Oral Presentation**

# DOSIMETRIC EVALUATION OF PLA AND ABS MATERIALS PRODUCED BY TWO DIFFERENT PRODUCTION TECHNIQUES

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## ABSTRACT

In recent years, polymer materials have become a wide range of scientific research in radiotherapy. Especially PLA (Polylactic Acid), and Acrylonitrile Butadiene Styrene (ABS) materials are widely used in the field of various radiotherapy applications. 3D printing was the first of these technologies, but the technology of plastic injection molding technology has also been used in manufacturing for many years. Firstly, the 3D printing of ABS and PLA materials was printed on the Ultimaker S5 model 3D printer. ABS and PLA materials in the form of square prisms, 12x12x1 $cm^3$ in size, were produced in order to be suitable for measuring instruments for radiation measurements. Then the test materials were produced by direct injection molding in an ISO D2 type mold made of S235JR steel (material number 1.0038) with the same dimension. It was aimed at dosimetric evaluation of the response of these materials to radiation, produced by 3D and plastic injection molding techniques. Hounsfield Units (HU) values were determined with the CT simulator device for materials produced from both techniques. Dosimetric measurements were made using the 6 MV nominal photon energy obtained in the Varian DHX linear accelerator. The radio transmittance measurements of the materials were performed in a solid water phantom. Although the dosimetric parameters of the materials produced in the 3D printer and plastic injection method give similar results, it seems appropriate to evaluate the material to be used dosimetrically before being used as personal material on the patient due to the printing characteristics and material variability.

**Keywords:** *3D Printer, radiotherapy, dosimetry.*

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**25 - 27 OCTOBER, 2023, ISTANBUL, TÜRKİYE**

## Acceptance Letter For Oral Presentation

**Dear : Çavdar Karaçam, Songül*; Tunçman, Duygu; Şahin, tülin; Şahin, Şenol; Ergen, Şefika Arzu; Dağdelen, Meltem; Uzel, Ömer Erol; Çolpan Öksüz, Didem**
**Reference No: 35**

It is our pleasure to inform you that manuscript which name is **" DOSIMETRIC EVALUATION OF PLA AND ABS MATERIALS PRODUCED BY TWO DIFFERENT PRODUCTION TECHNIQUES "** the seven International Congress on 3D Printing Technologies and Digital Industry (3D-PTC2023)**.**

Wish to meet at congress

With kind regards,



**Assoc. Prof. Dr. Binnur SAĞBAŞ**

**Chair of the 3D-PTC2023 Congress**




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## ABSTRACT PROCEEDINGS


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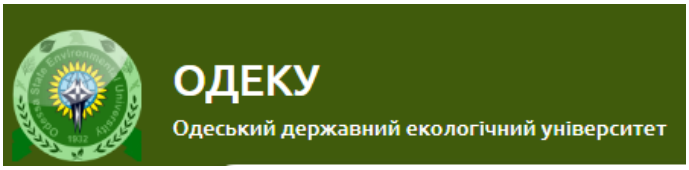










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| | | |
|---|---|---|
| | **Session Chairman:** Dr. Savaş DİLİBAL | |
| 10.00-10.20 | "Hardness Variation And Microstructural Characterization Of Bimetallic 316l Stainless Steel/Inconel 625 Waam Component" | Kumek, Hülya; Gürol, Uğur*; Dilibal, Savaş; Koçak, Mustafa |
| 10.20-10.40 | "Road accident forecasting using machine learning algorithms " | Zermane, Hanane*; Zermane, Abderrahim |
| 10:40-11.00 | "The Effect Of Milling Speed On The Properties Of Co-Cr-Mo-W Particles Recycled From Slm Support Scraps" | Aksa, Hüseyin Can; Varol, Temel*; Akçay, Serhatcan Berk |
| 11.00-11.30 | **COFFE BREAK** | |
| | **Session Chairman:** Dr. Burhan DUMAN | |
| 11.30-11.50 | "Development And Dosimetric Verification Of 3d Mould Applicator In Brachytherapy" | Çavdar Karaçam, Songül*; Tunçman, Duygu; Dağdelen, Meltem; Uzel, Ömer Erol |
| 11.50-12.10 | "Radiological Evaluation Of The Effects Of Infill Density On 3d Printed Pla Samples" | Azaklıoğlu, Deniz*; Çavdar Karaçam, Songül; Pastacı Özsobacı, Nural; Özçelik, Derviş |
| 12.10-12.30 | "Determining Mechanical Properties Of Ti6al4v Additive Manufactured Parts At Different Test Conditions" | Sagbas, Binnur*; Ovacık, Taylan |
| 13.30--14.30 | **LUNCH** | |
| | **Session Chairman:** Dr. Yusuf Cengiz TOKLU | |
| 14:30-14:50 | "Dosimetric Evaluation Of Pla And Abs Materials Produced By Two Different Production Techniques" | Çavdar Karaçam, Songül*; Tunçman, Duygu; Şahin, tülin; Şahin, Şenol; Ergen, Şefika Arzu; Dağdelen, Meltem; Uzel, Ömer Erol; Çolpan Öksüz, Didem |
| 14:50-15:10 | "Additive Manufacturing of Concrete Structures and Concrete Elements, Optimization of the Time Consumed" | Toklu, Yusuf Cengiz; ÇERÇEVİK, Ali Erdem* |
| 15:10-15:30 | "Design, Manufacturing and Finite Element Assessment of Functionally Graded Auxetic Structures" | Özen, Mert*; Kenan, Hamit; Azeloğlu, Cumhur Oktay |
| 16:10-16:30 | **COFFE BREAK** | |

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