Insights from the EURADOS eye lens dosemeter intercomparison IC2025eye: Evaluation of results from the Department for Radiation and Environmental Protection at the Vinča Institute of Nuclear Sciences, Serbia

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INTRODUCTION

This paper presents the results of the EURADOS Eye Lens Dosemeter Intercomparison IC2025eye. The intercomparison was coordinated by the EURADOS WG2 Intercomparison Organization Group, which established the irradiation plan, including photon energy and dose ranges, and managed all logistics, from participant registration to the return of dosemeters. A total of 46 institutes with 49 dosemeter systems participated, following standardized irradiation procedures in September-November 2025.

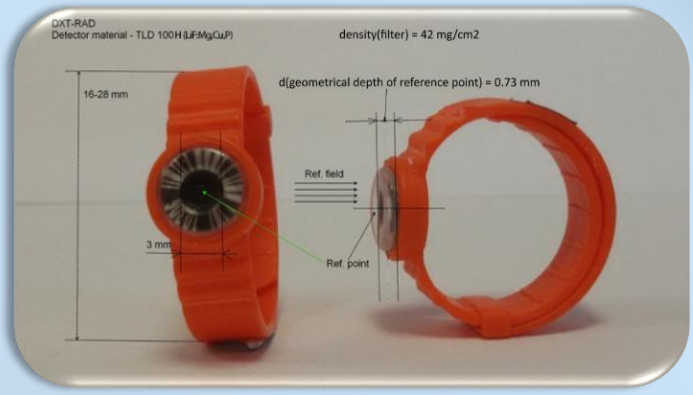

Fig. 1. Eye lens dosimeters

METHOD

At the Vinča Institute of Nuclear Sciences, the Department for Radiation and Environmental Protection participated in the intercomparison using passive thermoluminescent dosimeters (TLDs) with LiF:Mg,Cu,P crystals, commercially designated DXT-100H, selected for their high sensitivity and ergonomic suitability, enabling routine monitoring of occupational eye lens doses without compromising operator comfort. Readouts were performed using a Harshaw 6600 Plus automated TL reader (Thermo Fisher Scientific, USA), calibrated in a ^{137}Cs reference field (S-Cs radiation quality) with a 1 mSv reference Hp(3) dose at 0˚ incident angle. Participants applied readout procedures and reported measured doses, which were compared with reference values to assess performance. Expanded uncertainties (k = 2, 95.4% confidence) were calculated according to the GUM framework (ISO/IEC Guide 98-3:2008).

Fig. 2. Harshaw TLD Reader

CONCLUSION

In conclusion, the results achieved by the Department for Radiation and Environmental Protection at the Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia, University of Belgrade within IC2025eye intercomparison of passive eye lens dosemeters were generally satisfactory, confirming the suitability of DXT-100H dosimeters for routine eye lens dose monitoring.

LiF:Mg,Cu,P extremity	Signal loss	Sensitivity loss	Average
a	-0.0118	-0.006	-0.0062
b	1.0663	1.029	1.0476

Table 1. *a* and *b* parameters for fade function $F=a*ln(T)+b$ at storing temperature of 20°C

RESULTS

The results achieved by the Vinča Institute of Nuclear Sciences demonstrated good overall agreement with reference doses, with measured-to-reference ratios ranging from 0.87 to 1.16. Analysis by radiation quality showed that ^{137}Cs irradiations slightly underestimated doses (ratios 0.87-0.88), N-40 X-ray irradiations slightly overestimated doses (ratios 1.13-1.16), and W-80 X-ray irradiations showed excellent agreement across both low- and high-dose configurations and at different angles of incidence (ratios 0.95-1.06). These variations are consistent with expected TLD energy responses and are within acceptable intercomparison criteria.

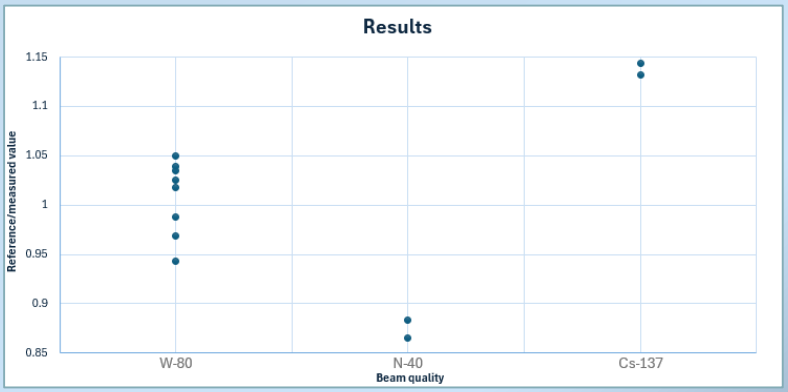

Fig. 3. Results

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