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Anatomical, physical, and mechanical properties of eldar pine (*Pinus eldarica* Medw.) grown in the Kelardasht region

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Abstract: The aim of this study was to determine some of the anatomical, physical, and mechanical properties of 35-year-old *Pinus eldarica* Medw. wood. For this purpose, 3 normal pine trees were randomly cut down from the Garagpas-Kelardasht site located in the northern part of Iran. Disks and logs of wood were cut at breast height. The testing samples were prepared along the radial axis from the pith to the bark to determine anatomical and physical properties such as annual ring width, tracheid length, oven-dry density, basic density, and volume shrinkage, and mature wood was used to measure mechanical strength characteristics such as static bending (MOE and MOR) and compression parallel to the grain. The results showed that the densities (oven-dry density and basic density) and volumetric shrinkage increased along the radial axis from the pith to the bark. With increasing cambial age, the values of length increased while the annual ring width decreased. The average density of the test sample (ρ_{12}) was 545 kg m^{-3} , the modulus of elasticity (MOE) was 7.21 GPa, the modulus of rupture (MOR) was 82.81 MPa, and the compression strength parallel to the grain was 52.18 MPa. The relationship between the wood density and strength properties was determined by regression analyses. It was found that there were strong relationships between density and MOR and compression strength parallel to the grain. However, the modulus of elasticity showed weak correlation with the wood density. The results of this research were compared with the other growing sites of pine trees in Iran. As a result of this comparison, it was observed that pine trees grown in Garagpas-Kelardasht and pine trees at other sites have different wood properties.

Key words: *Pinus eldarica* Medw., annual ring width, tracheid length, wood density, volumetric shrinkage, mechanical properties

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