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Investigation of inner mechanism of anisotropic mechanical property of antler bone

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Abstract

Bones have different functions and various applications depending on the roles they play in different mammal bodies. The internal relationships between the functions and microstructures of bones need further expounding to understand their specific mechanical properties. In this study, the relationships between the mechanical properties and microstructures of the compact bone of antler (called as antler bone for short) along its three different orientations are investigated. First, the bending mechanical properties of the specimens of the antler bone along its three different orientations are tested with material-testing machine, followed by the observations of the crack-extending routes and the fracture surfaces of the three different orientations with a scanning electron microscope (SEM). The results of the tests reveal that the antler bone possesses anisotropic mechanical property. Namely, the mechanical properties of the antler bone are closely related to its orientations. Concretely, the fracture strength, elastic modulus and work-of-fracture along the transversal

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