The Markov approximation is powerful for the directly synthesis of wave envelopes in random media when the wavelength is shorter than the correlation distance. We often assume isotropic randomness for mathematical simplicity. But the horizontal correlation distance is usually larger than the vertical one due to the geological evolution process of the Earth. Sato (2008) analytically derived vector wave envelopes in nonisotropic random media based on of the Markov approximation; however, the applicable range has not been cleared yet. The key parameter of this approximation is a product of the MS fractional velocity fluctuation, the ratio of the longitudinal correlation distance to the transverse correlation distance, and the ratio of the travel distance to the transverse correlation distance. This parameter well characterizes the relative partition of energy into vector components. The envelope broadening is strongly controlled by the correlation distance in the direction orthogonal to the global ray direction. When the horizontal correlation distance is larger than the vertical one, the envelope broadening and the excitation of amplitude in the transverse component for horizontal propagation is larger than that with vertical propagation for a P wavelet. Here, we examine the applicable range of the Markov approximation comparing with envelopes derived by finite difference simulations of the elastic waves in 2-D random media characterized by a Gaussian ACF. We find that the Markov approximation works well when this parameter is less than 0.05. We also discuss possible theoretical improvement of the Markov approximation.