The microwave spectrum of cis-hex-3-ene-1,5-diyne has been observed using a Fourier transform spectrometer. Twenty-two transitions were fit to eight constants to 3.9 kHz. The rotational constants have been determined as \( A = 6955.300(2) \text{ MHz} \), \( B = 2621.515(1) \text{ MHz} \), and \( C = 1900.734(1) \text{ MHz} \). The constants were calculated using \textit{ab initio} methods at the MP2/6-31G* level as \( A = 6906.098 \text{ MHz} \), \( B = 2579.524 \text{ MHz} \), and \( C = 1878.047 \text{ MHz} \) showing reasonable agreement with experiment. The electric dipole moment was measured to be 0.18(1) D. This molecule is the parent molecule of a series of compounds which undergo the 'Bergman cyclization' reaction, and thus serves as a precursor to aromatic compounds. It also has important implications in biological systems, and may exist in the interstellar medium.