Lattice constant is one of the paramount parameters that mark the quality of thin film fabrication. Numerous research efforts have been made to calculate and measure lattice constant, including experimental and empirical approaches. Not withstanding these efforts, a reliable and simple-to-use model is still needed to predict accurately this vital parameter. In this study, gene expression programming (GEP) approach was implemented to establish trustworthy model for prediction of the lattice constant of A2XY6 (A = K, Cs, Rb, TI; X = tetravalent cation; and Y = F, Cl, Br, I) cubic crystals based on a comprehensive experimental database. The obtained results showed that the proposed GEP correlation provides excellent prediction performance with an overall average absolute relative deviation (AARD%) of 0.3596% and a coefficient of determination (R2) of 0.9965. Moreover, the comparison of the performance between the newly proposed correlation and the best pre-existing paradigms demonstrated that the established GEP correlation is more robust, reliable, and efficient than the prior models for prediction of lattice constant of A2XY6 cubic crystals