Drought forecasting is of great importance for optimum usage of water resources. There are various methods for estimating meteorological drought. In the Palmer Drought Severity Index (PDSI) which is one of these methods, drought is calculated according to P-PET difference. The difference is estimated using the Thornthwaite method which takes into account the moisture content of the soil and climate in a region. It is calculated using precipitation (P) and potential evapotranspiration (PET). In the study, P-PET differences determined according to Thornthwaite method for Alanya Station were modeled by Support Vector Machines (SVM) method. The precipitation and temperature data taken from the Turkish State Meteorological Service were used as inputs between 1969-2011 years. Examining the results, it was seen that the developed model has good performance based on determination coefficients (R²) and mean absolute error (MAE). For testing set, R² and MAE values were found as 0.916 and 77.16, respectively. As a result, it could be said that this SVM model can be easily used for P-PET estimation in PDSI as an alternative to Thornthwaite method.