Freeze drying has been proven to be a useful, but expensive preservation method that gives an excellent product quality. The objective of this study was to compare the performance of several new dehydration methods in terms of end quality characteristics of strawberries. Quality change of whole and cubic cut strawberries, cv. San Andreas, was determined by color (lightness, redness, yellowness, hue, chroma, color change), texture (Young modulus, rupture force), geometry (first and second equatorial diameters, polar diameter), rehydration and moisture content after microwave dehydration with and without osmotic dehydration pretreatment, impingement drying and freeze drying. Maximum water loss (68.9% and 95.7%, respectively) was measured after microwave drying of whole and cubic cut strawberries. Improved color retention of 42% and 23%, respectively, was observed for impingement and microwave drying compared to freeze drying. Loss of cell turgor after dehydration was related to a decrease between 88 and 97% of initial elasticity of whole strawberries. However, mechanical strength against rupture improved after microwave and combined osmotic and microwave drying. Moreover, minimum shrinkage of whole fruit was found after microwave and impingement drying. Strawberries cut into cubes showed increased elasticity and mechanical strength after drying, but also higher color deterioration. Strawberries treated by microwave and impingement drying showed improved rehydration coefficient (two to four times). Microwave drying is an excellent preservation method of strawberries, providing an end product of improved quality attributes (color, texture, geometry, rehydration) compared to freeze dried fruit.