It is always a challenge to develop products with substitutes of wheat flour due to property of gluten to form viscoelastic network in the dough. The biscuits have the capacity to aggregate a variety of ingredients, and may support mixtures of flours in substitution of wheat. The objective of this study was to evaluate and compare the physical characteristics between three different formulations of buttery biscuits during the preparation and after 8 days of storage. The formulations were prepared with 100% of wheat flour (F1); 30% amaranth, 10% quinoa, 40% soy, 20% cassava (F2) e 35% amaranth, 10% quinoa, 30% soy, 25% cassava (F3). Physical analyzes were performed in order to evaluate weight, diameter, thickness, volume, expansion factor and specific volume of the three formulations after the preparation. After 8 days of storage, weight, diameter, thickness and expansion factor were again evaluated and compared by means of two-way ANOVA. The results of volume and specific volume of F1, F2 and F3 were analyzed by one-way ANOVA and means compared by Tukey test at 5% significance level. The results revealed that the storage time of 8 days did not alter significantly the physical characteristics of the biscuits. There was no statistically difference between the three formulations of buttery biscuits in relation to physical variables evaluated. However, formulations based on flour of wheat and flour mixtures were very similar to each other, suggesting that the mix of flours may be used in substitution for wheat in the preparation of buttery biscuits.