Positron emission tomography (PET) is an imaging technique allowing to determine radiotracer distribution in a patient's body. This work reviews basic principles of PET imaging. It also uses the random field theory to detect locations with increased radiotracer uptake. This procedure is tested on a collection of simulated PET images. The aim of this work is to describe the quality of simulated PET images in terms of both the patient's physical parameters and the amount of applied radiopharmaceutical. The relations are used to provide curves of constant quality determining the amount of radiopharmaceutical needed to achieve desired quality of the resulting images. The resulting curves are compared with the formula currently used in medical practice.