Abstract

The use of radionuclides has been well developed in medicine and today nuclear medicine is well established as a medicalspecialty.This work deals with the "Evaluation of Nuclear Reaction Cross Sections of Positron Emitting 63Zn, a Potential Candidate PET". 63Zn radionuclide is particularly important for diagnostic purposes especially used in transport kinetics of zinc into pancreas, prostate and across the blood-brain-barrier.

The objective of present study is to know about importance of 63Zn in the field of nuclear medicine. Basically, 63Zn is a positron emitting radionuclide with (T1/2 38.1 min; mean β+ energy 0.99MeV; total β+ intensity 93%) and it can be produced by using particle accelerators (Cyclotron).

There are many nuclear reactions for the production of 63Zn and a number of authors have reported their experimental data for the production of 63Zn. Almost all available data are given in EXFOR library but the reactions are selected on the basis of energy of incoming particles. All experimental cross sections are compared with theoretical model calculations using TENDL-2017 and ALICE-IPPE codes. Recommended data are generated for proton and deuteron induced reactions. Thick target yields are calculated and isotopic impurities are also discussed in this research work.

On the basis of recommended data, thick target yield and isotopic impurities, we conclude that 63Cu(p,n)63Zn reaction and 63Cu(d,2n)63Zn reaction are the best reactions for the production of 63Zn in low energy cyclotrons up to 18 MeV.