

## Development of Automatic System for Production of Small Batches of Radioiodine Capsules

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Preparation of small batches of custom ordered  $^{131}\text{I}$  capsules in hospitals and institutes is often done manually. Operators could be exposed to the significant level of radiation exposure doses during manual preparation of capsules with high activities of  $^{131}\text{I}$ . There are few commercial solutions for automatic capsule filling, but those devices are very expensive. We developed a simple and affordable automatic system for this purpose. The goal of this publication is to present and shortly describe function of our system. The system consists of PC controlled device which is dedicated to precise dosage of  $^{131}\text{I}$  solution and filling of capsules with different amount of radioiodine activities. The whole device is located into dedicated chamber, shielded by lead bricks. It is known that the solution volume in microliters closely correlates with the activity in mCi, which is a basic principle of our system. The first step in the whole process is filling of known volume of  $^{131}\text{I}$  solution into syringe. The next step is filling-out needed volume (i.e. activity) in the capsule and closing it with appropriate cap. The third step includes measurement of  $^{131}\text{I}$  activity in the capsule (dose calibrator) and printing its value on the self-adhesive label. The final step is transport of the capsule to a lead container. The whole process is automated, controlled by PC, which is equipped by appropriate software. The advantage of this system is that it is suitable for custom ordered capsules because every capsule it produces can be of desirable activity and calibration date. The list of capsules with their activities and calibration dates can be easily uploaded to the system as an Excel file. Our system reduces the unnecessary radiation exposure of personnel and also prevents errors caused by subjective or objective reasons, which are often the case during manual capsules filling.

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