

Robotics in Pharmaceutical Sciences

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INTRODUCTION

- The international standard organization gives a definition of robot in ISO 8373: “ An automatically controlled, reprogrammable, multipurpose, manipulator programmable in three or more axes, which may be either fixed in place or mobile for use in industrial automation and applications.



WHY TO USE ROBOTS IN PHARMACEUTICAL INDUSTRIES?

- As demand for new drugs and medicines grows, pharmaceutical companies are continuously looking for new ways to increase productivity, leading to an increased automated equipment and robotics.
- Due to the great potential for the use of robots in the pharmaceutical industries, they are gradually injecting more robotic systems into their operations.
- In the world of pharmaceuticals, there is a vital role for robots to play in the complicated processes of research and development, production, and packaging.

CURRENTLY USING INDUSTRIES

- Till date, robots have been successfully used by **Merck** on bottling lines to place dispenser caps onto bottled allergy medications. These robots are capable of operating at 120 cps.
- The only requirement for the human employees is to select the correct program for the robotic system itself.
- **SciGene** has also manufactured a robot that can prepare DNA samples.



TYPES OF ROBOTS

- **Cartesian robots**, moves up and down in a vertical plane, low cost
- **SCARA robots** (selective compliance articulated robot arm) , move freely but in a single geometrical plane
- **Articulated robots**, can move in horizontal and vertical planes



IN WHICH AREAS OF PHARMACY WE CAN USE ROBOTS?

- **In Packaging and processing**

- Can erase labour-intensive tasks
- Can produce large quantities of a product in a short space of time.

- **In drug development and discovery;** by this we can speedup the drug discovery processes.



- **In the laboratories**

- can produce efficient results with high precision and accuracy.



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- **To detect the Fraudulent medications**

- could also be useful in assisting pharmacies and drug companies in the identification of counterfeit medications.



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- **Robotic pharmacies**

➤ robotic dispensing can decrease errors in giving out incorrect medicines to the customers and can reduce the staff required in the pharmacy.



- **In manufacturing of devices**

• Devices such as syringes, inhalers, IV bags and diabetes testing kits are made with the help of robotics.

- **In Clean rooms** ; such as aseptic filling etc..



BENEFITS BEHIND THE USE OF ROBOTS

- **Accuracy**
- **Tirelessness**, perform a 96 man-hour project in 10 hours
- **Reliability**, can work 24x7
- **Return on investment (ROI)**: with the increase in quality and application speed, there are the benefits of increased production possibilities.
- **Speed**, work efficiently, without wasting movement or time.
- **Work continuously in any environment**

- **Production**
- **Safety:** Robots increase workplace safety, so they no longer have to perform dangerous applications in hazardous settings.
- ✘ A single robot can perform the functions of numerous pieces of equipment and therefore reduce the amount of space necessary to build a factory.
- **Reduced chances of contamination:** Removing people from the screening process reduces the potential for contamination.

CHALLENGES

- **Expense:** There is high initial cost of purchasing and using robots.
- **fears:** They pose any threat or danger to society, fears.
- Robotic systems are too complicated to use and require complex programming.
- **Expertise:** Employees will require training in programming and interacting with the new robotic equipment. This normally takes time and financial output.
- **Return on investment (ROI):** Incorporating industrial robots does not guarantee results. Without planning, companies can have difficulty achieving their goals.

CONCLUSION

- The changes and benefits robots that could provide the pharmaceutical industry are seemingly endless.
- From creating vast savings to increasing efficiency and safety it is the robots' speed, precision, reliability and flexibility that make them such valuable tools.
- Pharmaceutical industries are intently seeking ways to reduce their expenses, increase their efficiency, and make high quality products. Robots can help companies achieve these ends by providing speed, precision, repetability, and flexibility.