Industrial Training

at

Magbro Healthcare Pvt. Ltd.

Report submitted for the partial achievement of the degree of

MASTER OF SCIENCE

IN

BIOTECHNOLOGY

Submitted by

PALLAVI (197818)

Under the supervision of

Internship guide- Mrs. Rishpa Sharma

Administrative guide- Dr. Abhishek Choudhary

Department of bioinformatics and biotechnology

Jaypee University of Information Technology

Waknaghat, Solan (H.P)

February to May 2021

Declaration

I hereby declare that work presented in Industrial Training Performed at Magbro Healthcare Pvt. Ltd.

It is authentic record of work carried out by me during 08.02.2021 to 08.05.2021 at Magbro Healthcare Pvt. Ltd. Under the guidance of **Mrs. Rishpa Sharma** and the academic guide **Dr. Abhishek Choudhary** in department of biotechnology and bioinformatics.

PALLAVI

Place: Nalagarh

CERTIFICATE- I

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MHPL/2021-22 /03 **08 May 2021**

TO WHOM IT MAY CONCERN

This is to certify that Ms. Pallavi D/o Mr.Devender Singh Parihar Roll No-197818 student of M.Sc Biotechnology, Jaypee University of Information Technology Waknaghat Distt, Soaln (H.P) **has successfully completed her Industrial Training under the supervision of Miss. Rishpa Sharma, Manager Q.C./ Q.A. & Mr. Sanjay Gupta, Manager Production from 08.02.2021 to 08.05.2021 in this organization.**

We wish her all the best in her future endeavors.

For Magbro Healthcare Pvt. Ltd.

Authorized Signatory

MAGBRO HEALTHCARE PVT. LTD.
(A WHO, GMP & ISO 9001:2008 Certified Co.)
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CIN:-U24230 PB 2006 PTC 30212

CERTIFICATE – II

The report entitle **"Industrial training at Magbro Healthcare Pvt. Ltd."** submitted by PALLAVI (197818) to Jaypee University of Information Technology, Wakhnaghat, Solan (H.P.), in partial accomplishment for the honor of degree of Master of Science in Biotechnology In the department of Bioinformatics and Biotechnology has been accepted by the student's Research Guiding Committee after an oral examination of the same.

Name & Signatures of Research Guiding Committee Members

Head, Dept. of Bioinformatics & Biotechnology

Acknowledgement

First of all I am grateful to the department of biotechnology and bioinformatics of the **Jaypee university of information technology,** arranged the industrial training program for us. I also thank to the **Magbro Healthcare Pvt. Ltd.** for enlist me as an intern and creating such a magnificent environment for learn both soft and hard skills.

I would be very grateful to **Dr.Sudhir Syal** (Head of the department) and **Dr.Anil kant thakur** (program coordinator) for giving me opportunity undergo 3months project at **Magbro Healthcare Pvt. Ltd. Nalagarh .**

I convey my heartiest thanks to **Mrs. Rishpa Sharma** (QA & QC Manager) and **Mr.Sanjay Gupta** (production manager) for their most helpful suggestions, support and demonstrative supervision for the duration of this training. And I would be very thankful to all the staff members of **Magbro Healthcare Pvt. Ltd**.

And I would be very much likely to acknowledge my guide **Dr. Abhishek Choudhary** who gave all his possible effort to help us during this training and in completing this project work.

I would like to express my appreciation toward my parents and my friends for their kind collaboration and support which help me in finishing of this report .

Pallavi

CONTENTS

Objectives of training

- It is a practically leaning procedure in which person is capable to learn practically from his theoretical knowledge.
- Training provide practical knowledge to the students.
- Training promotes an environment in which students are induced to adapt themselves quickly to changed circumstances.
- Training puts the students in real life situation.
- Training removes the vacillation of the student about their working skill and personality improvement.
- Training develop skill and techniques directly application to their careers.
- Training fabricate a good communication skill with the group of workers and learn to proper behavior of co-operate life in industrial sector.
- Training enhances the capability to get better student's vision skills and giving out thoughts.
- Training also build the strength , teamwork spirit and self- confidence in students life.
- Training will increase a student's sense of responsibility and good work habits.
- The student's will be capable instilled with good ethical values such as responsibility, dedication and truthful through their training.

Introduction

Pharmaceutical industry is a **Life Saving Industry.** It provides the platform for the conversion of drugs in suitable doses form and medicinal articles, which have a significant role in treatment, mitigation, prevention and cure of various diseases.

A pharmaceutical manufacturing unit is a premise where a group of skilled & non skilled person work under the supervision of an experienced directorate so that efficient therapeutically effective least toxic formulation of the drugs may get prepared to serve the community in a sense to make it healthy and growing and hence to make this beautiful worlds persistent forever.

MAGBRO HEALTH CARE Pvt. Ltd. established in 2003. It is manufacturing company. WHO GMP certified pharmaceutical plant located in Nalagarh (Himachal Pradesh). This pharmaceutical industry manufacturing tablets, capsules, liquid orals and external ointments / lotions. And the manufacturing facility is approved by drug authorities of Shri Lanka, Cambodia, Philippines, Kenya, Nigeria, Ghana, Benin, Togo etc. They are regularly exporting their products to these countries and presently they have about 150 products registrations in these countries. Besides operating in the international market, they also offer a good range products for domestic marketing in India. It is one of the pharmaceutical manufacturing units which have owed to carry over the above responsibilities with complete awareness and honesty.

Nature of business- Manufacturer

Additional business- Trader

Company CEO- Mr. Sudhir Maingi

Annual turnover- 10 -25 crore

LOCATION- Situated in Village - Mehsa Tibba, P.O- Manjholi, Tehsil- Nalagarh & District- Solan (HP)

COPORATE OFFICE- Om Shanti Complex, 218, Industrial Area Ludhiana, Punjab-141003

Email: www.magbro.in

These are following few products of Magbro Healthcare:

- Muratac capsules(Rabeprazole sodium capsules)
- Cipmag tablets (Ciprofloxin tablets IP 500mg)

- Noswell –P tablets(Paracetamol diclofenac potassium & serretiopeptidase tablet)
- Espidase -5 tablets (serretiopeptidase tablets IP 5mg)
- Duotram tablets (Tramadol hydrochloride & paracetamol tablets)
- Aclosara- MR tablets (acrclofenac, paracetamol& chlorzoxazone tablets)
- Pregnamom tablets(Vitamins & minerals tablets)
- AZRA- suspension(A zithromycin oral suspension)
- Mrgesic gel (diclofenac , dieethylamine mehtyl salicycate , methanol, linseed oil gel)
- Redfol syrup (ferrous fumarate oral suspension BP)

Safety , Health and Environment (SHE)

MAGBRO HEALTHCARE has a clear safety policy and takes safety measures as importantly as production, cost and quality.

SHE Objectives:-

The safety and health of all employees is first priority. The only acceptable level of safety and performance is one that prevents injuries and accidents. The following objectives have been laid down in line with the above.

- Create and maintain a safe, injury free and accident free work place.
- Estimate and develop our practices, processes and products constantly to check all work correlated affliction and deathtrap.
- Create clean surroundings or environment acceptable to all employees, the customers and the public.

Safety rules :-

- No smoking is in the plants/factory.
- Rough housing of any type is prohibited in the factory.
- The employees shall have the adequate knowledge of the adverse effects (if any) of the chemicals being used by them.
- Proper protective equipments shall be provided to the employees and they shall be given training for the use of these equipments.
- Preventive maintenance and checks shall be made to avoid the probability of a failure or an accident.
- The speed limit of the vehicles inside the factory shall be 20kms/hr.

SHE Philosophy:-

- All injuries can be prevented.
- We all are answerable for preventing injury.
- Working safety is a provision of employment.
- Every operating revelation could be safe guarded.
- Prevention of the personal injuries is good business.

- Employee involvement is essential.
- Accidents don't happen but they are caused.
- Safety is everyone's responsibility.

Departments of Magbro healthcare:

Company have involve in the manufacturing of almost every segment of products having its self-regulating manufacturing sections which are controlled centrally air handling system. These following departments in Magbro Healthcare:

- Ware house
- Production department
- Packing department
- QC (Quality Control)
- QA (Quality Assurance)

Ware house:

Ware house is the place where industry receive the goods and store ordered goods. And it is responsible for incoming goods and releasing goods. It obtained the products then store the products and shared the stock products.

Premises

- It were well position, fine expand, neat, fresh and well secured enabling, good maintenance of raw material, packaging material and finish products.
- Temperature were maintained between 15-30 C.
- Humidity also set amid 35-60%.
- Regularly, checking the stocks.
- Maintained daily stock records.
- Ware house divided into different sections:
    - Raw material section
    - Packing material section
    - Finish good store

Raw material store:

Raw material store were further divided into following:

1. Quarantine area
    - Packing material area
    - RM (raw material) area
2. Excipients
3. API(active pharmaceutical ingredients)

4. Dispensing booth

- **Quarantine area:**

All over the raw material, apparatus, packing, and labeling materials were detained in quarantine area till they were sampled, tested and examined and liberated by the quality control laboratory. The samplewere performed according to specific trial through trained personnel.

Quarantine area are divided into two areas:

- Packing material area

In this area, packing material for different dosage forms are reserved under recommended and prohibited environment.

- Raw material area

In this area, raw material are reserve under regular circumstances. Active pharmaceutical ingredients are reserved under 15 -25 C. Excipients are reserved under 25 C in part of this area.

- **Stored materials:**

[1]. Preservatives

Methyl paraben sodium
Propyl paraben sodium
Benzoic acid
Sodium benzoate

[2]. Antimicrobials-

Boric acid

[3]. Antioxidants-

Sodium Metabisulphite
Citric acid
Sodium E.D.T.A.

[4]. Colorants-

FO8 Idacol FCF Supra	[sunset yellow]
Ponceau-4R	[pink]
Erythrosine supra	[red]
H.D. carmoisina supra	[red]

All the color should be used within 3 months of mfg.for best results

[5]. Isotonizing agents-

Sodium chloride
Potassium chloride

[6]. Diluents-

Lactose
Starch
Talcum
Dicalcium Phosphate

[7]. Sweeteners-

Saccharine
Refined sugar
Sorbital
Aspertame

[8]. Suspending agents-

Methyl cellulose
Carboxymethyl Cellulose
Hydroxymethyl Cellulose

[9]. Mineral drugs-

Ferrous ammonium citrate
Ferrous sulphate
Ferrous fumerate
Zinc sulphate
Calcium Gluconate
Calcium Pentothenate

[10]. Chemotherapeutic agents-

Amoxicillin
Cloxacillin
Metronidazole
Ciprofloxacin
Ofloxacin
Norfloxacin

[11]. Vitamins-

Vitamin-A
Vitamin-B_1
Vitamin-B_2
Folic acid
Vitamin-B_{12}
Vitamin-C
Vitamin-D_3
Vitamin-E

[12]. Other drugs-

Menthol

D-Panthenol
Ammonium chloride

[13]. Photosensitive materials-

Vitamin-B_{12}
Hydroxyprophyl methyl cellulose

[14]. Flavors-

Pineapple
Raspberry
Mixed fruits

All the above materials are stored in jars of sufficient size for convenient handling but their supplied stock are in large cylindrical cans of card board sealed by an open able aluminum strip lock.

Very expansive material like vitamin B12 and others are bought in small batches.

[15]. Capsule shells-

O size- 92 mg

[16]. Aluminium strips-

These are stored as printed and plane bundles/rolls that opened during stripping of capsules.

[17]. Containers for oral liquids-

It is stored in bottle section that is an accessory part of raw material section in which the washed bottle and non-washed bottled stored separately.

Different bottles stored are of the following volume capacities-

15 ml
30ml
60 ml
100 ml
150ml
170 ml
200 ml
300ml

Bottles of same size are stored in one poly bags.

Labeling of tested materials-

1. Name of company
2. Condition of material (tested/non tested)
3. Name of item
4. Batch number
5. Manufacturing date
6. Expiry date
7. Quantity received
8. Analytical report number
9. Released/ rejected
10. Signature of store in charge

- **Dispensing booth:**

  It is also present in raw material division where administration are perform beneath manufacturing order of a product at a time of dispensing for personnel's must be present there to verify the method of dispensing according to SOP.

Documentation in ware house

Documents done in ware house at different stages:

- Daily filled temperature and humidity record
- Filled dispensing log book
- Raw material analysis report
- COA (certificate of analysis)

Production department:

It is dedicated to produce best quality products, which can convince the requirements of both doctors and patients. Production team manufactures goods. These goods are cost-efficient by best utilize resources. This section is prepared with different equipments.
Before enter in production department follow these instructions:

- Wear cap
- Proper dress
- Shoes should be covered

In **Magbro healthcare** production department is divided into following sections:

- Tablet
- Capsule
- Oral liquid

Role of production department:

- Entire pharmaceutical industries stand on this department.
- Production department controlled to manufacture the different types of products
- Production department manufacture the tablets, capsules and liquid suspension.
- Manufacture section in company to create best quality medicines.

Tablet section:

Tablets are firm pharmaceutical dosage forms contain the drug material with or without appropriate diluents and equipped by also compression and molding methods.

Why we are Manufacturing Tablets?

- A unit dose from have greatest does precision and least content variability.
- Cost is lowest of all oral dosage forms.
- Lighter and cheaper to packaging or shipping of all oral amount forms.
- Manufactured goods categorization to potentially simplest or cheapest, requiring no extra processing steps when employing marked or monogrammed strike features.
- Grant furthermost relieve of swallowing with least affinity for HANG-UP above stomach, especially while coated, provides that tablet disintegration are not extremely fast.
- Have convinced particular liberate report products such as enteric or delay free products.
- Enhanced suitable to huge scale production then further unit oral forms.
- Most excellent collective properties of chemical, mechanical and microbiological permanence of all the oral forms.

Properties of Tablet Dosage form-

- Must be release therapeutic agents in the body in expected and reproducible protocol.
- Should have appropriate chemical constancy in excess of time so as not to allow modification over time.
- Must have the chemical and physical constancy to sustain its physical aspect over time.
- Strength with stand the rigors of mechanical shocks encountered on its production, packing, distribution or provision.
- Must be free of imperfection even as chips, cracks, discoloration or contamination.

Steps followed in tablet manufacturing:

- **Dispensing of raw material**

Tablet processing begins with administration of active pharmaceutical ingredients. Weighing and dispensing system start with a pharmacist receiving bill of materials for ingredients that create a procedure for a batch to be manufactured. Every material should be collected from the ware house. After that, it is confirmed since the proper material, weighing cautiously, then check once more, finally readed for addition in the recipe.

- **RMG (Rapid mixer granulator):**

It is used for mixing the ingredients and the granules before compression. Impeller and chopper are responsible for wet granulation in RMG.

- Produce precise blend.
- Break down of agglomerates very rapidly.
- Mechanical heat builds up with in powder and high power requirement drawbacks.

Capacity is 30-60kg. Horse power with shorter time interval given to reduce heat formulation.

- **Fluid bed dryer:**

Principle: In FBD hot air passes at high pressure throughout bottom of the container so as to contain granules should be desiccated. Now the solid bed looks like boiling liquid and called fluidized if hot air is used to fluidize the bed, drying of solid will take place very rapidly.

- Efficient heat & mass transfer.
- Dryer capacity is 30kg. and overage drying time is 30min. provide high aeration rates, so as to drying times are shorter than stagnant bed convection dryers.
- Heating time of thermo labile materials is minimized.
- Drying from individual particle and not from entire bed. Thus the most of drying would be stable while the falling rate is very short (when change of overheating is greatest).
- Temperature of FBD is uniform and controlled.
- Produce smooth product.
- Liberated faction of entity particles eradicates to the hazard of soluble materials as may happen in stagnant beds.
- Short drying times means that the unit has a high production since a petite base.
- Attrition due to turbulence, five particles become entrained and generation of charges of static electricity due to vigorous movement.

- **Multi mill:**

Multi mill is used for wet and dry granulation. It has force rotate blades having both knife and sharp edges with ratify screen size to diminish particle in controlled manner. Its mechanism is grinding and crushing the large particle into smaller particle.

- **Shifter :**

It is used for the shifting of materials in pharmaceuticals manufacturing through dissimilar appoint of sieves. Shifting is completed to eliminate bulge or increase the strength has formed on the materials after being stored a longer time and materials approved during engage so as to opens, which leads to well the material. Furthermore, eradicate the unwanted particles and detach material according to the size.

Types of shifter:

- One layer shifter
- Double layer shifter
- Triple layer shifter

- **Double cone Blender:**

It is used for mixing dry powder and granules. In pharma industry, blender used for mixing the active ingredients of a drug with excipients like starch, cellulose or lactose.

- **Tablet compression machine:**

Tablet compression machine that compresses the powder keen on tablets of regular size and weight. It makes tablets by pressing the granules in die with lower and upper puncher. Types of tablet compression machine present in Magbro Healthcare Pvt. Ltd:

Compression Machine-1(27 stations, Tooling-D)

- In MAGBRO HEALTH CARE Pvt. Ltd. One machine are present having 27 stations and it makes 48000 tablets per hours.

Compression Machine-2(37 stations, Tooling-B)

- In MAGBRO HEALTH CARE Pvt. Ltd. one machine are present having 37 stations and it makes 54000 tablets per hours.

/

Basic parts of machine:-

- Hopper for holding and feeding granulation to be compressed.
- Dies gives size and shape of the tablet.
- Upper and lower punches for compression of granules with in dies.
- Feeding methods for stirring granulation since hopper in to dies.
- Hydraulic pressure adjusters.
- Tablet machines output is effected by-
    1. Number of tooling sets
    2. Number of compression stations
    3. Rotation speed of the press
    4. Recompression stations are used to help in comprising difficulty.

- **Tablet Disintegration test apparatus:-**

  It is used to tablets breakdown into smaller particles and granules. This equipment consist of basket and paddle. Paddle and basket used according to USP, BP and IP. It has thermostatic arrangement for heating. It appropriate

temperature is 37 C . It is used for tablets disintegration according to USP , IP and BP.

Type of tablets	**Disintegration Time**
Uncoated tablet	**15 minutes**
Film coated tablet	**30 minutes**
Enteric coated tablet in HCL	**2 hours**
Enteric coated tablet in buffer	**1 hour**

- **Dissolution test apparatus:**

It is used on a usual basis in the quality control department. This process is used to observe the quality of the capsules and tablets that are twisted. A drug only go to the market if only it passes a dissolution test and is approved. In IP (Indian pharmacopoeia) apparatus 1 is Paddle and apparatus 2 is Basket. In USP (United states pharmacopoeia) and BP (British pharmacopoeia) apparatus 1 is Basket and apparatus 2 is Paddle.

Type of dissolution test using in Magbro Healthcare Pvt. Ltd.

- Basket type
- Paddle type

- **Basket :**

It consist of borosilicate glass. And its hold ability is up to 1000ml. The shape is semi-circular at the bottom whereas its duct as well finished through borosilicate glass. The shaft

holds the cylinder basket. It is generally referred since a rotary basket as it rotates easily and its rotating speed should be suggested in the USP. Generally its speed limit is 100 rpm. It is used for capsules or tablets, hovering dosage forms and a deferred liberate.

- **Paddle :**

This equipment especially completed and it comes with covered paddle that decrease the annoyance as of the moving. It has blade comes in contact with the base of the shaft. It also has a platinum wire so as to protects the capsules from hovering. The paddle reserved in the positioned that precise in the current USP. The rotation speed is 50 rpm for tablets while for suspension is 25rpm.

- **Leak test apparatus:**

Leak test apparatus is a solid state instrument for the drug leakage test. It is used to the quality of packing processes in strips, blisters and containing tablets, granulates and liquid. It is also used to check the seals enclosing the product.

- **Friability test:**

This test is also known as abrasion test. This test is performed to access the ability of the tablets to withstand wear and tear during transportation and handling. The instrument used for friability test is known as friability test apparatus.

Friability limit for tablet: 0.5 to 1 %

Uniformity of weight: All the tablets of a fastidious batch must be uniform in weight, if a small deviation in weight is there, that should fall inside the approved. Pharmacopoeia limits as follows:

i. **Tablets weighing 120 mg or less (+/- 10%)**
ii. **Tablets weighing 120-300 mg (+/- 7.5%)**
iii. **Tablets weighing more than 300 mg (+/- 5%)**

In the procedure for the determination of uniformity of weight, 20 tablets, selected at random are weighed. Then weighed individual tablet and determine the average weight of tablets.

Uniformity of contents:-The test for tablet is performed by assaying the particular drug, according to the Pharmacopoeia method. The variation in percentage of medicament per tablet is due to the following reasons:

1. **Variation in the weight of an individual tablets.**
2. **Purity of medicament.**
3. **During the process of granulation.**

The consequences acquired should be comply within the arranged percentage limits, given in particular Pharmacopoeia monograph.

Tablet coating machine:

It is an equipment that coats the outer surface of the tablets. Tablet coating, an additional step in the manufacturing process. The objectives of coating are:

(a) Tablet coating are mask tasting and odor mask.

(b) It gives physical and chemical defense to the medicine.

(c) It control the liberate of medicine from the dosage drug.

(d) It protects the medicine from the gastric atmosphere of the stomach.

(e) It improves the pharmaceutical sophistication by the use of special colors.

- **Types of tablet coating:**
  - Film coating
  - Enteric coating
- **Film coating:**

This coating is refers to the tablets by using mixture of film coating agents, like polyethylene glycol, **hydroxyl-propyl methyl cellulose**, carbowax, etc. These film coating agents are mixed in a volatile solvent and sprayed to the tablets rotating in a coating pan. This method is sustained until a regular good film is created over the tablets.

- **Enteric coating:**

The Enteric coating is given tablets to protect tablet from disintegration in the acidic medium in stomach but release the drug rapidly and completely when the tablet passes in the intestine or alkaline medium. The enteric coating process consists of water proofing tablets by coating with shellac in coating pan and then enteric coating material is added to the rotating tablet to form and enteric coat. The time of disintegration of enteric coated tablets is directly proportional to the thickness of coat. The thick coat means the disintegration is required in large intestine.

Put one tablet in all of six tubes of the basket and if the tablets are soluble exterior coating, submerge the basket in water at the room temperature for five minutes. Activate the equipment without adding the dices, using 0.1 N HCL while the fascination liquid maintained at 37^0 . At the end of two hours, remove assembly from the liquid NO tablet shows signs of

the shrivel breakdown, distant form fragments of coating, of cracks that will be allow the escape of the pleased. Then add a disc to each tube and operate the apparatus using mixed phosphate buffer p^{H-} 6.8 as the fascination liquid maintained at 37^0 +/- 2^0C. At the end of sixty minutes remove assembly from the liquid and observe the tablets.

Capsule section:

This section has three cabins with four semi automatic capsule filling machines, All cabins are fully centrally air conditioned with one entry & one exit.

Capsule is a solid dosage form in which the medicinal agent is dosed in the gelatin capsule.

Capsule is used for the oral administration of drug. Hard capsule are filled with the solid substance whereas soft capsule are filled with the liquid and semisolids.

Advantages:-

Capsules are flavorless, unscented. It could be simply administered. They are elegant in emergence.

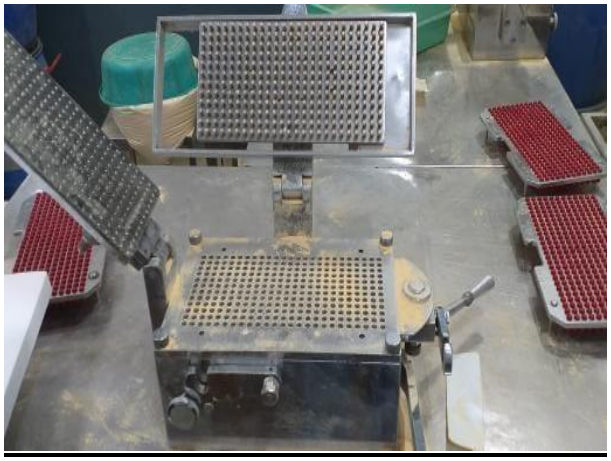
The medicine having repulsive odor and taste are enclosed in a flavorless case. They are easy to handle and carry.

Disadvantages:-

Hygroscopic drugs are not appropriate for fill the capsules. The determined solution which necessitate preceding dilution are incompatible for capsules because if administered as such lead to irritation in the stomach.

Capsule filling equipments:-

1.Capsule hand filling machine. (300 holes)



Working:- The capsule hand filling machine is made up of stainless steel. In this machine the empty capsules are filled in the loading tray which is the placed over the bed. The bodies of capsules are locked by using cam handle and caps are separated in the loading tray. The powder tray is filled with an accurate quantity of drug and spread the drug with a whisperer that load the bodies of capsules equally. The intemperance powder is collected on the stage of the fine particles. Lower the pin shield to press the powder in the bodies. After pressing, the pin plates in move up and remain the powder is filled keen on the bodies of the capsules. Force down the caps with the help of the shield with rubber top and activate the knob and unchain the cap and body of the capsules. The loading plate is removed and then the filled capsules are collected in a plate. With 200 holes machine, about 5000 capsules could be packed in one hour and with 300 holes, about 7500 capsule could be packed in one hour.

Polishing trays -

It consists of 4 compartments, the roof of which absent and is covered by canvas with some depression in each compartment. Capsules are polished here. In 1, 2 and 3 compartment they are rubbed over the canvas with furry towels so that all the particles adhered to the capsule get shed. In last compartment the towel is sprinkled with glycerin/paraffin that on rubbing over the capsule create a shining over them.

STEPS INVOLVE IN DURING PROCESS

Finishing-

The filled and sealed capsules necessitate a finishing operation before inspection or packing in strips 7 labeling; the following steps are involved in the finishing process.

Cloth dusting-

This is generally done manually in this process individual capsules are rubbed with cloths which could or could not be contain immobile.

Inspection-

This process is desirable to pickup imperfect and damage capsules. As yet inspection is manually.

Packing-

The finished product is allowed for packing most widely, they are packed either in strip packaging or in blister packaging.

Capsule Store at temperature not exceeding 30^0C and moisture content in capsule are 12 to 15%. This level should be maintain during storage. Storage during high and low humidity condition for extended period can cause deformation or become brittle. Capsule should be store in the areas with relative humidity is around 30 to 40 percents and also stored in cool and dry places.

Weight Variation in Capsule:- The weight limit less than 300 mg +/- 10%, weight greater than 300 mg +/- 7.5%.

Packing section:

A pharmaceutical packaging material are selected adequately to preserve the integrity of product material selected must have following factors:-

- They should not reactive with product.
- They should not convey the product taste or odor.
- They should be non toxic.
- They should be FDA approved.
- They should be temperature conflict necessity.
- They should guard the preparation from environmental circumstance.

➢ **PACKING SECTION**

Packing of tablets & capsules

Final product comes
in packing section

Packing with blister, strips,
aluminium foil strips
& jar packing

⇩

Packing into cartons with insert

⇩

Final packing in card
broad boxes.

Equipments used in packing section:

[A]. Blister packing machine-

The uncoated and coated tablets are packed in blister packing is performed by an automatic machine. Tablets are packed by machine between PVC and aluminium foil.

Machine has four basic units

1. Blister forming units
2. Batch coding units
3. Sealing units
4. Pack cutting units

[1]. Blister forming units

It is having detachable formation rollers any type of roller required as per size & shape of tablets/capsules to be packed, can be replaced in the unit. The unit is also provided with a heating rollers & vacuum system. The PVC film is heated by heating rollers & then sucked in to the cooled cavities of the formation roller by the vacuum system attached to the formation roller. These cavities formed in the PVC film are called blister & the process called blister formation.

[2]. Batch coding units

This part of the machine has a number of rollers and an inkpot and one of the rollers can be provided with number of rubber stereos for batch coding price, mfg. Date exp. Date on the aluminium foil.

[3]. Sealing units

This part has two rollers one folder and other sealing roller. When PVC film with blisters & aluminium foil are passed b/w these two, the sealant coating applied to the foil melt & stick on the PVC film & the tablets feeded in the blister are also got packed b/w the PVC film & aluminium foil.

[4]. Pack cutting units

This unit is provided with detachable cutters different types of cutter can be attached to the unit as per required of the pack size.

[B]. Strip packing machine

It is also a packing machine and used when a product is to be protected from moisture efficiently, strip packing is to be used. Most widely capsules and few tablets are main dosage form to be packed by this machine. Here the product is to be packed between two aluminium foils which are packed by polythene film. This machine has low heat sealing rollers, cutters batch coding rollers, hopper, vibrator etc. the maximum packing speed of this machine is 85 strips per second.

Oral liquid section:

They are the biphasic liquid dosages formulations comprising solids particles (the continuous phase or dispersion medium). Since measure form a suspension posses various attributes. A suspension allows the formulation of drugs that have a extremely low solubility in pharmaceutical suitable liquids.

In accumulation, a suspension in non aqueous solvent provides a valuable appearance of supervision for drugs so as to disgrace quickly in aqueous solution.

The enviable properties of a pharmaceutical suspension comprise.

- Pour ability and the simple elimination of quantity.
- Prepared to dispersion of a settled preparation.
- Clean silky manifestation.
- Conflict to microbial contamination.

- Suspensions are generally arranged to using diffusion techniques. Shear should be practical through the distribution method. This is frequently proficient on a huge range through using a colloidal crush.

Formulation:

[1]. Vehicle

Water, glycerin, alcohol, Sorbital, Propylene glycol etc.

[2]. Additives:

(A) Coloring agents- erythrosine, sunset yellow etc.

(B) Flavoring agents- pineapple, mixed fruit

(C) Sweetening agents - saccharin, aspartame etc.

(D) Preservatives- propyl paraben, methyl paraben, sodium benzoate, bronopol etc.

Equipments:

[1]. Sugar syrup tank-

This is a big size tank made by generally stainless steel and other suitable matter and used to dissolve sugar in water with or without application of heat and make a viscous sugar solution.

[2]. Batch preparation tank-

It is generally created of sophisticated stainless steel and it is generally covered to permit for heating or cooling of the substance.

This tank is big size tank with a stirrer rotated by a motor in which batch are prepared. Sugar solutions are made in sugar syrup tank and transfer in this tank and all active ingredients as per formula are mixed and stir properly. This tank is usually made up of 300 ltr.of capacity.

[3]. Homo colloid mill -

It is very important in formulation of suspension. It is used to reduce the particle size 5- 10 microns.

[4]. Filter press-

It is also an important machine used for filtration of liquid oral syrup. The multistage filtration makes the filtrate sparking clear. It is most versatile of filters since the no. & type

of filter sheets can be varied to suit a particular requirement. It can be used for course to fine filtrations and provides multistage filtration within a single press. The normal range of flow is three gallons per minutes per squire fit of filter surface at a pressure of up to 25 psi.
It is having two main components:

(A). Centrifugal pump & electric motor.

(B). Filter supporting frame work enclosed in a pressure tank, six filters are supported on six stainless steel support screen of eight diameter. The frame is bottled of the filter (woven) & adjusted in the pressure tank syrup holding tank is connected to the pump with pipe, operate the pump to push the liquid in to the liquid passes through the filters and come out being clear liquid.

[5]. Bottle washing machine-

This machine is used for washing of bottle which is operated by an electric motor. This machine is provided with 96 washing cavities used for washing of bottles.

[6]. Bottle inspection machine-

This machine is consisting of a tube light which is used for the inspection of empty bottle.

[8]. Semiautomatic volumetric filling machine-

This machine is used for filling the measured volume of liquids into the bottle. This machine is provided with a piston that attached to the other side with a tank. It is a double head or four head machine consists of two/four filling syrups.

Quality control department:

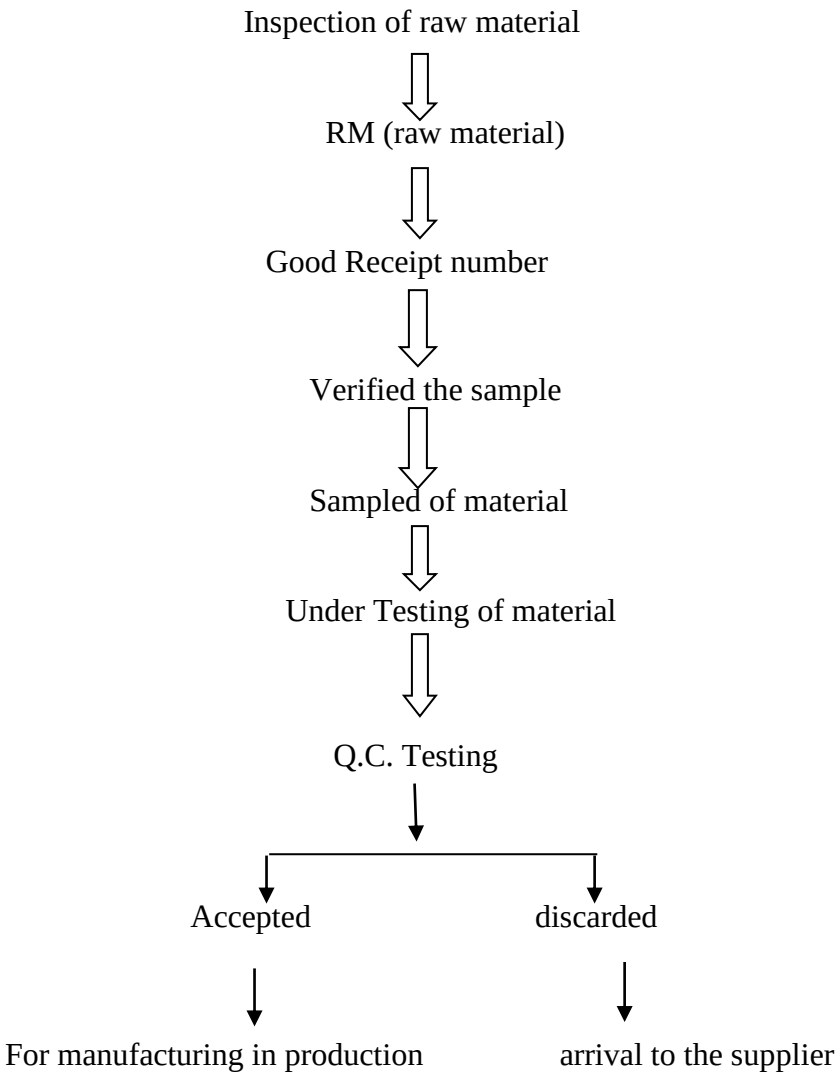
The quality control department shall have following principles and duties:

- Organize details the instruction in writing for moving out every test and analysis.
- Liberate or eliminate every batch of raw materials.
- If required then discharge and reject the semi finished products.
- To discharge and reject packaging and labeling materials and finishing the containers in which drugs to be packed.
- To discharge or reject every batch of finished goods to ready for delivery.
- To estimate the adequacy or constancy of finished goods and whenever essential of raw material and partially finished products.

- Evaluate the quantity or stability of finished goods and whenever required of raw material and semi finished products.

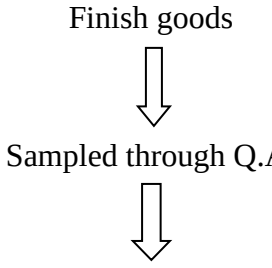
The perception of total quality control refers to the process of determined to produce a faultless product through a sequence of quantify requiring or prepared endeavor through the whole company to avoid or eliminated inaccuracy at each stage in production.

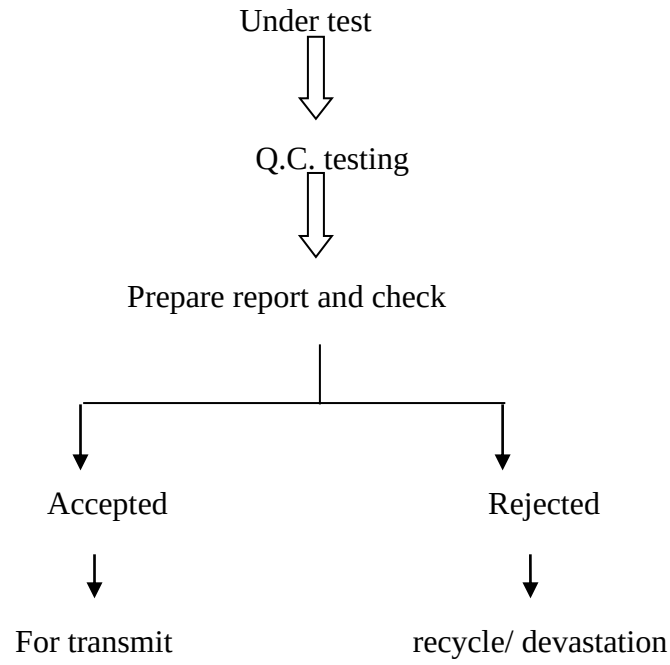
Raw material testing in QC:



Finish product inspection:

Finishing of batch





Instrument used in Quality control department:

Different types of instrument used in QC:

- **P^H meter**

The measurement of p^H is generally done with a suitable potentiometer known as the p^H meter. It has two electrodes one assemble with glass and sensitive to hydrogen ion activity and another one is calomel reference electrode. The determination is carried out a temperature of 25 ± 2^oC, unless & otherwise specified in individual monograph.

- **Melting point apparatus**

This apparatus is used for determination of melting range or temperature.

This apparatus is consist of a glass heating container of appropriate creation or capability.

- A suitable grade of liquid silicon for temperature up to 300^oC (this liquid is already placed in the XL-lab apparatus).
- Liquid paraffin for sufficiently high boiling range for temperature up to 250^oC.
- Glycerin for temperature up to 150^oC.

- **Ultra- violet & visible spectrophotometer**

This instrument is used to analyze the raw material and finished products for calculating its percentage purity.

Description

This instrument are based on the principle that when a radiation are passes from side to side layers of a solution containing and absorbing material, part of the radiation are absorbed, the intensity of radiation rising from the solution are less than the intensity of the radiation toward the inside it. This extent of assimilation are expresses in terms of the destruction and used in calculating the percentage purity of sample product.

This extinction based on the concern of the absorbing material in the solution and the thickness of the riveting layer taken for dimension, usually calculation purposes, the extermination of a one cm layer of 1% w/v solution is adopted in IP.

- **Dissolution apparatus (USP standards)**

This apparatus is used to estimate the dissolution rate of the tablets and capsules.

- **Disintegration test apparatus**

This apparatus is used to estimate the disintegration time of tablets and capsules.

- **Hardness tester**

Monsanto hardness tester is used to estimate the hardness of the tablets.

- **Friability test apparatus (USP standard)**

This instrument is used to estimate the friability of the compressed tablets.

- **Vernier caliper**

This instrument used to check the physical parameters of tablets like thickness, length, width, diameter etc.

- **Hot plate**

This is used for heating purpose.

- **Weighing balance machine**

This is used for weighing material.

- **HPLC(High performance liquid chromatography):**

It is used to separate the mixture of the components for the purpose to identify, quantify and purify the individual components of the mixture.

Principle:

HPLC principle based on adsorption and partition chromatography. It depends on the stationary phase. It is determine the qualitative and quantitative analysis.

Components of HPLC:
Columns:
It is place where the stationary phase placed in it. It is an analyzer. The separation of compounds take in the clolumn.
Pumps:
It produce suitable pressure to push the solvents into the sample.
Sample injector:
It is sample manager that flowing mobile phase in the column.
Detector:
It is needed to see the separated compounds from the HPLC column.

In Magbro healthcare they use two type of HPLC:

- Ezchrom site software(manual HPLC)
- Lab solution (automatic HPLC)

https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indiamart.com%2Fproddetail%2Fautomatic-hplc-system-22819786812.html&psig=AOvVaw12wa-9bJ24SyOyRFkQm5PF&ust=1621663929725000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCJiR0_6O2vACFQAAAAAdAAAAABAD

Quality assurance department:

The system of quality assurance shall accomplish manufacturing of pharmaceutical products insure that-

- The pharmaceutical products are intended or developed in a method that take report of necessities and good manufacturing practices (GMP) and further linked codes such as GCP and GLP.
- Sufficient preparations are completing for manufacturing and use of the accurate initial and packaging materials.

- Sufficient control on preliminary materials intermediary goods and bulkiness products and added in process control, calibrations, validation.
- The final product are correctly procedure and checked in accord with recognized procedure.
- Pharmaceutical products are not release for trade or supplied before person have certified that every production batch has been product and control in accord with necessities of the labels, claims and all other requirements applicable to the production control.

Quality assurance department is associated with fallowing responsibility

- **Raw materials**

Quality assurance should check the original contains of released raw material for cleanliness before they are taken to the production department.

The quality assurance personal is responsible for issuing of raw material which is used for the formulation of dosage form. He inspects the raw material and allows the order for the correct weighting of the raw material.

Mainly raw materials are weigh in an environmental manage weighing area, where these are transfer in less important containers that circulates only inside the manufacturing area.

- **Manufacturing apparatus**

QA personal should make sure so as to manufacturing apparatus is considered, situated and maintained so as to it facilitate through cleaning are appropriate for its deliberate utilize or minimizes probable for infectivity for the duration of manufacturing, manufacturing apparatus and utensils should be carefully hygienic or maintained in accord by specific written way, satisfactory proceedings of such measures and tests if appropriate shall be monitored through QA personal.

- **Quality assurance at start-up raw material processing**

It only released accurately labeled raw materials be allow in the processing part, depending upon the nature of the product. QC officer must checked or validate to the temperature and humidity in the area be inside the precise limits necessary in favor of the product, if the temperature and humidity are further than the particular limits, production chemist should be up to date and remedial action taken.

The specific procedure is to be check at every step within the method according toward write in process qualify assurance procedure. At convinced points, Samples are to be taken to the

quality control laboratory for strength examine and further testing so as to the essential to be ensured uniformly and purity.

- **Compounding**

At present GMP (good manufacturing practices) required to facilitate in process quality assurance be satisfactorily acknowledged during all the stages of industrialized for the duration of production run in process sample are removed and tested and data are recorded on unique forms as particular in the products in procedure monograph.

If deviation from specified limits occurs, the necessary corrective action are taken and tested to conclude whether the quality features to the manufactured goods is at present within limits.

- **Packing material control**

Quality assurance personal inspect and verify every packaging apparatus or equipments are intended for the wrapping operation to assurance it has the appropriate classification by using the parameter gram per square meter (GSM)

The evaluation of packing material by quality assurance personal the store person issued the requisition of packing material from store.

- **Finished product control**

The last testing of the finished product complete in QC lab. These tests are intended to conclude observance with specification. Therefore the testing of the finished product for conformity with predestined standards preceding to liberate of the product for packaging and ensuing allocation are significant factor for QA (quality assurance). This testing alongside with in process testing assures that every unit include quantity of drugs claimed on the marker, to the whole drug in every unit is obtainable for inclusive adsorption, so as to the drug are secure in the formulation in its exact last container finished method for its predictable shelf life.

- **Quality assurance during packaging operation**

QC laboratory analysis the product and accumulate with the specification. The quality assurance audits that developed operations are acceptable, the bulkiness product unconfined toward the packing section and production section are notified.

Quality assurance officer inspect the packaging lines and also check the filled and labeled containers for fulfillment with written specification.

Quality assurance shall be perform self inspection and finished preservation of samples. This preservation sample must be retained for one year behind the ending date. And it should be stored their package in under suitable conditions and with product labeling.

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Role of Q.A. in industry:

- Check the Temperature and humidity
- Documentation
- Prepare BMR and BPR
- Checking stability
- Check the daily records
- Testing of dispatch
- Purchaser comment and approval
- Checking of dispensing material
- In process control
- Prepare SOP
- Workers training
- Manage the validation
- Self –inspection and auditing

<u>Work done by me in industry:</u>

- **Volumetric solution- preparation and standardization**

0.05M EDTA (Disodium ethylenediamine tetra acetate)

Accurately weigh 18.6 g. of EDTA then dissolve in water to make 1000ml and store in polyethylene container.

Standardization:

- Weigh accurately 250 mg calcium carbonate. Transfer it in a 500ml conical flask and add 50ml water with gentle stirring to form slurry.
- Add 10ml 1M hydrochloride acid and shake well until it dissolve.
- Then add 15ml 1M sodium hydroxide solution with constant stirring.
- Add two to three drops of indicator hydroxyl naphthol blue.
- Prepared primary standard solution and titrate with 0.05M EDTA.
- Titrate it until the solution gives blue color.

Stability:

Re-standardization after 15days.

0.1M HCL (hydrochloride acid):

Take 100ml water in cleaned beaker then add 8.5ml concentrated HCL with continuous stirring. Add more 700 ml of water. Make up the volume 1000ml with water.

Standardization:

- Weigh accurately 150 mg anhydrous sodium carbonate.
- Dissolve in 100ml of water.
- Add 2 to 3 drops of indicator methyl red.
- Prepared solution titrate with 0.1M HCL to a pale yellow endpoint.

Stability:

Re-standardization, after 15 days.

1M NaOH:

Weigh accurately 40g sodium hydroxide and transfer in conical flask. Dissolve in water to make 1000ml .

Standardization:

- Weigh 5g potassium hydrogen phthalate.
- Dissolve in 75 ml water .
- Add few drops of phenolphthalein indicator.
- Prepared solution titrate with 1M NaOH to the produce permanent pink color.

Stability:

Re – standardization after 15 days.

0.1M Sodium thiosulphate

Take 100ml of water in 1000ml volumetric flask and add 25 gm of sodium thiosulphate. Then add 200mg sodium carbonate with continuous stirring. Make up the volume 100ml with water.

Standardization:

- Weigh accurately 200mg of potassium bromate.
- Dissolve in 250ml of distilled water in 500ml conical flask .
- Remove the 50ml solution from the flask.
- Then add 2g potassium iodide and add 3ml 2M HCL
- Add few drops of starch indicator.
- Prepared solution titrate with 0.1 m thiosulphate .
- Titration it until the blue color is discharged.
- And note the reading

Stability:

Re – standardization after 15 days.

0.1M Silver Nitrate:

take 100ml of water in cleaned conical flask and add 16.98g of silver nitrate with continuous stirring. Make up the volume 1000ml with water.

Standardization:

- Weigh accurately 100mg sodium chloride.
- Add 5ml of water and 5ml acetic acid.
- Then add 50ml methanol and add eosin solution indicator.
- Prepared solution titrate with 0.1 M silver nitrate

Stability:

Re – standardization after 15 days.

0.05 M Iodine:

Dissolve 14 g iodine in a 36 g of potassium iodide in 100ml of water. Then Add 3 drops of HCL and make up with 1000ml water.

Standardization:

- Accurately weigh 0.15 g of arsenic trioxide, dissolve in 20 ml of 1M NaOH.
- Diluted with 40 ml of water and then add 0.1 ml of methyl orange and add drop wise HCL until yellow color is change into pink.
- After that add 2g of sodium carbonate, dilute with 50ml of water.
- Add 3ml starch solution.
- Titrate with iodine solution until a permanent blue color produced.
- Note down the reading

Stability:

Re – standardization after15 days.

After standardization of primary standard solution we fill the primary standard solution record according to readings of titrations. We also fill the volumetric solution log books. We repeat the same procedure of preparation and standardization of volumetric solutions after 15 days and readings are vary in every standardization of volumetric solutions. There are one example of medicine we done in industry :

Example:

Calcium citrate malate (oracold tablet):

Reagent required:

1M HCL

0.05 EDTA

1M Sodium hydroxide solution

Hydroxy napthol blue

Procedure:

Accurately weighed 250mg of calcium citrate (bulk) and transfer it in conical flask. Then add 10ml of 1M HCL. Then heat it and cool at room temperature. After cooling, dilute with 50ml of water. And add 15ml of 1M sodium hydroxide. Then add few drops of hydroxyl napthol blue indicator. Titrate with 0.05M EDTA and titrate to be blue endpoint.

Calculation:

Weight= 250.3mg

Factor= 5.004(As per I.P.)

Formulation :

$$\frac{\text{Weight x molarity}}{\text{Sample reading x factor}}$$

$$\frac{250.3 \times 0.05}{48.4 \times 5.004}$$

= 0.05167M

Physical parameters of tablet and capsule:

Tablets:

We use vernier caliper for measures the physical parameters of tablets. Physical parameters such as thickness, diameter, width and length of the tablet. We check the appearance of the tablet.

Procedure:

We take 20 tablets and weighed of 20 tablets. Then average weight were determined. Tablets were weighed individually. Then we take maximum and minimum weight of the tablet . then determined the maximum and minimum percentage of tablets.

Formulation:

Average weight of tablet= total weight of 20 tablets / 20

$$\text{Maximum percentage} = \frac{\text{maximum wt. of tablet - average wt. of the tablet}}{\text{Average wt. of tablets}} * 100$$

$$\text{Minimum percentage} = \frac{\text{minimum wt. of tablet - average wt. of the tablet}}{} * 100$$

Average wt. of tablets

After, that we check the thickness, length, width and diameter of the tablet.

Thickness:

We using the vernier caliper for thickness. Take 10 tablets and measure the thickness of each tablets.

$$\frac{\text{Sum of all the thickness of the tablets}}{10} = \text{avg. of the thickness of tablets}$$

Length and width:

For elongated tablets, take 10 tablets measures the length and width of each tablets.

$$\frac{\text{Sum of all length of the tablets}}{10} = \text{avg. of the length of tablets}$$

Same formula used for width of the tablets.

Diameter:

For oval shape tablets, take 10 tablets measures the diameter of each tablets.

$$\frac{\text{Sum of all the diameter of the tablets}}{10} = \text{avg. of the diameter of tablets}$$

After that, we identify the tablet by their physical appearance like shape, size and color etc.

Fribility of the tablets:

It is used for only uncoated tablets.

As per I.P. standard weight of uncoated tablets are 6.5g.

We take tablets and weigh them then note the initial wt. of the tablet. Then put the tablets in friabilator. Then set the time is 4minutes for 100 rpm. After that we take tablets and weigh them then note the final weight of the tablets.

Formulation:

$$\frac{\text{Initial wt.} - \text{final wt.}}{\text{Initial wt.}} * 100$$

Capsules:

Firstly, we take 20 filled capsules and weighed of 20 filled capsules . Then average weight were determined. Capsules were weighed individually. Then we take maximum and minimum weight of the capsules. Then determined the maximum and minimum percentage of capsules. .

Formulation:

Average weight of filled capsules = total weight of 20 filled capsules / 20

$$\text{Maximum percentage} = \frac{\text{maximum wt. of filled capsules} - \text{average wt. of filled capsules}}{\text{Average wt. of filled capsules}} * 100$$

$$\text{Minimum percentage} = \frac{\text{minimum wt. of filled capsules} - \text{average wt. of filled capsules}}{\text{Average wt. of filled capsules}} * 100$$

After that, we take 20 empty capsules and weighed of 20 empty capsules . Then average weight were determined. Capsules were weighed individually. Then we take maximum and minimum weight of the empty capsules. Then determined the maximum and minimum percentage of tablets.

Formulation:

Average weight of empty capsules = total weight of 20 empty capsules / 20

$$\text{Maximum percentage} = \frac{\text{maximum wt. of empty capsules} - \text{average wt. of empty capsules}}{\text{Average wt. of empty capsules}} * 100$$

$$\text{Minimum percentage} = \frac{\text{minimum wt. of empty capsules} - \text{average wt. of empty capsules}}{\text{Average wt. of empty capsules}} * 100$$

Then identification of the capsule by their physical appearance like color of pellets and external color of capsules and size.

Dissolution test apparatus:

According to IP, BP and USP this apparatus used to different types of tablets and capsules testing.

For example:

We take semi finished tablets, then we check the drug releasing quality of that tablets. Some tablets are dissolve in HCL and some are dissolve in buffer according IP, BP and USP. The recommended volume of 900ml for basket and paddle.

Take 51 ml of HCL 6000ml of water then heat it. After that bowls are filled with 900ml dilute solution. Then temperature required 37C. Put on the tablets in every bowls then time and rpm set according to USP, IP and BP.

For buffer:

Adding the buffer in 7ltr. Water and adjust the pH. Then buffer put on the bowls and same proceeding as HCL.

UV spectroscopy:

After dissolution test, take a sample to the bowls and filter in test tubes. Then we check the absorbance of the sample and set wavelength according to USP, IP and BP.

HPLC (High performance liquid chromatography):

Mobile phase of the sample:

Meloxicam -15 tablet:

Solution A – weigh 2gm of dibasic ammonium phosphate then add in 1000ml of water. PH set on 7.0 with the help of orthophosphoric acid(OPA).

Solution B- take 65 ml methanol add in 100ml isopropyl alcohol.

MOBILE PHASE:

Solution A + solution B

630:370 for 1000ml

315: 185 for 500ml

Prepare standard :

Take 45 mg standard transfer it 50ml volumetric flask then add 1M NaOH . Add 100ml of methanol

Prepare sample:

Take 435 mg sample in volumetric flask then add 1M NaOH. Add 100 ml methanol. With the help of pipette take 5ml of sample make up it 25ml.

Formulation:

$$\frac{\text{Equivalent wt. X Average wt.}}{\text{Claim}}$$

According to USP set the flow rate, injection volume and wavelength .

Before 10 minutes, on the mobile phase.

CONCLUSION

I am postgraduate of the **Jaypee university of information technology** I want to say that this industrial training is an admirable prospect for us to the basic level knowledge of the things so as to we will never gain through going straight into the job. I am thankful to the Department of biotechnology and bioinformatics to give us this chance.

Industrial training is very essential. It is very useful to gain realistic knowledge. For the duration my training time, I obtained plenty of experience in QC and QA department. I also visit the production department and acquired knowledge about the manufacturing of tablets and capsules and other products. . I hope it will help me in future.

For the duration of my training period, I saw the various instruments in the industry. The instruments are highly sophisticated. We can acquire a lot of knowledge about the latest equipments and their working.

It was learned to us that the cGMP procedures are sternly following in industry and the every department of the industry.

Furthermore, the training were very interesting with lots of things to be learned. It helped us to gain knowledge on regularity, reliability in the industry. Hence, we can say that our purpose of attending the industrial training is fulfilled. We confess the great help of Magbro Healthcare Pvt. Ltd.

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