

Industrial Training

Report

Submitted in partial
fulfillment of the
requirements for the Degree
of Bachelor of Pharmacy, of
Dibrugarh University

Submitted by:
Bipul Deka
Roll No: 05
B. Pharm 4th Year



Dibrugarh University
Dibrugarh , Assam , India

OZONE
PHARMACEUTICALS LTD.

CERTIFICATE

This is to certify that Mr. Bipul Deka, a student of Deptt. of Pharmaceutical Sciences, Dibrugarh University has completed the compulsory Industrial Training (Four week) in the Ozone Pharmaceuticals Limited, Guwahati in India during winter vacation in the 4th year of four year integrated B Pharm Degree Course.

Place: Dibrugarh

Dated.....

(Prof. S. K. Ghosh)

Head of the Department

Deptt. of Pharmaceutical Sciences

Dibrugarh University

Dibrugarh-786004(Assam)

ACKNOWLEDGEMENT

I consider it a great privilege & honour to have had the opportunity to undergo the industrial training work in Ozone Pharmaceuticals Limited. Hence, I would like to offer my heartiest thanks to **D. Singh**, (GM, OPL) and Mrs. (HR Manager).

I am greatly indebted to Proff. S.K. Ghosh, HOD, Deptt. Of Pharm Sciences, D.U for enabling us to have the chance of industrial training and arranging such a nice arrangement.

I convey my heartiest thanks to U. Kalita (Production Manager), M. Rehman (Asst. Production Manager), A. Shakya (Manager, QC), L. Ahmed (Asst. Manager, QC), A.Bhoumik (Manager, QA), K. S. Yadav (Head, Maintenance Section) for their most valuable suggestions, constant encouragement, and affectionate guidance during the period of this training.

I owe deep gratitude to the chemists B. K. Borah, R. Changmai, A. Biswas, R. Kalita, and N. Rai for their support and guide to carry out the tasks assigned to us while we are in the training. At last, I am greatly thankful to all my seniors and colleagues in OPL for extending their constant cooperation which went a long way towards the completion of this Training and Report.

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PREFACE

Pharmacy is a profession which is concerned with the art and science of preparing suitable and convenient material for distribution and use in the treatment and prevention of disease, so it is a fully technical profession where practical knowledge is much more important along with theoretical knowledge.

According to curriculum of a four year integrated degree course of BACHELOR OF PHARMACY each student has to undergo practical training for a periods of four week in various pharmaceutical industries in India. As it is to be done during the winter vacation of 4th year B. Pharm.

I was directed to undergo the 4th year training at “OZONE PHARMACEUTICALS LIMITED” and this report contains a brief description of the above pharmaceutical industry which was observed during the training program.

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INTRODUCTION:



About Ozone:

Ozone came into existence in the year 1991, with the sole purpose of making 'Star class' products for people from all walks of life. 'Ozone', means the outer layer of the atmosphere which protects the earth from the Ultra Violet rays which can harm the entire human existence. The Ozone group has adapted the same ideology, promising to act as a protective shield against the harmful effects of Mother Nature and extend a 'healing touch'.

Why are They Called Ozone:

The Ozone layer Exists 20 km above the earth's surface, it acts as natural guard for ALL earth life. It guards life itself on the planet. The Ozone layer absorbs and shields the earth from the harmful ultra violet rays that may harm the existence. This thin layer of safety is essential for sustaining life on the planet. This is the reason why they have initiated their company's activities under the banner name Ozone.

Ozone Group of companies :

The Ozone Group is one of India's fast-emerging health, beauty and skin care products player in the market today. The Group came into existence with a Big bang in the year 1991 and with the journey of 20 years, the group has achieved many Landmarks and Milestones through addressing the Health, Beauty and skin Care needs of people in India and abroad through its group companies I e Ozone Pharmaceuticals Ltd and Ozone Ayurvedics. The organized skin care and research Institute (OSCAR Institute) caters as a Knowledge Hub for the group companies and looks after the Commercial lab facility for Pharmaceuticals, Ayurvedics and Food Processing Industry. In addition to this OSCAR would also undertake R&D in Pharma, Ayurvedics and Food industry in a big way.

In Ozone, Human resources are considered as our biggest assets and we take lots of initiatives and pride to coach and guide them to take higher responsibilities.

Mission:

To promote "Well Being" as Ozone way of life...Because "Life is Precious".

Vision:

To be a valued partner to all their associates to in their passionate pursuit of excellence and reach a turnover of Rs. 1000 Crores by the year 2015

Ozone Pharmaceuticals Limited:

Ozone Pharmaceutical is the 1st venture of the group; it was established in the year 1991. The Group aims to be among the top 50 companies in Pharmaceuticals business and having a consistent spot among the fastest growing companies. This company was incorporated with a keen desire and

aspiration to serve humanity through the finest quality medicaments. Today, it produces world class products manufactured at its own production facilities at Bahadurgarh, Baddi and Guwahati complying 'WHO GMP' standards and also has the distinction of receiving 'World Quality Commitment' award.

The Ozone Pharmaceuticals Ltd. comprises of three divisions namely:-

Proton - 'Extending a healing touch to the masses'. Proton is the biggest and the largest division in the group which caters primarily to orthopedic section.

Nucleus - Dedicated to Gynecologist segment with- "Woman First" as the theme. All the problems related to women are taken care of in this segment.

Cardiazone - Dedicated to The heart- 'Health and happiness' as the theme.

Ozone Mission

Ozone Mission is a charitable trust engaged in the rural development through need based and people advancement program with a motto that employment is a birth right and employment opportunities should be developed to let people live with dignity.

THE 3rd Manufacturing Unit at Amingaon, Guwahati (Assam) was launched in 2001.

PRODUCTION SECTION:

Tablet Components and Additives:

- A. Active Ingredients: ornidazole IP, Folic acid, pantoprazole sodium, tranexemic acid, azithromycin, cefixime, metformin, vitamin B₆, glimepiride, atorvastatin, voglibose, lactic acid bacillus etc.
- B. Non-active Ingredients: six major excipient categories:
- Diluents: lactose, starch, mannitol, Sorbitol
 - Binders: Acacia, Gelatin, Tragacanth, Calcium lactate trihydrate granular N. F., starch.
 - Lubricants: stearic acid, magnesium stearate, calcium stearate. and talc
 - Disintegrants: Starches are the most common disintegrating agents
 - Colors: D&C and FD&C dyes and lakes, and
 - Flavors and Sweeteners: mannitol, lactose, sucrose, saccharin and dextrose

Unit Operations

There are three methods of preparing tablet granulations. These are

- Wet granulation,
- Dry granulation (also called "slugging"), and
- Direct compression.

Each of these methods has its advantages and disadvantages. The first two steps of milling and mixing of the ingredients of the formulation are identical, but thereafter the processes differ, Each individual operation of the process is known as a unit operation.

Steps in Different Methods of Tablet Manufacture (Unit Operations)

Wet granulation

1. Milling of drugs and excipients
2. Mixing of milled powders
3. Preparation of binder solution
4. Mixing binder solution with powder mixture to form wet mass
5. Coarse screening of wet mass using 6- to 12- mesh
6. Drying moist granules
7. Screening dry granules with lubricant and disintegrants
8. Mixing screened granules with lubricant and disintegrants
9. Tablet compression

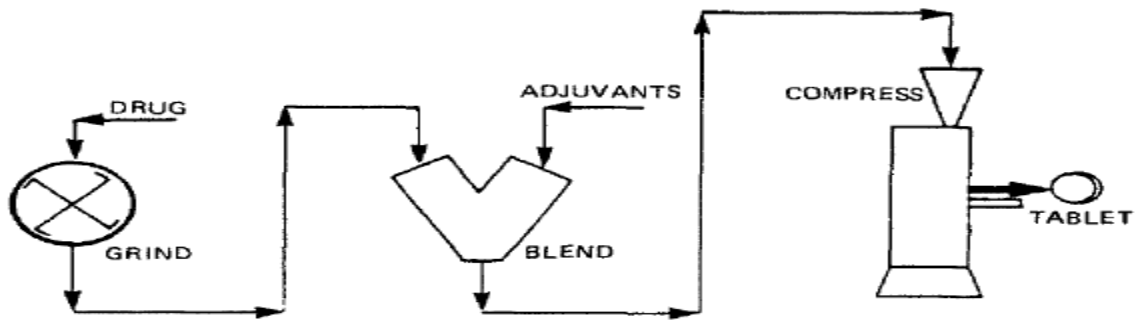
Dry granulation

1. Milling of drugs and excipients
2. Mixing of milled powders
3. Compression into large, hard tablets called slugs
4. Screening of slugs
5. Mixing with lubricant and disintegrating agent
6. Tablet compression

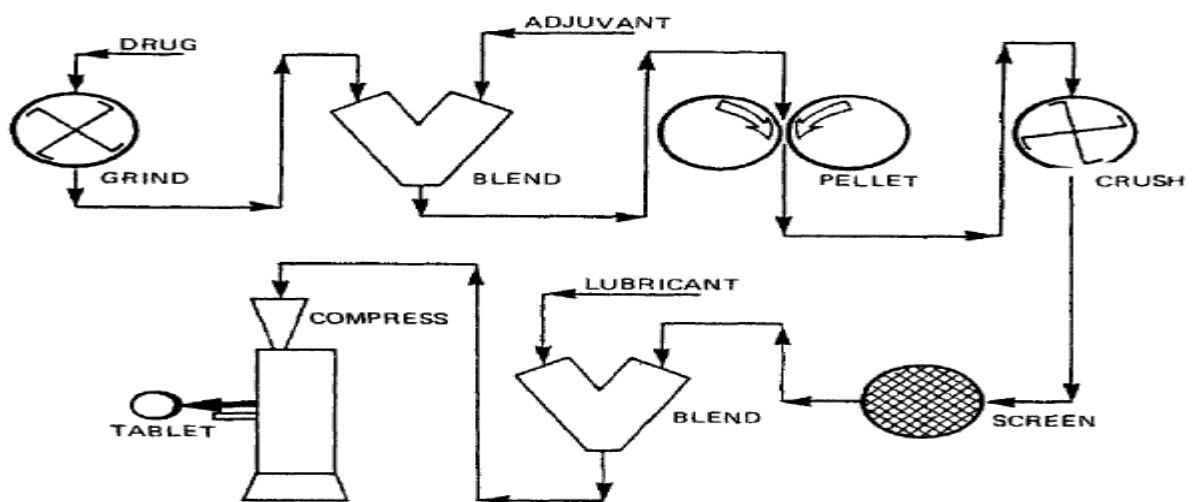
Direct compression

1. Milling of drugs and excipients
2. Mixing of ingredients
3. Tablet compression

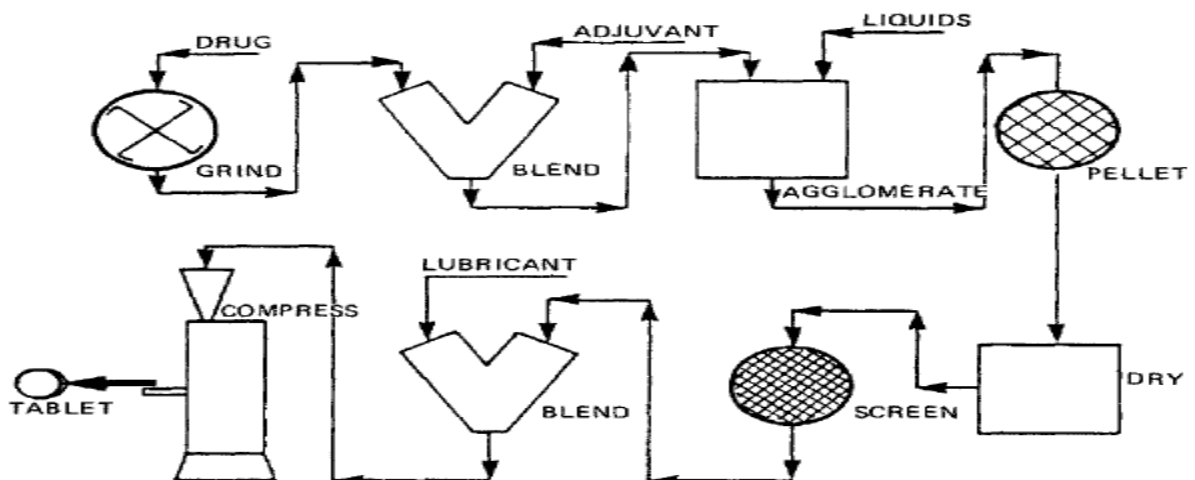
1. Direct Compression Process:



2. Dry Granulation Process:



3. Wet Granulation Process:



EQUIPMENTS:

1. Sifter:

An instrument used to sieve the ingredients of a tablet with a replaceable mesh ware. In this technique, particles of powder mass are placed on a screen made of uniform aperture. The sifter is attached with a vibrator that helps in sieving the materials through the meshwork. The mechanism of action is to loosen the packing of the particle in contact with screen surface, permitting entrapped sub sieve particles to the screen surface.

2. Planetary Mixer:

For wet granulation a planetary mixer is used. Solutions of the binding agent are added to the mixed powders with stirring. The powder mass is wetted with the binding solution until the mass has the consistency of damp snow. The planetary mixer can mix a material of 100kg. The beater of the planetary mixer revolves 2-4 times for each revolution of the head, providing double mixing action.

3. Mass Mixer:

This is also mixing equipment used to mix dry as well as wet ingredients. The mixer has blades that are alternately arranged and it allows uniform mixing. The mass mixer is emptied by inverting it and scraping off its ingredients. The planetary mixer can mix a material of 100kg.

4. Multi-mill:

This is a hammer mill that uses a high speed rotor to which a number of swinging hammers are fixed. The unit is enclosed with a chamber containing a grid or removable screen through which the material can pass. The material is fed from the top and ground by impact of hammers or against the plates around the periphery of the casing. The materials are enough to pass through the screen that forms the lower portion of the chamber. The fragments are swept downward against the screen where they undergo additional hammering action until they are reduced to a size small enough to pass through the openings and out. Oversize particles are hurled upwards into the chamber where they also undergo further blows by the revolving hammers.

5. Fluidized bed dryer:

In a fluidized bed dryer, the fluidized air stream is introduced by a fan or blower mounted at the top of the apparatus. The air is heated to the required temperature in an air heater and flows upwards through the wet materials, which remain in a drying chamber fitted with a wire mesh supported at the bottom. By this process, the material is suspended and agitated in a warm air stream while the granulation is maintained in motion.

6. Tray dryer

It consists of a chamber, containing horizontal arrangements of trays on which granules are dried. The drying process is accomplished by a gust of hot air driven by a blower through an electric heater and heat exchange. In this method, the wet materials are placed over paper sheets and finally placed over the trays and the drying operation is carried out. These dryers are mainly useful for materials that contain alcoholic solutions and where slow drying for better granule characteristic is necessary.

7. Compressor:

For increased production, Rotary machines offer a great advantage. A head carrying a number of sets of punches and dies revolves continuously while the tablet granulation runs from the hopper, through a feed frame and into the dies placed in a large, steel plate revolving under it.

This method promotes a uniform fill of the die and therefore an accurate weight for the tablet. Compression takes place as the upper and the lower punches passes between a pair of rollers. This action produce a slow squeezing effect on the material in the die cavity from the top and bottom and so gives a chance for the entrapped air to escape. The lower punch lifts up and ejects the tablet. The punches and dies can be removed for inspection, cleaning and inserting different sets to produce a great variety of shapes and sizes.

Tablet presses

The basic unit of any tablet press is a set of tooling consisting of two punches and a die which is called a station. The die determines the diameter or shape of the tablet; the punches, upper and lower, come together in the die that contains the tablet formulation to form a tablet. There are two types of presses: single-punch and rotary punch. The single-punch press has a single station of one die and two punches, and is capable of producing from 40 to 120 tablets per minute depending on the size of the tablet. It is largely used in the early stages of tablet formulation development. The rotary press has a multiplicity of stations arranged on a rotating table in which the dies are fed the formulation producing tablets at production rates of from a few to many thousands per minute. There are numerous models of presses manufactured by a number of companies, ranging in size, speed, and capacity.

Tablet presses consist of:

- 1) Hoppers, usually one or two, for storing and feeding the formulation to be pressed
 - 2) Feed frame(s) for distributing the formulation to the dies
 - 3) Dies for controlling the size and shape of the tablet
 - 4) Punches for compacting the formulation into tablets
 - 5) Cams (on rotary presses) that act as tracks to guide the moving punches
- All other parts of the press are designed to control the operation of the above parts.

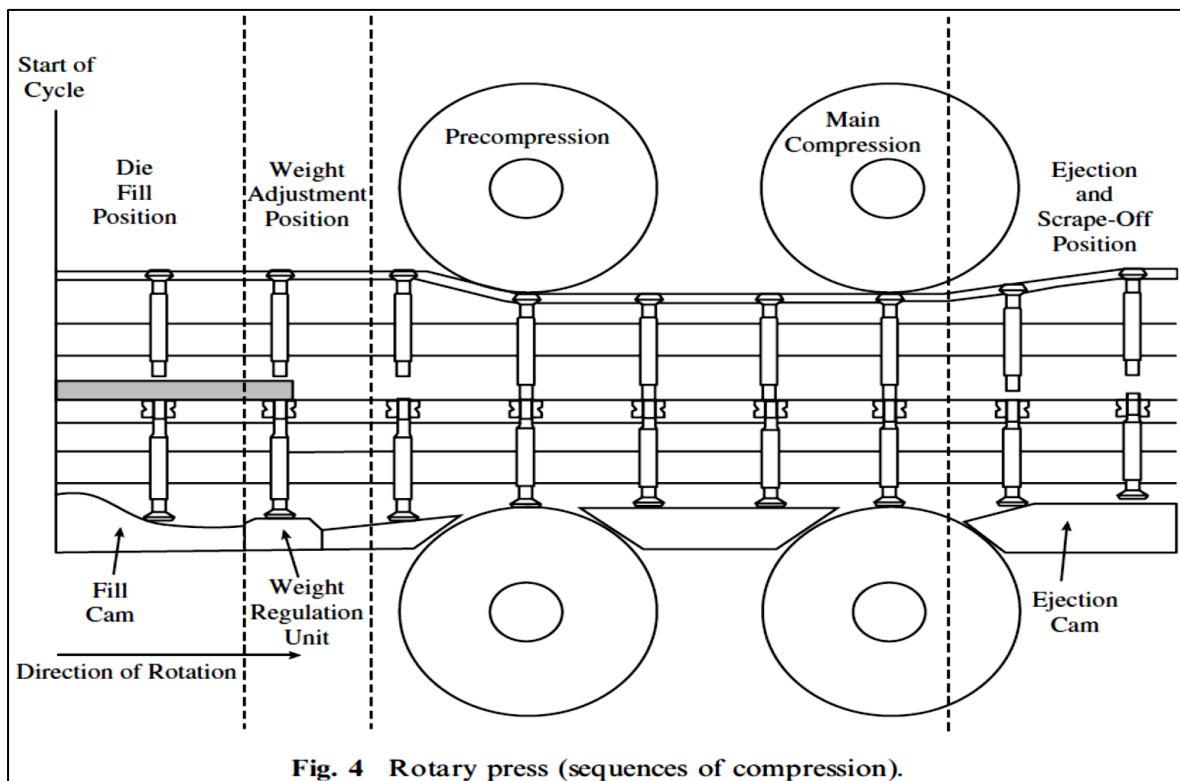


Fig. 4 Rotary press (sequences of compression).

Coating

Tablets may be coated for a variety of reasons, including protection of the ingredients from air, moisture, or light. Tablets are also coated to protect the drug against decomposition or to disguise or minimize the unpleasant taste of certain medicaments. Coating also enhances the appearance of tablets and makes them more readily identifiable. In addition, coatings can be resistant to gastric juices but readily dissolve in the small intestine. These enteric coatings can protect drugs against decomposition in the acid environment of the stomach.

a. Sugar Coating

The sugarcoating process involves building up layers of coating material on the tablet cores as they are tumbled in a revolving pan (Figure 10.7) by repetitively applying a coating solution or suspension and drying off the solvent. Before sugarcoating, the core is coated with a sealing coat of shellac, PVP*-stabilized types of shellac, or other polymeric materials, such as cellulose acetate phthalate and polyvinyl acetate phthalate. The next stage is to build up a subcoat that will provide a good bridge between the main coating and the sealed core, as well as round off any sharp corners. This step is followed by smoothing or grossing.

The finishing stage is accomplished by again applying one or two layers of clear syrup. The tablets are then left for several hours before being transferred to the polishing pan. The polish is a dilute wax solution (e.g., carnauba or beeswax in petroleum spirit) applied sparingly until a high luster is produced.

b. Film Coating

Film coating has increased in popularity for various reasons. The film process is simpler and, therefore, easier to automate. It is also faster than sugarcoating, since weight gains of only 2 to 6% are involved, as opposed to more than 50% with sugarcoating. Two major groups of film coating materials may be distinguished: (a) those that are nonenteric and, for the most part, cellulose derivatives, and (b) those that can provide an enteric effect and are commonly esters of phthalic acid. Films may contain a plasticizer that prevents the film from becoming brittle with consequent risk of chipping. Until recently, alcohols, esters, chlorinated hydrocarbons, and ketones have been among the most frequently used types of solvents. However, because of increasing regulatory pressures against undesirable solvents, there has been a pronounced trend toward aqueous film coating.

c. Modified-Release Coatings

A coating may be applied to a tablet to modify the release pattern of the active ingredient. Two general categories, enteric coating and controlled-release coating, are distinguished. The former are insoluble in the low pH environment of the stomach but dissolve readily in the small intestine with its elevated pH. They are used to minimize irritation of the gastric mucosa by certain drugs and to protect others that are degraded by gastric juices.

PACKAGING AND LABELLING OF TABLETS:

Packaging and Labeling of tablets are done in Packaging and Labeling area. In this area concurrently three actions i.e. visual checking for contaminant or deformity, Labeling and Packing are taking place. This room is fitted with air-conditioners and a temperature of about 27°C is maintained. This area has a inspection table where deformity and contamination are checked against black and white background. The minimum luminosity required in the inspection zone is 500lacs. The inspection table is fitted with stainless steel conveyors. The equipment is attached with a motor of 1 H.P. and a reduction gear box with adjustable pulley.

Types of Packaging:

1. Blister Packing:

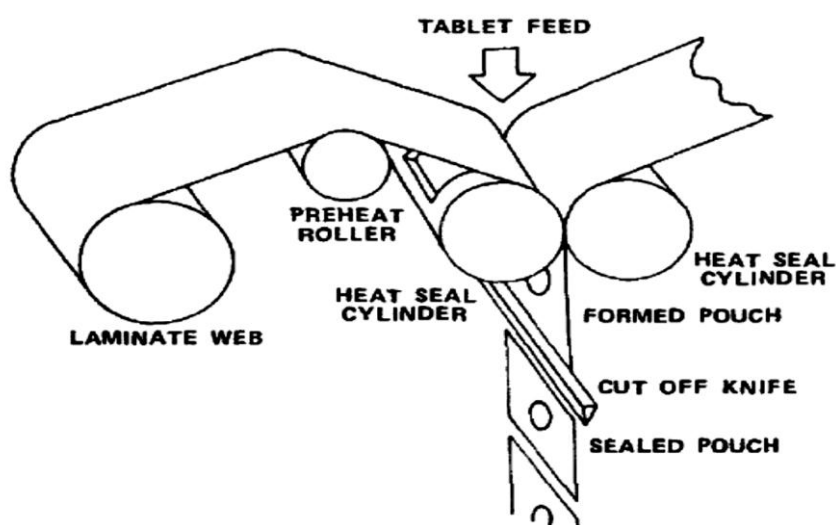
This is useful for packaging of unit dose of pharmaceuticals. This packing mode has been used extensively for several good reasons. It is a packaging configuration capable of providing excellent environmental protection, coupled with an aesthetically pleasing and efficacious appearance. It also provides user functionality in terms of convenience, child resistance and now temperature resistance.

The blister package is formed by heat softening a sheet of thermoplastic resin and vacuum drawing the softened sheets of plastic into a contoured mould. After coming, the sheet is released from the mould and proceeds to the filling station of the packaging machine. The semi-rigid blister previously formed, is filled with the product and lidded with a heat sealable backing material. The backing material can be either a push through or peelable type. For a push through type of blister, the backing material is usually heat seal coated aluminum foil.



2. Strip Packing:

The strip packing is done by aluminum foil or glassine poly paper. A strip package is formed by feeding two webs of a heat sealable flexible film through either a heated crimping roller or a heated reciprocating platen. The product is dropped into the pocket formed prior to forming the final set of seals. A continuous set of packets is formed, generally several packets wide depending on the packaging machine's limitations. The strip of packets is cut to the desired number of packets in length. The strips formed are usually collected and packed into a folding carton. The product sealed between the two sheets of film usually has a seal around each tablet, with perforations usually separating adjacent packets.



The packaging of the final product is done in paper cartons, manually, and is finally sealed using an automatic sealer. The machine can seal cartons.

Ointments:

Ointments are semi-solid preparations meant for external application to the skin or mucous membrane. They usually contain a medicament or medicament dissolved, suspended or emulsified in an ointment base. The ointments are mainly used as protective or emollient for the skin. Medicated ointments are semi-solid preparations intended for application to skin or mucous membranes. Non-medicated ointments are used as protectants, lubricants, and emollients.

Ointment bases used for ointment preparation are of four types:

1. Hydrocarbon bases,
2. Absorption bases,
3. Water-removable bases, and
4. Water-soluble bases.

Hydrocarbon bases have emollient properties and are effective as occlusive dressings (e.g., Petrolatum, USP). Absorption bases permit the incorporation of aqueous solutions to form w/o emulsions (e.g., hydrophilic petrolatum and lanolin). Water-removable bases are also o/w

emulsions and are water washable (e.g., hydrophilic ointment). Water-soluble bases have no oleaginous component and are referred to as greaseless water-washable bases (e.g., polyethylene glycol ointment).

Preparation of ointments

The ointment can be prepared by any one of the following methods-

- ❖ Trituration method
- ❖ Fusion method
- ❖ Chemical reaction method
- ❖ Emulsification method

Additives used in ointments

During the dispensing of ointments, the preservatives, antioxidants, chelating agents and perfumes may be incorporated with the ointment base along with medicaments. Methyl paraben or propyl paraben may be incorporated as preservative to prevent the microbial growth in ointment during its storage for a long period. To prevent the loss of moisture from the preparation, the humectants such as, glycerin, propylene glycol or sorbitol may be added.

Ointments are dispensed in glass or plastic jars having screw caps with impermeable liners. Nowadays ointments are generally supplied in plastic or metallic collapsible tubes.

The ointment should be stored in a well closed container so as to prevent the loss of volatile constituents. The ointments should be placed in a cool place. A secondary label "For external use only" should be fixed on the container.

Capsule Section:

Capsule is the most versatile of all dosage forms. Capsules are solid dosage forms in which one or more medicinal and inert ingredients are enclosed in a small shell or container usually made of gelatin.

There are two types of capsules, "hard" and "soft". The hard capsule is also called "two piece" as it consists of two pieces in the form of small cylinders closed at one end, the shorter piece is called the "cap" which fits over the open end of the longer piece, called the "body". The soft gelatin capsule is also called as "one piece". Capsules are available in many sizes to provide dosing flexibility. Unpleasant drug tastes and odors can be masked by the tasteless gelatin shell. The administration of liquid and solid drugs enclosed in hard gelatin capsules is one of the most frequently utilized dosage forms.

Industrial filling of hard gelatin capsules:

- a) Removal of caps
 - b) Filling of the bodies,
 - c) Replacement of caps, and
 - d) Ejection of filled capsules
-
- Capsules are delivered into the perforated capsule filling ring. The ring is rotated on a turntable, and a vacuum pulls the bodies into the lower half of the ring, leaving the caps in the upper half of the ring.
 - The top & bottom halves of the filling ring are separated manually, and the cap half of the ring is set aside.
 - The body half of the ring is then moved to another turntable where it is rotated mechanically under a powder hopper.
 - The hopper contains an auger which feeds the powder into the bodies.
 - When the capsule bodies are filled, the cap and body rings are rejoined.

Specifications of the Capsule Filling Machines

Output	5000 to 6000 capsules per hour.
Capsule Combinations	Size 00/0, Size 0/1/2, Size 3/4 and Size 5.
Machine Dimensions	395 X 240 X 500 MM
Machine Weight	45 KG
Shipping Dimensions	533 X 400 X 609 MM
Shipping Weight	70 KG

FEW PRODUCTS OF OPL AND THEIR COMPOSITION:

1) D.F.O.Gel

Composition:

OleumLini(containing predominantly α -Linolenic Acid)	B.P	3.0 % w/w
Diclofenac Diethylammonium Salt (Equivalent to Diclofenac Sodium I.P. 1.0 % w/w)		1.16%w/w
Methyl Salicylate I.P.		10.0% w/w
Menthol I.P.		5.0 % w/w
Benzyl Alcohol I.P. (As preservative)		1.0 % w/w
Gel Base		q.s.

2) Osil Cream

Composition:

Calcium Dobesilate Monohydrate BP (equivalent to Anhydrous Calcium Dobesilate)	0.5% w/w
Hydrocortisone Acetate IP	0.25 % w/w
Lignocaine Hydrochloride I.P. (equivalent to Anhydrous Lignocaine)	3.0%w/w
Aloe Vera Gel	5 % w/w
Allantoin USP	0.5 % w/w
In a rose essence cream base	q.s.

3) Cynocal(Tablets)

COMPOSITION: Each film coated tablet contains

Vit.B ₁ (As Mononitrate)	I.P. 10 mg
Vit.B ₆ I.P.	3 mg
Vit.B ₁₂ I.P.	15 mcg
Calcium Pantothenate I.P.	50 mg
(Appropriate overages added)	

4) Tranostat MF Tablets

COMPOSITION: Each film coated tablet contains

Tranexamic Acid B.P.	500 mg
Mefenamic Acid I.P.	250 mg
Excipients	q.s.

5) MuvUP-MR Tablets

COMPOSITION:Each film coated tablet contains

Aceclofenac I.P.	100 mg
Paracetamol I.P.	500 mg
Chlorzoxazone USP	500 mg
Excipients	q.s.

6) Dizone Tablets

COMPOSITION: Each uncoated tablet contains

Disulfiram I.P.	250 mg
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7) Norzole-TZ

COMPOSITION: Each uncoated tablet contains

Norfloxacin I.P.	400 mg
Trinidazole I.P.	600 mg

8) Cynocal-16 Injection

COMPOSITION:

Vit.B ₁ I.P.	100 mg
Vit.B ₆ I.P.	100 mg
Vit.B ₁₂ I.P	1000mcg
D-Panthenol I.P.	50 mg
Phenol(preservative) I.P.	0.5% w/v
Water For Injection I.P	q.s.
(Appropriate overages added)	

Injectable Section:

Instruments:

- 1) 8 Head Ampoule Washing Machine
Model No: PEPL/AMW8
Capacity: 120 amp/min
- 2) Sterilizing Tunnel
Model No: PEPL/ST 300
Capacity: 120-140 amp/min
- 3) Hinged door Autoclave
Model No: IGPE-685/04
Capacity: 600 ltrs.
- 4) Pressure Vessel (Manufacturing Vessel)
- 5) Ampoule Labeling Section
Model No: VSC-HS150
Capacity: 150 label/min
- 6) Petals Ampoule Inspection Machine
Model No: PA112
Capacity: 6 Head

Different Classes of Injection Section:

- Corridor: Class 10,000
- Decartoning Room: Class 1, 00,000
- Air Lock: Class 10,000
- Washing Area: Class 1, 00,000
- Solution Preparation: Class 10,000
- Quarantine: Class 1, 00,000
- Visual Inspection Area: Class 10,000

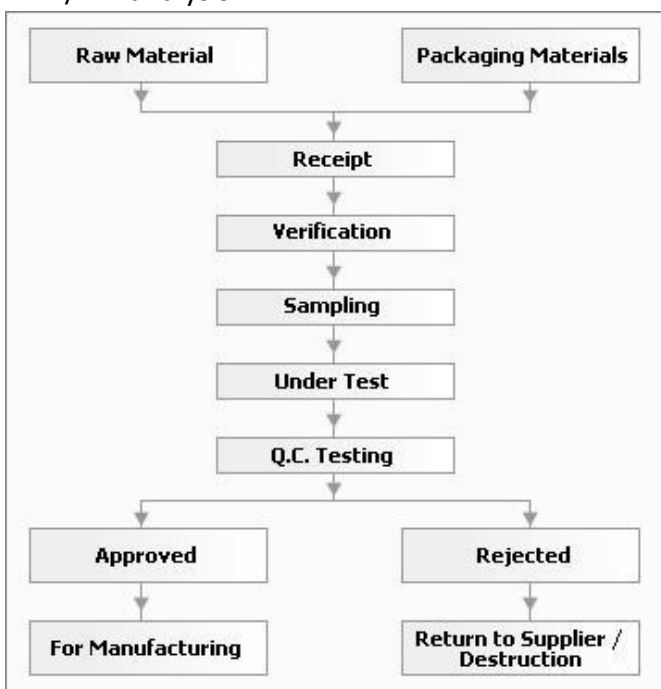
QUALITY CONTROL SECTION:

Quality control is the part of GMP concerned with sampling, specification and testing and with organization; documentation and release procedures which ensure that necessary and relevant tests are carried out and that materials are not released for sale or supply, until their quality has been judged satisfactory.

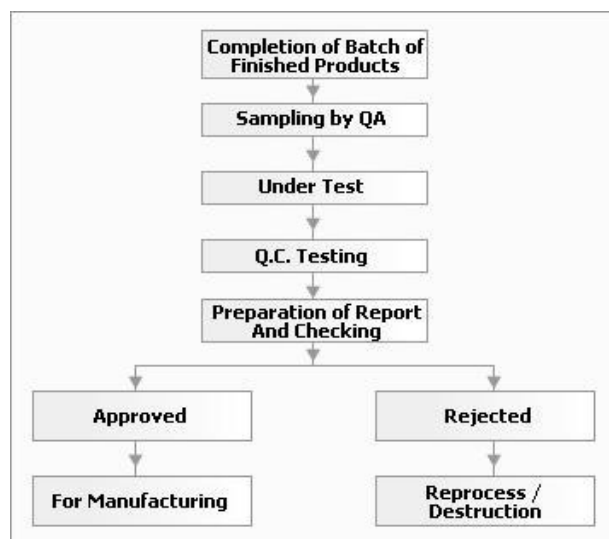
Quality Control (QC) laboratory, ensures that the products are pure, safe and effective and are released only after thorough analysis as per stringent specifications, methods and procedures developed according to international guidelines viz. EU cGMP, MHRA, WHO, TGA, etc.

The QC department performs following activities:

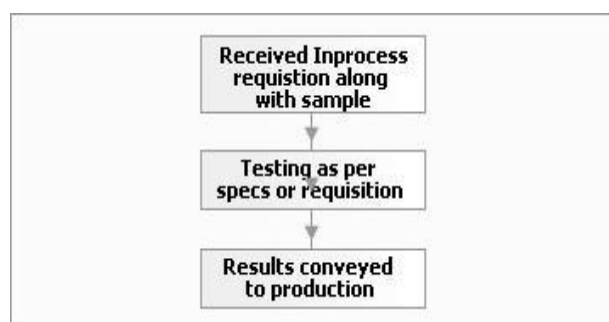
RM/PM analysis



Finished Products analysis



In-process Checks



The quality control section performs different control measure and test procedures to verify the product and material quality. The tests are performed by the QC personnel and the results are matched with a reference standard.

Quality control is an essential operation of the pharmaceutical industry. Drugs must be marketed as safe and therapeutically active formulations whose performance is consistent and predictable. New and better medicinal agents are being produced at an accelerated rate. At the same time more exacting and sophisticated analytical methods are being developed for their evaluation. Requirements

governing the quality control of pharmaceuticals in accordance with the Canadian Food and Drugs Act are cited and discussed.

Different types of test are performed for different material. The types of test performed for each material are as follows-

1. Testing Purified water
2. Testing Water for Injection
3. Testing Uniformity of Weight of Tablets
4. Disintegration Test
5. Dissolution Test
6. In Process Quality Control
7. HPLC – An Introduction
8. Assay of different tablet.

Testing Purified Water

Physical properties: Clear, colorless liquid, odorless, tasteless.

Production: This is produced by distillation - ion exchange - from potable water which complies with all relevant statutory regulations.

Tests:

Reference: I.P. 2007, Page no. 1870.

Acidity or alkalinity:

- 1) To 10 ml freshly boiled and cooled purified water under test in borosilicate glass flask, add 0.05 ml of *methy l red* solution. The test is passed if the resulting solution not red.
- 2) To 10 ml freshly boiled and cooled purified water under test in borosilicate glass flask, add 0.1 ml *bromothymol blue* solution. The test is passed if the resulting solution not blue.

N.B. Tap water showed blue coloration showing alkaline nature. The test is failed.

Calcium and Magnesium:

To 100 ml purified water under test, add 2 ml of *ammonia buffer* (pH 10.0). Then add 50 mg of *Mordant Black II* mixture and 0.5 ml of 0.01 M *disodium edetate*. The test is passed if the a pure black colour is produced

N.B.: Tap water showed a blackish pink colour.(Failed).

Chlorides:

To 10 ml purified water under test →adds 1ml of 2 M *nitric acid* and 0.2 ml of 0.1 M *silver nitrate*→ the test is passed if the appearance mustn't change for at least 15 minutes.

N.B. Tap water showed a whitish coloration. The test is failed.

Ammonia:

Standard: 1 ml of alkaline Potassium Mercuric-iodide solution to a mixture of 4.0 ml of Ammonium standard solution (1 ppm of NH_4) and 16 ml of Ammonia free water (0.2 ppm).

Test: To 20 ml of test water add 1ml of alkaline potassium mercuric-iodide solution and allowed to stand for 5 minutes.

Results: View vertically → solution is not more intensely colored than standard prepared at the same time.

Sulphates:

To 10 ml of test water add 0.1 ml of 2 M HCl and 0.1 ml of Barium Chloride solution. The test is passed if the appearance does not change for at least 1 hour.

Oxidisable Substances:

To 100 ml of test water add 10 ml of 1 M H_2SO_4 and 0.1 ml of 0.02 M Potassium Permanganate → Boil for 5 mins. The test is passed if the Solution remains faintly pink.

Instruments and Devices seen:

- 1) Hot Air Oven.
- 2) Dissolution Test Apparatus.
- 3) Vacuum Oven.
- 4) Bulk Density Apparatus.
- 5) Membrane Filter.
- 6) Muffle Furnace.
- 7) Centrifuge.
- 8) Magnetic Stirrer.
- 9) Ultrasonic Bath.
- 10) UV Cabinet.
- 11) Bursting Strength Test Apparatus.
- 12) UV-VIS Spectrophotometer.(Ultra Violet Visible)
- 13) FT-IR Spectrophotometer.(Fourier Transform Infrared).
- 14) Karl Fisher Titration.
- 15) HPLC system
- 16) Polarimeter
- 17) Digital pH meter
- 18) Magnetic Stirrer etc.

Testing Uniformity of Weight of Tablets

1) **Product:** Dizone tablets.

Batch no.: GD-16893 **Mfg. Date:** 06/11 **Exp. Date:** 05/11

Data Obtained:

a) Weight of 20 tablets = 12.8867 g

b) Average weight = $12.8867/20$

= 0.6443 g

= $0.6443 \times 1000 \text{ mg} = \underline{644.3 \text{ mg}}$

Serial Number	Weight(G)	Weight – Paper Weight (G) (Paper Weight = 0.1112 G)
1.	0.7623	0.6511
2.	0.7526	0.6414
3.	0.7589	0.6477
4.	0.7406	0.6294
5.	0.7530	0.6418
6.	0.7407	0.6295
7.	0.7530	0.6418
8.	0.7558	0.6446
9.	0.7567	0.6455
10.	0.7523	0.6411
11.	0.7567	0.6455
12.	0.7553	0.6441
13.	0.7581	0.6469
14.	0.7493	0.6381
15.	0.7460	0.6348
16.	0.7559	0.6447
17.	0.7408	0.6296
18.	0.7503	0.6391
19.	0.7687	0.6575
20.	0.7576	0.6464

Calculations:

According to I.P.specification:

- 1) Average weight = $645 \text{ mg} \pm 10 \text{ mg}$
- 2) For maximum & minimum variation:

Tablet weight Variation specified

Below 80 mg $\rightarrow \pm 10 \%$

80—250 mg $\rightarrow \pm 7.5 \%$

Above 250 mg $\rightarrow \pm 5 \%$

Result:

- 1) Average weight = 644.3 mg (Passed).
- 2) Minimum weight= 0.6294g(Sl. No. 24) =629.4 mg
So, minimum variation = $(644.3-629.4) \times 100/644.3$
= -2.31% (Within Limit, Passed).
- 3) Maximum weight = 0.6575g (Sl. No. 19)
= 657.5 mg
So, maximum variation = $(657.5-644.3) \times 100/644.3$
= +2.05% (Within Limit, Passed).

Sampling

- The process of sampling is done by the QC dept. after raw material enters the store and 'UNDER TEST' label is pasted on it by the officials in the raw material store.
- For Active Pharmaceutical Ingredient (API), 100% sampling must be done.
- For Inactive Pharmaceutical Ingredient sampling is done on the basis of the following formulae:-
- No. of containers to be sampled = $\sqrt{\text{Total no. of containers}} + 1$

Product: Disulfiram (raw material form).

Sampling is done with the help of a SAMPLING ROD.

Labels:

<u>UNDER TEST</u>	→	<u>SAMPLED</u>	→	<u>APPROVED</u>
Material name: Material code no: Batch no: GRN No: GRN Date: Quantity: No. of containers: Mfg. date: Exp. Date: Manufacturer: Supplier: Prepared by: Checked & verified by:		Sampled by: Sign with date:		A.R. No.: Potency: Approved by: Sign with date:

Testing Packing Materials' Quality And Standard

Bursting Strength Calculation:

Product: C. Box (Corrugated Box) of Dizone tablets.

Bursting Strength :

<u>Sample As Per Specification result</u>		
10.2 kg/cm ²	NLT 8kg/cm ²	Within specification.

Testing Packing Materials' Quality And Standard

Product: C. Box (Corrugated Box) of Axbex tablets.

Inner:

<u>Sample As Per Specification</u>		
Length (mm)	330	within limit
Breadth (mm)	310	within limit
Height (mm)	140	within limit

Packing Details: 20 x 10 x20'S, 3 Ply.

Outer:

<u>Sample As Per Specification</u>		
Length (mm)	642	within limit
Breadth (mm)	348	within limit
Height (mm)	301	within limit

Packing details: 40 x 20x (10 x 20'S), 5 Ply.

RESULT: Passed.

In Process Quality Control:

Inprocess Line Clearance:

Product: Cefilab DT-100

Batch No.: GC-18011

Batch Size: 2 lacs.

Status: Compression.

Machine Name: Rotary 3 (having 27 stations)

Procedure:

- 1) Tablet Disintegration Test using DT Apparatus.
- 2) Friability Test.
- 3) Weight
- 4) Parameters like diameter, thickness, etc. using Vernier Calliper, Screw Gauge, etc.
- 5) Hardness using Monsanto Hardness Tester.

20 tablets are taken from each batch.

Tests Standards

Weight	175 \pm 7 mg
Diameter	8.1 \pm 0.2 mm
Thickness	2.7 \pm 0.2 mm
Hardness	2-6 kg/cm ²
Friability	NMT 0.5% w/w
Disintegration Time	NMT 1 minute

Solubility:

1)	Very soluble	→	Less than 1.
2)	Freely soluble	→	1 – 10.
3)	Soluble	→	10 – 30.
4)	Sparingly soluble	→	30 – 100.
5)	Slightly soluble	→	100 – 1000.
6)	Very Slightly soluble	→	1000 – 10,000.
7)	Practically insoluble or insoluble	→	10,000 or more.

Assay Of Dizone Tablets:

Assay of Dizone tablets are done to find the actual amount of Disulfiram present in it and compared with the claim given.

BATCH NO: GD-16269

INSTRUMENT USED: UV-VIS Spectrophotometer. (Ultra Violet Visible)

Standard preparation:

Weigh about 100 mg Disulfiram(working standard) into a 100 ml volumetric flask → Dissolve in sufficient Methanol → Make up the volume up to 100ml with the same.

- 1) Dilute 5 ml of above to 50 ml with Methanol.
- 2) Further dilute 5ml of above to 25ml with 0.1% w/v Cupric Chloride solution.
- 3) Shake the above for 2 minutes → Filter through Whatman Filter Paper No.1.
- 4) Mark as STANDARD.

Test preparation:

- 1) Weigh and powder 20 tablets.
- 2) Put an accurate amount of powdered tablets containing 0.1 gm of Disulfiram into a 100 ml volumetric flask → Dissolve in 75 ml of Methanol.
- 3) Shake for 30 minutes.
- 4) Make up the volume up to 100ml with the same.
- 5) Dilute 5 ml of above to 50 ml with Methanol.
- 6) Further dilute 5ml of above to 25ml with 0.1% w/v Cupric Chloride solution.
- 7) Shake the above for 2 minutes → Filter through Whatman Filter Paper No.1.
- 8) Mark as TEST.

Procedure:

- 1) Allow to stand STANDARD and TEST solution for 1 hour.
- 2) Measure absorbance of resulting solution at the maximum of about 400 nm against reagent blank. (Dilute 5ml Methanol to 25 ml with 0.1% w/v Cupric Chloride solution.)

Calculations:

$$\begin{aligned}\text{Disulfiram (in mg)} &= A_T/A_S \times W_S/100 \times 5/50 \times 5/25 \times 100/W_T \times 50/5 \times 25/5 \times P/100 \times \text{Avg wt.} \\ &= 0.485/0.491 \times 100.2/100 \times 5/50 \times 5/25 \times 100/257.8 \times 50/5 \times 25/5 \times 99.14/100 \times 642.00 \\ &= 244.36\end{aligned}$$

Where, A_T = Absorbance of Disulfiram in TEST Solution.

A_S = Absorbance of Disulfiram in STANDARD Solution.

W_S = Weight of Working Standard (in mg).

W_T = Weight of TEST Sample (in mg).

P = Purity of Working Standard in percentage as such basis.

$$\text{Percentage of Disulfiram} = \text{Disulfiram (in mg)} / \text{Label Claim} \times 100$$

$$= 244.36/250 \times 100 = 97.7 \%$$

SPECIFICATION:

Percentage of Disulfiram = 95% -- 105%

RESULT: PASS.

Maintenance Section

Maintenance Section is the backbone of a pharmaceutical industry which provides a suitable environment for manufacturing of different forms of drug. They regulate all the physical, instrumental requirements of a pharmaceutical industry.

Instruments, operated by maintenance section are as follows:-

1. Ground floor-

- Vapour absorption machine, capacity=150 TR, model no-A2135X
- Steam boiler-RXD 850, capacity=850 kg/hr
- DM water plant-NGMF 30,CA 34/1-1.75M/hr
- Reciprocating air compressor 2545 D10, capacity=35CFM
- Refrigerated Air dryer IR32R, capacity=3.2 M³/min
- Air receiver tank, capacity=1000 ltr
- Screw Air compressor UP5-18-7, capacity=109 CFM

2. Top floor

- WFI plant- multicolumn distilled water still plant 300 WS/ capacity-300 ltr/hr.
- WFI storage tank
- Purified water storage tank/ capacity-1000 litre
- Pure steam generator 300 PSG/ capacity-300kg/hr
- FRP pressure vessel DM/240 MB/volume-75ltr
- RO water plant RO 219/capacity-0.5 M³/min.

CONCLUSION

Industrial training is very much essential for Pharmacy Students. It is also a great opportunity to acquire practical knowledge. During my training period, in the industry I acquired lots of experiences in Pharmaceutical Production and Production management. This will help me to clarify my theory knowledge. I hope and pray that it will help me much in my future profession.

During our training period, we had seen the various instruments and apparatus in the industry. The highly sophisticated instruments that work precisely must be operated with intense care for optimum use. We could acquire a lot of information regarding the latest instruments and their working procedures.

It was taught to us that, the CGMP guidelines are to be strictly followed in the industries in each and every section. But the same was seen not to be satisfactory in the Ozone Pharmaceuticals Limited, Guwahati. The workers were seen dealing the active medicaments with bare hands. The quality control section was also of substandard. Due to lots of vacancy of chemists, they did not do the basic tests of the solid dosage forms like assays, disintegration test, dissolution tests etc. They are doing the same only on the paper documents, not in practice. Hence it can be said that, the authorities are not paying much importance on the quality of the products.

Apart from all that, the training was very interesting with lots of things to be learned. It helped us to acquire knowledge on punctuality, regularity and working environments in industries. The friendly working environment in ozone pharmaceuticals will remain in our mind in near future. Hence, we can say that our goal of attending the industrial tour is fulfilled. We acknowledge the great help of Ozone Phramaceuticals Limited.