SUMMER INDUSTRIAL TRAINING OFFERED

BY:

ASIATIC COLOUR CHEM LTD.

COLLEGE : ADITYA SILVER OAK INSTITUTE OF TECHNOLOGY

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Mr. Shantilal Patel ACKNOWLEDGMENT

It was a great opportunity of Industrial training at "ASIATIC COLOUR-CHEM INDUSTRIES LTD." at Ahmedabad as we are chemical engineering students to gain practical knowledge and industrial experience in this industry.

We are very thankful to Mr. Nimesh Patel who motivated us &giving full support for this training. Also thankful to Mr. Shantilal Patel for giving fully support and opportunity for the great experience to increase the technical knowledge.

The guiding on site was very supportive to all students. We are sure that this training will help us in our future practical life and bring a positive change in our thinking and positive behaviour regarding engineering and technologies.

INTRODUCTION

The dyestuff industry plays important role in the overall growth of chemical industry. The preparation and usage of dyestuff is one the oldest forms of human activities. The usage of natural dyestuff dates back to the bronze age.

Archaeological evidence shows that particularly In India and Phoenicia, has been extensively carry out for over 5000 years. The dyes were obtains from animal, vegetable or mineral origin with no or little processing First synthetic organic dye, mauveine, was discovered by William Henry Perkin in 1856.

Dyes are the coloured, ionizing and aromatic organic compounds which has affinity to the substrate to which it is being applied. The dye is generally applied in an aqueous solution which may also require a mordant for improving the fastness of the material on which it is applied.

A dye is a coloured substance that has an affinity to the substrate to which it is being applied. The dye is generally applied in an aqueous solution, and may require a mordant to improve the fastness of the dye on the fibre. Many dyes are organic compounds. These may be natural or synthetic. Other than pigmentation, they have a range of applications including organic dye lasers, optical media (CD-R) and camera sensors (colour filter array).

Both dyes and pigments are coloured because they absorb some wavelengths of light more than others. In contrast to dyes, pigments are insoluble and have no affinity for the substrate. Some dyes can be precipitated with an inert salt to produce a lake pigment, and based on the salt used they could be aluminium lake, calcium lake or barium lake pigments.

The first human-made organic aniline dye, mauveine, was discovered serendipitously by William Henry Perkin in 1856, the result of a failed attempt at the total synthesis of quinine. Other aniline dyes followed, such as fuchsine, safranine, and induline.

HISTORY

The first attempt to manufacture dye products was attempted by arlabs ltd. Owner V.D.desai in 1940. Furthermore, the first plan for achieving self-reliance in the manufacture of dyestuffs was conceived M. U. Atul in 1945. Inspired by the success story of Atul, Asiatic colour chem Industries limited owner Mahesh k Agrawal envisioned the establishment of a manufacturing plants for dyes and intermediates.

Known for exporting, importing, manufacturing and supplying the best quality of Dyes & Chemicals, Asiatic Colour Chem Industries Limited started its operation in the year 1995. Inclusive of Leather Dyes, Black Leather Dyes and Fur Dyes, we offer a wide range of industrial Dyes and Chemicals. For processing of the offered dyes and chemicals in compliance with the industry laid norms, our professionals make use of latest machinery and quality assured ingredients. Offered by us at industry leading prices, these dyes and chemicals are known for their accurate composition, purity and longer shelf life.

Garment manufacturing, textile and leather industries are some of the places, the offered dyes and chemicals are highly demanded. Keeping the ease of our valuable customers in mind, we pack these chemicals with standardized packaging. Being a quality conscious name, we assure that the premium quality of the offered chemicals and dyes is never compromised at our end. For ensuring high standards of quality, the offered chemicals are procured from trusted vendors of China. With the aid of our large production capacity, we have been able to manage the bulk demands in the most efficient manner. For the case of our valuable customers, we accept different modes of payment such as cash, online, demand draft and credit card.

This company export their product such chemicals and dyes, to Thailand, Brazil, Singapore, Germany, Italy and Spain and importing from China.

GENREAL OVERVIEW OF PLANT

1. Manufacturing of Dyes: manufacturing of dyes takes place in MSRL vessels using raw materials under controlled conditions

2. Clarification: produced dyes are sent to press filter for removal of any immiscible substance present in it.

3. Reverse Osmosis (RO SYSTEM): after being clarified product is sent to RO plant for further filtration and concentration.

4. Drying Operation: after product passes from RO for specific time it is sent to spray dryer to convert product into powder form.

5. Quality control: a sample of dried product is sent to quality control lab to check the quality of product according to company standards and adjustments are made to product according to buyers demand.

6. Packing: adjustments are made to final product as per the instruction received from lab and it packed and palletized as per buyers requirement.

MANUFACTURING OF ACID BLACK 210 DYE

- **Raw Materials**
    i. Para Nitro Aniline (PNA)
    ii. 1-Hydroxy-8-amino-3,6-disulphonic acid (H-Acid)
    iii. Sodium Nitrite ($NaNO_2$)
    iv. Diamine Sulfonic acid (DASA)
    v. NaOH
    vi. HCl
    vii. Meta phenyl diamine (MPD solution)

- **Factors Affecting**
    i. pH
    ii. Acidic Medium
    iii. Temperature

- **Apparatus Used**
    i. Cargo red paper (CR paper)
    ii. Silicon iodide paper (Si paper)
    iii. pH Meter

Steps Included in Manufacturing process

1. **Diazotization:** The process of conversion of primary aromatic amines into its diazonium salt is called diazotization. Primary amine like PNA/DASA are to be diazotized in acidic medium using HCl and reducing temperature by ice and Sodium Nitrite to be added to complete Diazotization. This diazo is then further used to couple with various coupling components.

2. **Preparation of coupler solution:** Coupler solution is to be prepared by suspending coupling components like H-acid/MPD in water and desired pH to be adjusted by addition of Soda Ash/Caustic Lye/Sodium Acetate into ready coupler solution.

3. **Coupling:** Coupler solution is added to prepared diazo and stirring is done up to completion of coupling. This procedure is to be carried out once or twice as per the product.

4. **Clarification:** The product formed is passed through filter press for clarification

5. **Reverse Osmosis:** The clarified dyes solution is passed through Reverse Osmosis System and salts are removed from dyes making dyes more concentrated

6. **Spray Drying:** Concentrated mass is then transferred to spray dryer tank for spray drying and making it into powder form.

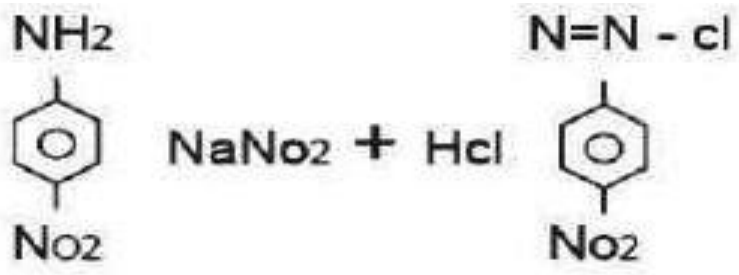
7. **Quality Control:** A sample from dried product is sent to lab to ensure the quality of the product and to find out about adjustment needed to be done to product according to buyers demand.

8. **Packing:** The standard dye is to be packed and palletized as per the buyers requirement.

PROCEDURE FOR PRODUCTION OF ACID BLACK 210 DYE

1. First Diazotization

Para nitro aniline (PNA) is charged to an M.S.R.L. action vessel along with water and ice to maintain temperature between 0 to 5°C. Then Hydrochloric Acid was added followed by Sodium Nitrite powder gradually till diazotization completed, which can be confirmed by starch iodide paper. Starch iodine paper will convert into purple colour. Any excess nitrite will be removed by adding Sulfamic Acid just before coupling.

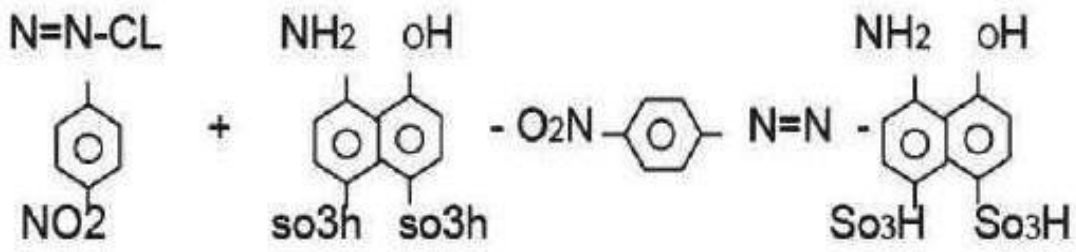


2. Preparation of clear solution of H-acid

H-Acid (1-Hydroxy-8-amino-3,6-disulphonic acid) was charged to a M.S.R.L. reaction vessel along with caustic lye and maintained at temperature at 15-20°C and pH at 6.5 to 6.8. Stir it till clear brown solution appeared.

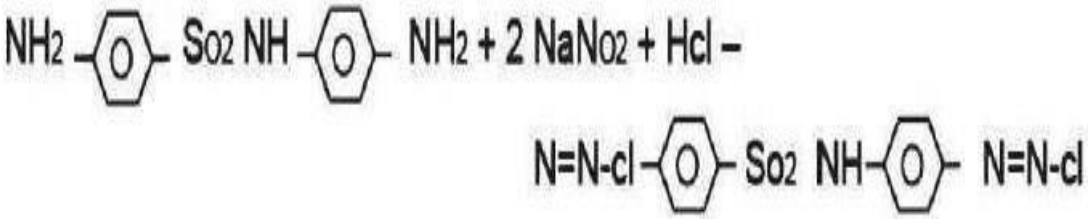
3. First coupling

Prepared clear solution of H-acid was charged in to the diazotized PNA and stirred for 6-8 hours keeping the temperature between 0-5 °c by adding ice.



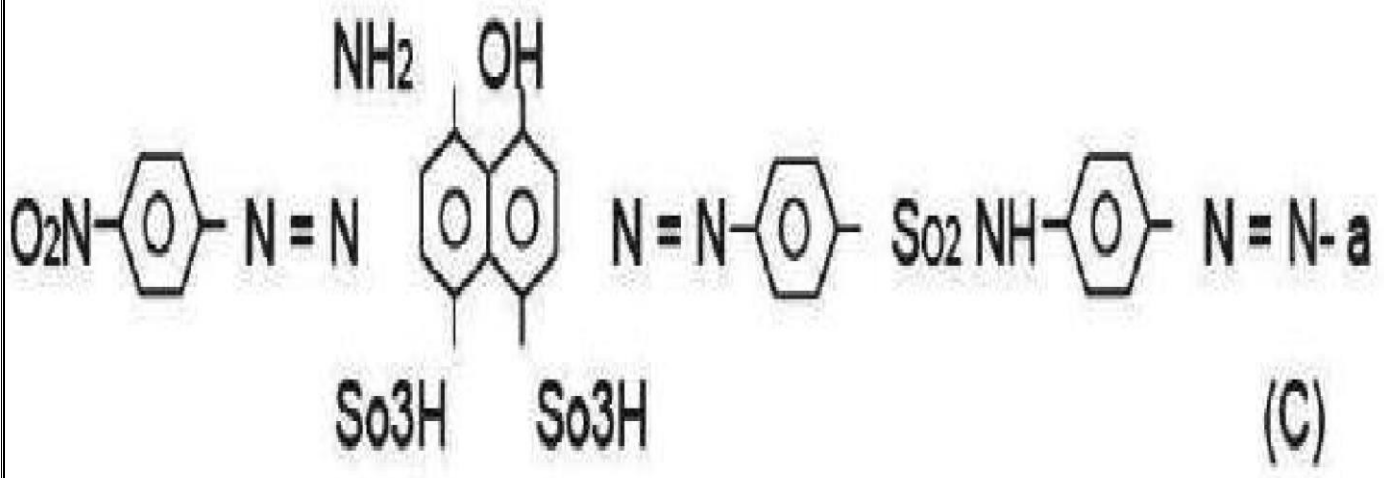
4. Second Diazotization

As mention in first coupling, DASA (Diamine Sulfonic Acid) charged to a M.S.R.L. vessel along with water and ice to maintain temperature between 0 to 5°C. Then Hydrochloric Acid was added followed by Sodium Nitrite powder gradually till diazotization completed, any excess nitrite was removed by adding Sulfamic Acid just before coupling. Keep temperature between 0 to 5°C throughout the diazotization reaction.



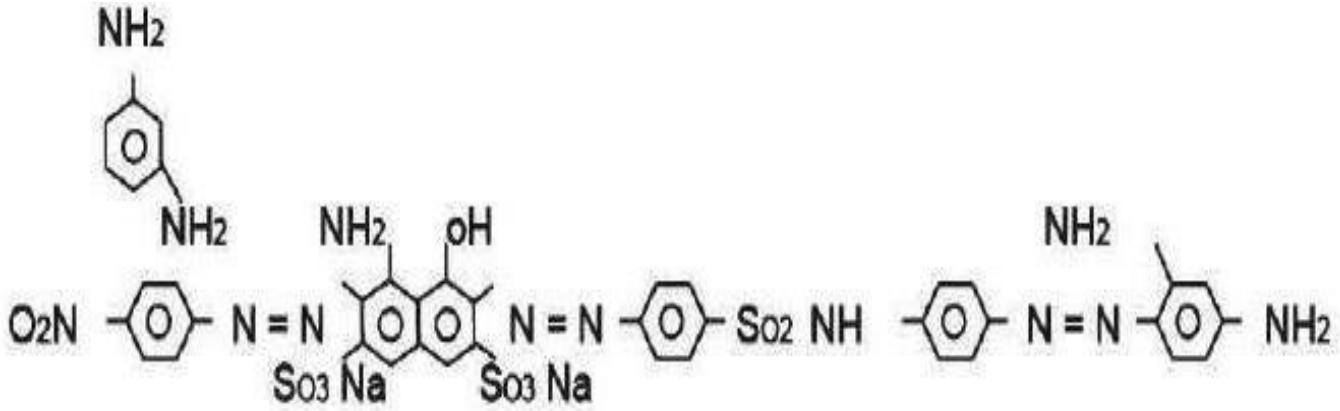
5. Second Coupling

Charge tetra azo of DASA to the first coupling mass and stir for 8-10 hours keeping temperature 0 to 5°C. pH of the coupling mass was raised by addition of sodium hydroxide and maintained temperature at 8 to 12°C by addition of ice.



6. Third Coupling

Prepare MPD (Meta Phenyl Diamine) solution with adding water and heat up to 50°C. Then add MPD solution into second coupling mass. Stir for 2 hours and check pH. After completion of reaction, heat the final mass up to 55°C. Properties of dye (strength, tone etc.) was checked before starting Reverse Osmosis.



Thank You all for your kind support