Industrial Application - A Pragmatic Approach
5. INDUSTRIAL APPLICATION – A PRAGMATIC APPROACH

The society is dependent in many ways on the metal fabrication and electroplating industry to maintain the current standards of living and improve the quality of our lives—'better living through chemistry'. The past few decades have been an era of successful chemistry. Developments in water treatment, waste disposal methods, agricultural pesticides and fungicides, polymers, materials sciences, detergents, petroleum additives and so forth, have all contributed to the improvement in our quality of life. But unfortunately all these advances come with a price tag of 'Pollution'. Today, with growing awareness, in industry, academia and the general public, of the need for the sustainable development, the international chemistry community is under increasing pressure to change current working practices and to find general alternatives. Scientists and engineers from both the industry and the academic world have made efforts to correct pollution problems by the more extensive use of 'green chemistry'. Thus, the green chemistry covers the following area which encompasses

- **Application of innovative technology to established industrial processes.**
- Development of environmentally improved routes to important products.
- **Design of new green chemicals and materials.**
- **Use of sustainable resources.**
- Use of biotechnology alternatives.
- **Methodologies and tools for evaluating environmental impact.**
- **Replacements for hazardous reagents.**

In recent years, the application of 'green chemistry' principles to the area of corrosion inhibitors has attracted lot of attention which has resulted in the reduction/elimination of toxic inhibitors and the production of 'green' or low toxicity environmentally friendly formulations. There is a need to work for this betterment by encouraging the practices of green chemistry. Collaborations between industrial and
academic partners are important to expedite the transfer of significant green products to the market place. For such collaborations to be successful, individuals in these two differently motivated cultures need to work together to advance green sciences.

To achieve this, all the studied plant extracts were tested three small scale industries like electroplating, metal fabrication for their inhibition efficacy against metal corrosion under their environmental conditions. Some of the pictures shown are photographed, during the industrial visit to test the samples in industrial condition. Final reports from industries are enclosed.
INDUSTRIAL REPORT – TRANSLATED FORM

STR Metal Process

Extracts from Sunflower and African marigold plant parts were tested at STR metal process industries. The extract was mixed with HCl (used for pickling bath), used to remove rust from the metal surface. Time taken to remove rust is doubled when HCl is mixed with extracts, compared to blank HCl (without extract). These extracts, when mixed with acid, the corrosive nature (property) of HCl on the metal is less. Also, it reduces fumes emitted from HCl during the pickling process.

It is found that these plant extracts reduce the environmental pollution, when used in the pickling bath. So, we are also confident that such extracts will be of immense use to small scale electroplating industries.

Nandhini Bright Bar Industries

Extracts from Sunflower (Flowhead and Stem) and African marigold (flower, leaves and stem) were tested in our industry. The extracts from the above plants mixed with sulphuric acid in the proportion (10ml of extract with 1 litre of acid), it greatly reduces the corrosive nature of acid on the metal surface. It also reduces acid mist formation and increases the life time of the acid (7days instead of 5days).

Hence, these extracts are very useful for metal fabrication industries.

Srivinayaka metal process

Before electroplating, to roughen the metal surface, the metals are subjected to pickling process (ie) to remove the rust deposited on the metal surface. During this process, along with rust small amount of metals also get dissolved into the acid. And it also produces fumes. Extracts from Sunflower and African marigold plant parts are mixed with acid (in the pickling bath), reduces the metal dissolution and fumes from the acid. These extracts are not only found to reduce the corrosion of metal and also protect the environment from pollution. Hence, these extract can be used for electroplating industries.

Weight of metal = 25 Kg
Weight of metal in blank acid (after 5 minutes) = 23.498 Kg
Weight of metal with extract (after 10 minutes) = 24.465 Kg.
Nandhini Bright Bar Industries

Mfrs.: BRIGHT BARS & GROUND BARS
313/A, Vannan Kovil Thottam, Sanganoor Road, Ganapathy, Coimbatore - 641 006.

Ref:

To,

Sir R, General Manager,
Nandhini Bright Bar Industries,
29/II, Arora Business Centre, Madhapur, Hyderabad - 500 030.

Madam,

Our attention has been drawn to your recent circular No. 115 dated 1.9.2000, wherein you have informed us about the changes made in the price list.

We have noted the changes made in the price list and are not in a position to accept the revised prices. We have observed that the prices of Bright Bars and Ground Bars have been increased to such an extent that they are unaffordable.

We request you to revert to the previous prices and provide us with a quotation for the following quantities:

- Bright Bars: 500 units @ Rs. 150 each
- Ground Bars: 300 units @ Rs. 180 each

We understand your business and are willing to place a large order. We would appreciate it if you could send us the revised quotations.

Yours faithfully,

[Signature]

For Nandhini Bright Bar Industries

[Stamp]
To

R. Ram

Madam,

I am pleased to inform you about S.T.R. Metal Process -

 Monsters in the field of Hard Chrome and Nickel Plating ETC.

Please find enclosed the quotation for your perusal.

Thank you.

Best regards,

[Signature]

Partner
Ref:

To

S. S. R.

感知

Muthusamy Gounder Nagar Sanganur Road,
Ganesh Lay-Out, Ganapathy, Coimbatore - 6.

Madam,

I am writing to convey the following information regarding the process of 315/1.

I have been informed that the current production rate is 5/1. However, due to some issues, we are facing delays in delivery.

I would request you to please ensure that the production is scheduled accordingly.

Thank you for your cooperation.

C. Selvaraj
Proprietor
INDUSTRIAL VISIT

PICKLING BATH

HARD CHROME PLATING BATH

NICKEL PLATING BATH
SAMPLES COLLECTED FROM INDUSTRY

IMMEDIATE IMMERSION IN BLANK ACID

IMMEDIATE IMMERSION IN THE PRESENCE OF INHIBITORS
PROTECTED METAL SURFACE AFTER IMMERSION STUDY

TESTED SAMPLES AFTER 1 WEEK

TESTED SAMPLES AFTER 2 WEEK
The salient outcomes of their reports are as follows.

1. All studied extracts could act as good pickling inhibitors in both acid media.

2. The extracts reduce the hydrogen evolution and acid mist formation.

3. It greatly reduces the base metal loss and forms a temporary protective coating on the metal surface. And this protective coating does not affect the electroplating bath.

4. The time for pickling process is doubled in presence of extract in the pickling bath when compared the time with blank.

5. It is hygienic to the working environment and reduces the environmental pollution.

Hence, they recommend that these plant extracts act as good pickling inhibitors and are highly useful for their industries.