NON TECHNICAL NOTE

1. Name of the process: Electrochemical preparation of Benzyl bromide

2. Products: Benzyl bromide

3. Uses of the products:

The Product benzyl bromide and substituted benzyl bromides have industrial importance in pharmaceutical industry, useful intermediates for chemicals, agriculture chemicals. These bromo compounds are useful class of intermediates as they are precursors to a number of organo metallic species, which are used in the synthesis of natural products and pharmaceutically important compound. It is also used in the manufacture of a range of bulk and fine chemicals, including flame retardants, disinfectants, antibacterial and antiviral drugs.

4. Advantages :

The two-phase electrolysis has a distinct advantage over conventional homogenous electrolysis in practical electroorganic synthesis**.** The reactive species formed by the electrolytic oxidation of the halide ion in an aqueous phase can be continuously taken into the organic layer and then reacted with the substrate giving regioselective products. After the completion of the electrolysis, the separation and concentration of the organic layer afford the product. The electrolysis can be performed in mild condition without any hazardous starting material at atmospheric pressure. In this electrochemical cell good mass transfer and high conversion and high yield could be achieved. The cell design is simple and cost effective.

5. a. Present consumption pattern : 10,000 TPA

   b how is the demand being met : by import

   c. estimated future demand : Expected to increase

   d. present market price : Rs.300.00 per kg

6. Description of the process:

The electrochemical preparation of benzyl bromide in aqueous medium containing sodium bromide electrolyte with platinum as anode and cathode in an undivided batch cell by two phase electrolysis at a current density of 50 mA/cm^2, the top layer containing the acidic aqueous sodium bromide solution as electrolyte and the bottom layer containing toluene in an organic solvent chloroform and at a temperature of 0^oC with stirring speed of 50 rpm at atmospheric pressure.

7. Purity of the product : 99 %
8. Laboratory work details :
   a.Scale of investigation : 100 grams per batch
   b.Can you supply samples : yes
   c.Quantity of product prepared: 100 grams per batch
9. Total Capital Investment :

a.	Total Capital Investment	: Rs.81.00 lakhs
b.	Fixed capital investment	: Rs.40.00 lakhs
c.	Working capital investment	: Rs.31.00 lakhs
d.	Cost of production	: Rs. 141.00 per kg
e.	Selling price	:Rs. 160.00 per kg
f.	Annual Turnover	: Rs. 160 lakhs
g.	Gross profit	: Rs.19.00 lakhs
h.	Net profit	: Rs. 18.00 lakhs
i.	Return on investment	: 22%

10. Suggested terms of release of the process:

1. Lump sum premium Rs. 10.0 lakhs
2. Recurring royalty - 5% on sales.

12. Address for correspondence :

Director, CECRI, Karaikudi –630 006.

Experimental Details

i.	Anode.	: Platinum (10 cm^2)
ii.	Cathode	: Platinum (10 cm^2)
iii.	**Current Density**	: **50 mA/cm^2**
iv.	Electrolyte	: NaBr(30g);H_2O(50ml);CHCl3(25ml); HBr(5 ml)
v.	Temperature	: 0^0C
vi.	Amount of Toluene taken	: 5 ml (4.32 gm)
vii.	Charge passed	: 4.5 F/mole
viii.	Total current	: 5.7 Ahr
ix.	Current rate	: 0.5A
x.	Cell Voltage	: 1.3V
xi.	Time of electrolysis	: 11.4 hrs
xii.	Amount of Benzyl bromide formed	: 7.7 g
xiii.	**Yield**	**: 96 %**
xiv.	**Current efficiency**	**: 45 %**
xv.	**Conversion**	**: 100 %**