BRIEF NOTE ON PROJECT

1. INTRODUCTION

This report has been prepared for proposed project by **M/s. MVL Medisynth Pvt. Ltd.** to be set-up at located at Plot No. E-13, MIDC Chincholi, Tal.: Mohol, Dist.: Solapur. The company has taken into consideration the need to meet the demands of the national & international market, the proponents of the industry have planned to go for establishment of Bulk Drugs and Intermediates and Neutraceuticals Manufacturing Unit at Solapur.

Total capital investment towards proposed project of Bulk Drugs and Intermediates and Neutraceuticals manufacturing unit is Rs. 10.30 Crores.

2. PROJECT AT A GLANCE

Table No.1
Project at a Glance

Sr. No.	Particulars	Details
1.	Name and Address of the Industry	**M/s. MVL Medisynth Pvt. Ltd.** Plot No. F-13, MIDC Chincholi, Tal.: Mohol, Dist.: Solapur.
2	Type and capacity of Project	Proposed Bulk Drugs and Intermediates and Neutraceuticals Manufacturing Unit
3	Latitude ,Longitude and Elevation	17° 46' 26.02“ N Latitude 75° 47' 59.66” E Longitude 460 Meter above sea level
4	Land area and break up	➢ Total Plot Area – 16340 Sq. M (1.63 Ha) ➢ Built - Up Area for Proposed industrial activities – 7840.27Sq. M. (0.78 Ha) ➢ Area Under Internal Roads – 3878 Sq. M (0.38 Ha) ➢ Open Space Available – 4621.73 Sq. M. (0.46 Ha) ➢ Green Belt Area : 3065.41 Sq. M. (0.30 Ha)

3. PROCESS DESCRIPTION

3.1 Products and Byproducts:

The details of products and byproducts that would be manufactured under proposed project are presented in the following table:

Table No. 2
List of Products and By- products

Sr. No.	Name of Product	Quantity (Kg/Yr)	Uses
1.	Meropenam	12000	Antibiotic - treatment of infections
2.	Carboplatin	48	Chemotherapy Drug

Sr. No.	Name of Product	Quantity (Kg/Yr)	Uses
3.	Cisplatin	24	Anti cancerous
4.	Famicyclovir	50400	Herpes Zoster, Herpes Simplex Virus 2 & Herpes Labialis
5.	Imatinib Mesylate	4800	Chronic Myelogenous Leukemia & Gastrointestinal Stromal Tumors
6.	Azacitidine	48	Myelodysplastic Syndrome (MDS)
7.	Efavirenz	24600	Highly Active Antiretroviral Therapy (HAART) for treatment of HIV
8.	Tenofovir	49800	With other antiretroviral agents for treatment of HIV-1 infection
9.	Travoprost	12	Controlling progression of glaucoma or ocular hypertension
10.	Latanoprost	12	
11.	Bimatoprost	12	Control glaucoma progression & management of ocular hypertension
12.	Erlotinib	47.88	Anti cancerous; lung & pancreas cancer
13.	Impenam	12000	Intravenous β-lactam antibiotic
14.	Caffeicacid Phenethylester	39513.6	Anti carcinogenic & anti inflammatory
15.	Curcumin	50232	Food color, food additive & in controlling inflammation
16.	Pterostibene	39600	Used as cardioprotective & chemopreventive
17.	Reserveratrol	36000	Antioxidant, minimizes risk of cancer & heart disease
	Name of the Byproduct		
1.	Potassium Chloride	24.9	Inorganic chemical
2.	HBr	3640	In Bromine Recovery
3.	Ammonium Chloride + Acetic Acid	4219.6	Inorganic chemical
4.	Triethyl Amine HCl Salt	600	Recycled
5.	Hydroxy Benzotriazole	520	Recycled
6.	Buta-1,3-Diene	1845	Recycled
7.	MgBr	1845	Inorganic chemical
8.	Imidazole	2050	Chemical
9.	4-Methylbenzenesulfonic Acid	3320	Chemical
10	Bromo Ethane	2573	Recycled
11.	DBUHI	10.1	Recycled
12.	Potassium Bromide	6.8	Inorganic Salt
13.	Sodium Sulphate	8314.7	Inorganic Salt
14.	Alluminium Hydroxide	5068	Chemical
15.	Pyridine. HCL	966	Recycled
16.	Potassium Carbonate	3000	Recycled
17.	Phosphorodibromidous Acid	4727	Recycled
18.	Diethyl Phosphate Sodium	3250	Recycled

Sr. No.	Name of Product	Quantity (Kg/Yr)	Uses
19.	3,4-dihydro-2H-pyran	2000	Recycled
20.	Tetrabutyl Ammonium Carbonate	73.311	As base in organic chemistry
21.	Piperidine Hydrochloride	840	Organic Compound
22.	Sodium Chloride	1535	Inorganic salt
23.	Silver Iodide	13.9	Silver Oxide manufacturing

4. MANUFACTURING PROCESSES OF PROPOSED PRODUCTS

Refer **Appendix - 1** for manufacturing process of proposed products

5. SOURCES OF POLLUTION AND MITIGATION MEASURES

5.1 Water Pollution

- The total water requirement under proposed activity would be to the tune of 62 M^3/ Day out of this 32 M^3/ Day would be fresh water and 30 M^3/ Day would be recycled water from ETP.

- The trade effluent generated from the proposed industrial activities would be segregated into two streams viz. Stream I (High TDS and High COD Effluent) and Stream II (Low TDS and Low COD Effluent).

  The **Stream I** effluents generated shall be to the tune of 27 M^3 / Day. Same shall comprise of effluent from manufacturing operations viz. process effluent – 22 M^3 / Day and washing- 5 M^3 / Day. This effluent shall be treated in an ETP comprising of Collection Tank, Screening Chamber, Equalization Tank, Tube Settler, Sand Filter followed by Triple Effect Evaporator (TEE) and ATDF. The condensate from TEE would be recycled back for cooling and boiler make up water as well as for ash quenching, thereby achieving **'Zero Discharge'**. Further salts from TEE would be forwarded to CHWTSDF

  The **Stream II** effluents generated shall be to the tune of 5.5 M^3 / Day. Same shall be contributed by DM plant – 2 M^3/Day, boiler blow down – 1.5 M^3 /Day and cooling blow down - 2 M^3 / Day. The stream II effluent shall be treated in an ETP comprising of Collection Tank, Bar Screen, Equalization Tank, Aeration Tank, Tube Settler, Multi Grade Filter followed by Activated Carbon Filter and Sludge Drying Beds. The treated water from stream II would be used for gardening in own factory premises.

- The domestic effluent of proposed activities would be 1.5 M^3/ Day. The same would be treated in septic tanks followed by soak pits provided in a decentralized manner.

5.2 Air Pollution

- Under the proposed activity, boiler would be installed having capacity of 4 TPH for steam generation. Baggage to the tune of 26 MT/Day would be used as fuel. The boiler would be provided with Pulse jet type Bag Filter as Air Pollution Control (APC) Equipment followed by adequate height stacks.

- A D.G. Sets of 350 KVA capacity would be installed. The same would be provided with adequate stack height and acoustic enclosure. The D.G. Set would be used only during power failure.

- There would be process emissions in the form of Cl_2, SO_2, H_2SO_4 & Bromine. Same would be controlled through installation of Scrubbers.

5.3 Noise Pollution

- The source of noise generation would be the Boiler, Reactors, Compressors, and D.G. Set etc.
- Major source of noise generation would be the Boiler house. Insulation helps in limiting noise levels. The workers entering inside the plant are protected by earmuffs, which would give the reduction of 30 dB (A).

- D.G. Sets shall be enclosed in a separate canopy to reduce the noise levels.

- Green belt is developed to attenuate the noise levels.

5.4 Solid Waste

- Solid waste would be generated in the form of boiler ash to the tune of 0.78 MT/Day. The ash would be disposed off by giving it to the brick manufacturers for secondary use.

5.5 Hazardous Waste

Table No. 3
Hazardous Waste Details

Sr. No.	Cat.	Description	Quantity	Mode of Disposal
1.	20.3	Distillation Residue	1.93 MT/M	To be forwarded to CHWTSDF
2.	28.1	Process Residue	1.39 MT/M	
3.	34.3	ETP Sludge	36.9 MT/M	
4.	5.1	Used/ Spent Oil	50 Lit/M	Shall be sold to Authorized Re-processor.
5.	28.2	Spent Carbon	0.76 MT/M	
6.	33.3	Discarded Containers	250 Nos/M	
7.	20.2	Spent Solvent	3.02 MT/M	Would be sold to Authorized Spent Solvent re-processor

6. IMPACT ON BIODIVERSITY

Any unfavorable alteration in the quality of soil, water or air will lead the change in quality of habitat for plants and animals. This alteration may favor growth of some species and may reduce / eliminate others. The resilience to this change will depend on the extent of unfavorable change.

6.1 Habitat Removal: The land acquired by MVLMPL for implementing the proposed project is located in notified industrial area i.e. the Chincholi MIDC at plot No. F-13, which is

designated for Industrial purpose only. Hence, there will not be any loss to terrestrial habitat. In study area of 10 Km radius around the project site, the Great Indian Bustard Sanctuary , Nanaj is located at 1.5 Km from site. The study area represents ecosystem with habitat types of agriculture land, scrubs, scattered trees, and human habitations. This region is diverse in terms of species or habitat richness, this ecosystem has its own importance.

6.2 Contamination of Habitats:

As discussed earlier, a full-fledged ETP would be provided on site for treating the industrial effluent whereas a Septic tank followed by soak pits would be installed for treatment of domestic effluent. Untreated effluents, either domestic or industrial, would not be released in the environment at any time. Also, APC equipment shall be provided to boiler. Proper O & M of ETP and APC equipment would be done regularly. Hence, there shall not be contamination of terrestrial as well as aquatic habitats due to any release of pollutants.

6.3 Effect on Flowers, Grass, Trees and Scrubs: In case of proposed activities, particulate emissions and process emissions would be of concern. However, the same would be well within the limits specified by concerned authority. No significant loss to the productivity of surrounding agricultural crops is envisaged. Moreover, undertaking and implementation of greenbelt development program will bring about beneficial impact of the project on surrounding area.

6.4 Mitigation Measures

- Proper landscaping of the project premises
- Steps towards reducing noise levels and an action plan towards same.
- Greenbelt development along periphery of the industrial premises through shelterbelt plantation to create a thick and dense green barrier.
- Implementation of internal roadside avenue plantation and in certain pockets mass plantation to strengthen the green belt program.
- Use of recyclable papers, if possible, would be done.
- Promoting measures of energy and water conservation, wherever possible, would be adopted.
- Activities like slide shows or expert's lectures on Local Biodiversity shall be arranged for the staff to make them aware about the plant and animal species found near by, also it will reduce unnecessary human-wild conflict. This will eventually reduce the damage to biodiversity by the employees.

7. GREEN BELT DEVELOPMENT

- Trees would be planted in the proposed project's premises along roads as well as along the fence.
- A thick barrier of trees would be created along the entire periphery of the plot.
- Trees of commercial importance would be planted.
- In the immediate vicinity of ash storage sections / godowns, the trees tolerant to dust would be planted.

- Total land acquired for industrial Unit would be of 1.64 Ha. The area covered under green belt would be about 0.30 Ha. There about 1361 nos. of trees would be planted.

8. ENVIRONMENTAL MONITORING PROGRAM

Monitoring of various environmental parameters will be carried out on a regular basis to ascertain the following:

- State of pollution within the plant and in its vicinity;
- Examine the efficiency of Pollution Control Systems installed in the plant;
- Generate data for predictive or corrective purpose in respect of pollution;
- To assess environmental impacts

The project management will carry out the monitoring regularly and record shall be maintained of the same

9. ENVIRONMENT MANAGEMENT PLAN

- The Environment Management Plan aims at controlling pollution at source with available and affordable technology followed by treatment measures.
- The industry shall effectively implement the EMP. The EHS Officer shall report the Managing Director, Operational Risk Committee and the Board on matters regarding HSE performance, HSE Management System performance and the HSE risk position in the Industry

Table No. 3
Capital & Recurring Cost towards EMP

	Description	**Cost Component**	
		Capital	**Capital**
1.	Capital cost of the ETP comprising TEE	100 Lakhs	25 Lakhs
2.	Cost towards APC equipment	15 Lakhs	2 Lakhs
3.	Cost towards Noise Level Management	2	--
4.	Cost incurred on the Green Belt Development	15 Lakhs	0.25 Lakhs
5.	Environmental Monitoring	--	3 Lakhs
6.	Occupational Health & Safety	2 Lakhs	1 Lakhs
7.	CSR Activities for next Three years	20	--
	Total	**154 Lakhs**	**31.25 Lakhs**

10. CONCLUSION

The proposed Bulk Drugs and Intermediates and Neutraceuticals manufacturing unit by M/s. MVL Medisynth Pvt. Ltd. will help to elevate the economic growth at the local level as well as national level. It will also generate the employment in the study region, thereby improving

the standard of living in the region. The proposed activity would not disturb the land use pattern in the study region of 10 Km. No Rehabilitation is involved under this project.

There is a good demand of products manufactured from the proposed unit as out of the total production more than 50 % of the products manufactured will be exported. The products will be utilized by pharmaceutical companies in India. The proposed project is further beneficial for society without hampering the environment and thereby accomplishing the aim of sustainable development.

MANUFACTURING PROCESS

1. Meropenam

Stage-1
Reaction of 4R, 5R, 6S)-4-methyl-6-[(R)-1-hydroxyethyl]-1-azabicyclo [3.2.0]hept-3,7-di-one-2-carboxylic acid (4-nitrophenyl)methyl ester with N-ethyldiisopropylamine and diphenylchlorophosphate in acetonitrile ,ethyl aceatae and Diisopropyl ether to get the (4R,5R,6S)-3-[(diphenoxyphosphoryloxy]-6-[(R)-1-hydroxyethyl]-4-methyl-7--oxo-1-azabicyclo[3.2.0]-hept-2-ene-2-carboxylicacid-(4-nitrophenyl)methylester.

Stage-2
Condensation of (4R,5R,6S)-3-[(diphenoxyphosphoryloxy]-6-[(R)-1-hydroxyethyl]-4-methyl-7--oxo-1-azabicyclo[3.2.0]hept-2-ene-2-carboxylic acid (4-nitrophenyl) methyl ester with (2S,4S)-1-p-nitrobenzyloxycarbonyl-2-dimethylaminocarbonylamino-4-mercapt- opyrrolidine and N-ethyldiisopropylamine in acetonitrile, ethyl aceatae and diisopropylether and to get the(4R,5S,6S,8R,2'S,4'S)-p-Nitrobenzyl-3-[4-(1-p-nitrobenzyloxycarbonyl-2-di-methylaminocarbonyl) pyrrolidinylthio]-4-methyl-6-(1-hydroxyethyl)-1-azabic- yclo[3.2.0]-hept-2-en-7-one-2-carboxylate.

Stage-3
Reduction of 4R,5S,6S,8R,2'S,4'S)-p-Nitrobenzyl-3-[4-(1-p-nitrobenzyloxycarbonyl- -2-dimethylaminocarbonyl)pyrrolidinylthio]-4-methyl-6-(1-hydroxyethyl)-1-a- zabicyclo [3.2.0] hept-2-en-7-one-2-carboxylate ethyl acetate, tetrahydrofuran , water and 10% palladium-carbon a hydrogen pressure to get the Meropenem.

2. Carboplatin

Stage-1
Potassium tetrachloroplatinate, potassium iodide are charged into the reactor and maintained 40-50℃ for 30 min. The reaction mass is then cooled to room temperature and ammonium hydroxide 25% solution is added to crystallize the output from 1st stage which is then filtered and dried to get the output from 1st stage.

Stage-2
Silver oxide and 1,1-cyclobutane dicarboxylic acid are reacted in presence of water at 50-60℃ for 1 hr. 1st stage output is then added to the reaction mixture and maintained at 40-50℃ for 6-8 hrs to complete the reaction. Silver iodide so formed is separated by filtration.
The filtrate is treated with carbon and concentrated, cooled and filtered to get pure Carboplatin.

3. Cisplatin

Stage-1
Potassium tetrachloroplatinate is dissolved in water to which potassium iodide is added. The reaction mixture is maintained at 40-50^{0}C for 30 minutes, cooled to room temperature and ammonium hydroxide 25% solution is added to crystallize the material. The material is then filtered and dried to get the 1st stage output.

Stage-2
Silver nitrate is dissolved in water to which the output from 1st stage is added and the mixture is maintained for 30 min at 50–60^{0}C. Silver iodide formed during the reaction is isolated by filtration. The filtrate is collected and potassium chloride is added to crystallize cisplatin. The material is filtered and dried to get Cisplatin.

4. Famicyclovir

Stage-1
Condensation of 2-amino-6-chloropurine with 2-acetoxymethyl-4-bromobutyl acetate in DMF and potassium carbonate to get the 9-[4-acetoxy-3-(acetoxymethyl)butyl]-2-amino-6-chloropurine .

Stage-2
Reduction of 9-[4-acetoxy-3-(acetoxymethyl) butyl]-2-amino-6-chloropurine in methanol and by using palladium charcoal to give the Famicyclovir.

5. Imatinib Mesylate

Methylene dichloride, 4-methyl-N3-(5-pyridin-3yl pyrimidine-2-yl) benzene-1,3-diamine, -(4-methyl-piperazin-1-yl-ethyl)benzoic acid dihydrochloride, triethylamine and hydroxy benzotriazole are charged and maintained for 4 hrs at 30 to 35℃ to complete the reaction. Triethylamine hydrochloride salt formed is then isolated by filtering. MDC layer is collected and evaporated. Methanol and methane sulphonic acid are added to the reaction mixture and heated to 50-60℃ in order to dissolve. Carbon is then charged into the mixture which is filtered. The mixture is stirred for 2 hrs at room temperature to isolate Imatinib mesylate.

6. Azacitidine

Stage-1
Reaction of 2, 3,5-tri-O-acetyl-β-D-ribofuranosyl isocynate with O-methylisourea in chloroform to give 1-2,3,5-tri-o-acetyl-b-D-ribofuranosyl -4-methylisobiuret.

Stage-2
Cyclisation of 1- 2,3,5-tri-o-acetyl-b-D-ribofuranosyl -4-methylisobiuret in ethyl orthoformate to give1-2,3,5-tri-o-acetyl-b-D-ribofuranosyl-4-methyoxy-2-oxo-1,2-dihydro-1,2,3-triazine.

Stage-3
Reaction of 1-2,3,5-tri-o-acetyl-b-D-ribofuranosyl-4-methyoxy-2-oxo-1,2-dihydro-1,2,3-triazine with ammonia to give Azacitidine

7. Efavirenz

Stage-1
The acylation of 4-chloroaniline with pivaloyl chloride by means of sodium carbonate in toluene gives the expexted anilide.

Stage-2
The benzylation of anilide with ethyl trifluoroacetate by means of butyllithium in THFand with HCl gives the 2'-amino-5'-chloro-2,2,2-trifluoroacetophenone.

Stage-3
The condensation of 1-(2-amino-5-chlorophenyl)-2,2,2-trifluoroethanone with 4-bromo-1-butene in THF with magnesium to give 2 -(2-amino-5-chlorophenyl)-1,1,1-trifluoro-5-hexen-2-ol

Stage-4
The cyclization of 2 - (2-amino-5-chlorophenyl)-1,1,1-trifluoro-5-hexen-2-ol with carbonyldiimidazole in THF to get the efavirenz

8. TENOFOVIR

Stage-1
Reaction of adenine with 1,2-propylene and diethyl p-toluenesulfonyl-oxymethylphosphonate in DMF lithium tert-butoxide to get the ®-9-[2-(diethylphosphonomethoxy)propyl]adenine.

Stage-2
Hydrolysis of 9-[2-(diethylphosphonomethoxy)propyl]adenine in acetonitrile by using bromotrimethylsilane to get the tenofovir

9. Travoprost

Reaction of lactol in tetrahyofuran with 4-carboxybutyl triphenyl phosphonium bromide, potassium tert-butoxide to get the travoprost acid,

Travoprost acid is reacted with isopropyl iodide in acetone and DBU to get the travoprost

10. Latanoprost

Reaction of lactol in tetrahyofuran with 4-carboxybutyl triphenyl phosphonium bromide, potassium tert-butoxide to get the latnoprost acid,Travoprost acid is reacted with isopropyl iodide in acetone and DBU to get the latanoprost

11. CAFFEICACID PHENETHYLESTER

Stage-1
Demethylation of vanillin with alunimium chloride in pyridine &toluene, ethylacetateto get the 3, 4-dihydroxybenzaldehyde.

Stage-2
Condensation of3, 4-dihydroxybenzaldehydewith 2-((phenethyloxy) carbonyl) aceticacid in toluene and piperidine to give the caffeicacid phenethylester

12. CURCUMIN

Stage-1
Condensatation of vanillin with 2, 4-pentanedione in n-butanol, ethyl acetate and boric acid to get the Curcumin

13. PTEROSTILBENE

Stage-1
Esterification of dihydroxy benzoic acid by using dimethylsulfate in acetone &potassium carbonate to get the methyl 3, 5-dimethoxybenzoate.

Stage-2
Reduction of methyl 3, 5-dimethoxybenzoate with sodium borohydrate in tetrahydrofuran & methanol to get the product (3,5-dimethoxyphenyl)methanol(In-situ) which on halogenations (bromination) of with tribromophosphine in toluene to get the product 1-(bromomethyl)-3,5-dimethoxybenzene(In-situ) and which is on esterification of 1-(bromomethyl)-3,5-dimethoxybenzene with triethyl phosphate to get the diethyl (3,5-dimethoxyphenyl) methylphosphonate

Stage-3
Condensatation ofdiethyl (3,5-dimethoxyphenyl)methylphosphonate with 4-(tetrahydro-2H-pyran-2-yloxy)benzaldehydein tetrahydrofuran and sodium hydride to get the 2-(4-(3,5-dimethoxystyryl)phenoxy)-tetrahydro-2H-pyran

Stage-4
Deprotection of 2-(4-(3,5-dimethoxystyryl)phenoxy)-tetrahydro-2H-pyranwith citric acid in methanol to get the Pterostilbene

14. Resevetrol

Stage-1
Esterification of dihydroxy benzoic acid by using dimethylsulfate in acetone &potassium carbonate to get the methyl 3, 5-dimethoxybenzoate.

Stage-2
Reduction of methyl 3, 5-dimethoxybenzoate with sodium borohydrate in tetrahydrofuran & methanol to get the product (3,5-dimethoxyphenyl)methanol(In-situ) which on halogenations (bromination) of with tribromophosphine in toluene to get the product 1-(bromomethyl)-3,5-dimethoxybenzene(In-situ) and which is on esterification of 1-(bromomethyl)-3,5-dimethoxybenzene with triethyl phosphate to get the diethyl (3,5-dimethoxyphenyl) methylphosphonate

Stage-3
Condensatation ofdiethyl (3,5-dimethoxyphenyl)methylphosphonate with 4-methoxybenzaldehyde in tetrahydrofuran and sodium hydride to get the 1-(4-methoxystyryl)-3,5-dimethoxybenzene.

Stage-4
Demethylation of 1-(4-methoxystyryl)-3,5-dimethoxybenzene with alunimium trichloride in toluene and triethyl amine to get the resevetrol

15. Curcumin

Brief manufacturing process of CURCUMIN

Stage-1

Condensatation of vanillin with 2, 4-pentanedione in n-butanol, ethyl acetate and boric acid to get the Curcumin

16. PTEROSTILBENE

Brief manufacturing process of Pterostilbene

Stage-1

Esterification of dihydroxy benzoic acid by using dimethylsulfate in acetone &potassium carbonate to get the methyl 3, 5-dimethoxybenzoate.

Stage-2

Reduction of methyl 3, 5-dimethoxybenzoate with sodium borohydrate in tetrahydrofuran & methanol to get the product (3,5-dimethoxyphenyl)methanol(In-situ) which on halogenations (bromination) of with tribromophosphine in toluene to get the product 1-(bromomethyl)-3,5-dimethoxybenzene(In-situ) and which is on esterification of 1-(bromomethyl)-3,5-dimethoxybenzene with triethyl phosphate to get the diethyl (3,5-dimethoxyphenyl) methylphosphonate

Stage-3

Condensatation ofdiethyl (3,5-dimethoxyphenyl)methylphosphonate with 4-(tetrahydro-2H-pyran-2-yloxy)benzaldehydein tetrahydrofuran and sodium hydride to get the 2-(4-(3,5-dimethoxystyryl)phenoxy)-tetrahydro-2H-pyran

Stage-4

Deprotection of 2-(4-(3,5-dimethoxystyryl)phenoxy)-tetrahydro-2H-pyranwith citric acid in methanol to get the Pterostilbene

17. Resevetrol

Brief manufacturing process of Resveratrol

Stage-1

Esterification of dihydroxy benzoic acid by using dimethylsulfate in acetone &potassium carbonate to get the methyl 3, 5-dimethoxybenzoate.

Stage-2

Reduction of methyl 3, 5-dimethoxybenzoate with sodium borohydrate in tetrahydrofuran & methanol to get the product (3,5-dimethoxyphenyl)methanol(In-situ) which on halogenations (bromination) of with tribromophosphine in toluene to get the product 1-(bromomethyl)-3,5-dimethoxybenzene(In-situ) and which is on esterification of 1-(bromomethyl)-3,5-dimethoxybenzene with triethyl phosphate to get the diethyl (3,5-dimethoxyphenyl) methylphosphonate

Stage-3

Condensatation ofdiethyl (3,5-dimethoxyphenyl)methylphosphonate with 4-methoxybenzaldehyde in tetrahydrofuran and sodium hydride to get the 1-(4-methoxystyryl)-3,5-dimethoxybenzene.

Stage-4

Demethylation of 1-(4-methoxystyryl)-3,5-dimethoxybenzene with alunimium trichloride in toluene and triethyl amine to get the resevetrol