WATER, WATER EVERYWHERE ???

- 1.1 billion people do not have access to safe drinking water.
- 2.2 million people die every year from diseases caused by polluted drinking water
- Less than 0.007% of water on earth is suitable for drinking
- More than 80% of effluents in developing countries are discharged untreated, polluting rivers & lakes

NOT A DROP TO DRINK !!!

Current Scenario

Samriddhi Water Solutions

Idea:

Waste Water Management and Recycling Technology using the coir pith based filter for Textile and other effluent based industries.

Institute : IIFT Delhi & BARC	
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Agenda

- Inspiration
- Market and Industry Analysis
- Technology Description
- Competitive Scenario
- Marketing and Selling Strategy
- Market Traction
- Financials & Costing
- Exit Strategy
- Potential Risks
- Sustainability Benefits

Samriddhi Water Solutions

About Us

•Samriddhi Water Solutions is to be established in Surat, Gujarat to commercialize biosorption technology.
•The aim of the plan is to commercially implement adsorption capacity of waste coir pith, for removal of metal ions, acid and basic dyes from aqueous solutions so as to use it for industrial wastewater treatment.
•**The company derives competitive advantage from the technology developed in house for which we are planning to file a patent**.

Vision

•To become **world leaders in water treatment solutions** across different manufacturing sector helping them achieve environmental compliances

Mission

• Enabling cost effective solutions to maintain the price competitiveness & environment compliances of industries.
• Continued investment in research and development to develop technologies for efficient water purification.
• Providing waste water consulting services.

Collaborators

- R & D from PhD candidates in leading institutes
- Machinery Suppliers
- Chemical Suppliers
- Dyeing Houses & Textile Firms

Inspiration

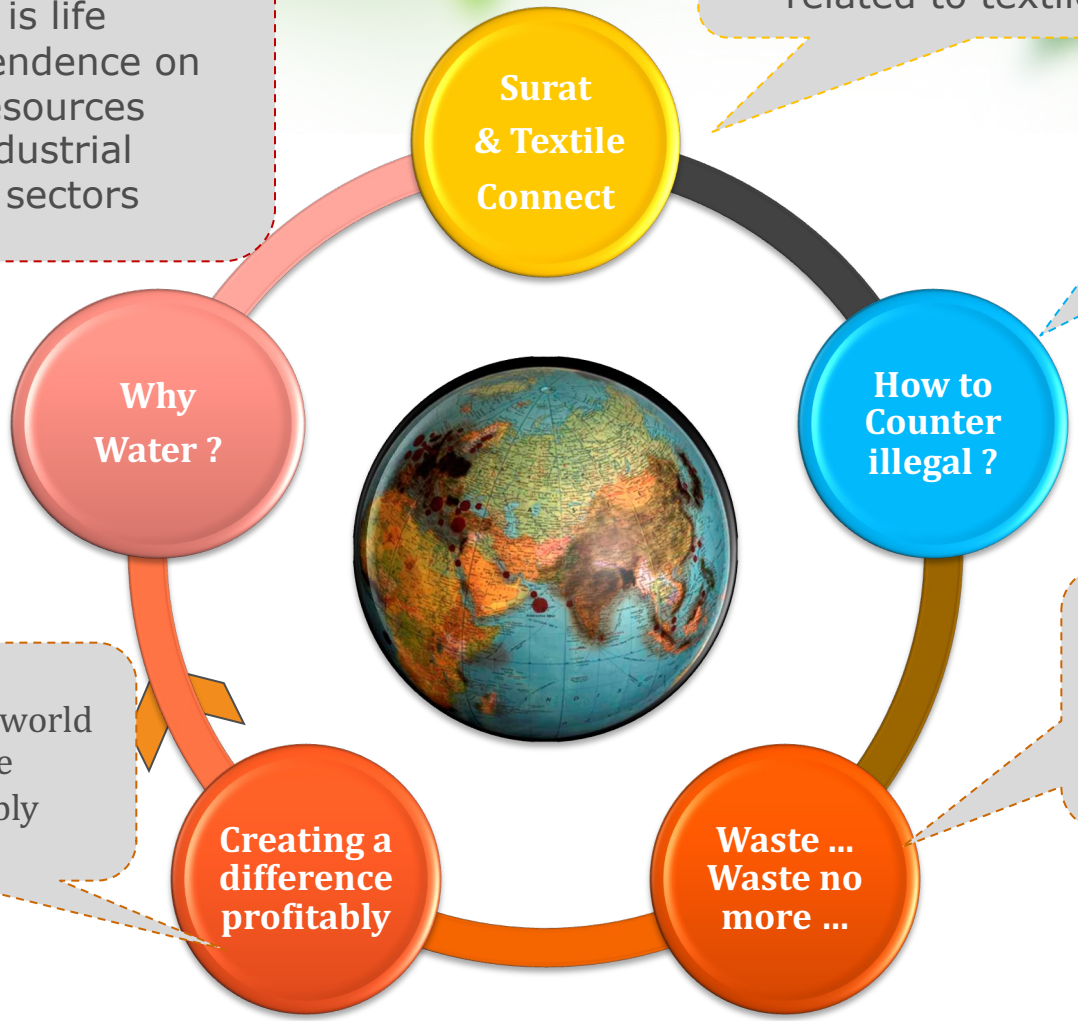
Our team member belongs to Surat and has a family business related to textile industry .

Water is life
Excess dependence on water resources from industrial and civil sectors

The problem was how to counter the illegal discharge of industrial Waste water ?

How can we use a waste to Create a solution which will help treat waste ?

How to make the world A better place that too profitably



Market Analysis

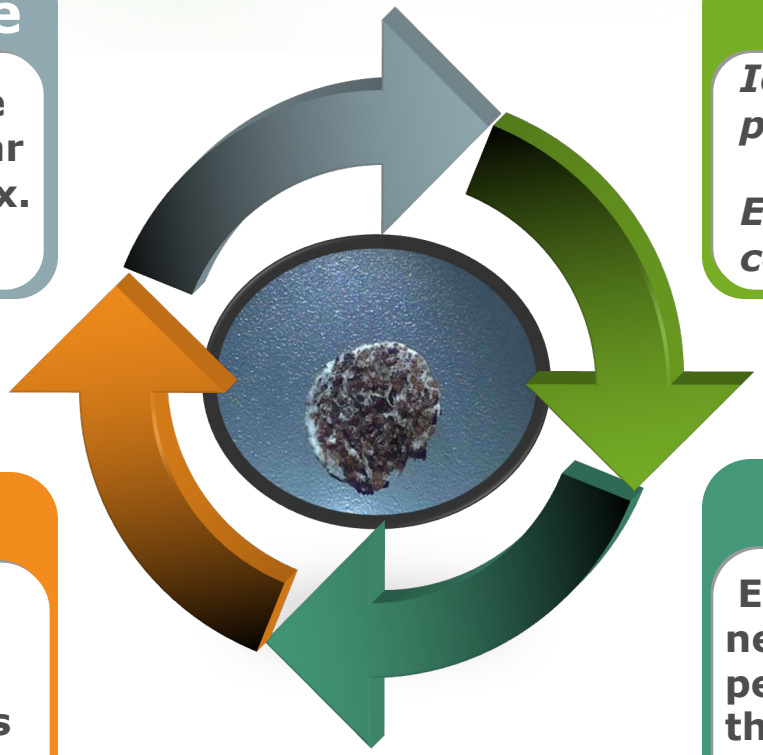
Current Share

15% fraction of the $16.5 billion per year sales which is approx. $2.5 billion/year.

Current Price

Ion-exchange resin price: $50-70/kg

Estimated biosorbent cost: $ 7-10 /kg



BIOSORBENT

Drivers

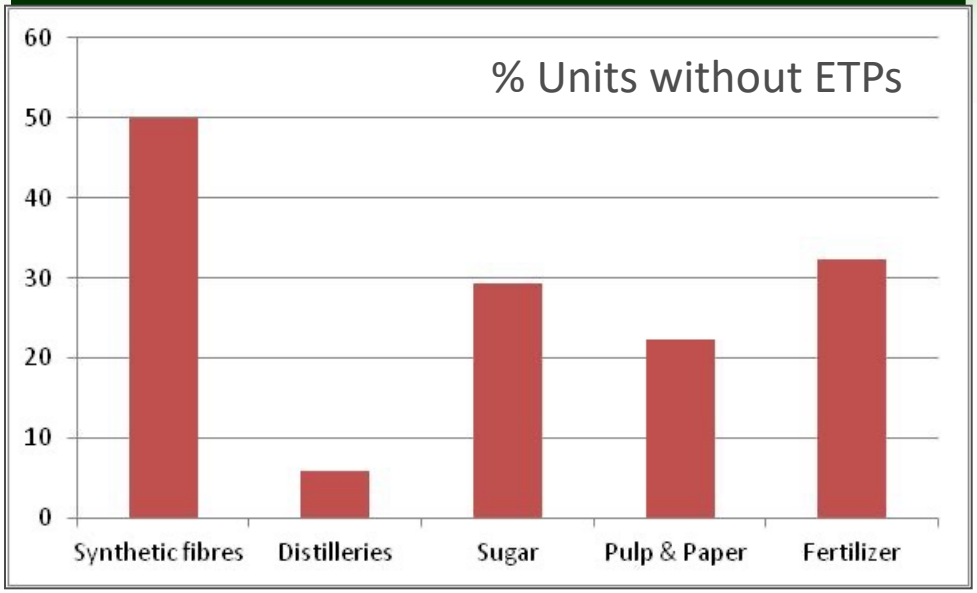
- Price edge will Open new markets
- Environmental regulatory pressures
- Existing Structure can be used

Future Trends

Even at no growth the new biosorbents to penetrate the market to the level of at least 15% i.e. $375 million/year

Industry Analysis

Potential opportunities existing in India



Other Industries

Dyeing, Textile, Paper and Plastics, use dyes in order to colour.
Consuming substantial amount of water.
Presence of even small amounts of dye is highly visible and undesirable.

Harmful affects

Carcinogenic on human consumption.
Affect the photosynthetic activity in aquatic life
Toxic to aquatic life.

Management Team

- Pursuing Ph.D . Chemistry, Bhabha Atomic Research Centre.
- M.Sc. Chemistry (Hons), Punjab University, Chandigarh.
- Area of interest : Chemistry, Nanotechnology & Polymer & Separation Chemistry .

Charu Dwivedi (CTO)

- MBA (International Business), 2010-12, IIFT Delhi (Marketing)
- B.Tech.(Computer Engineering) , G.Z.S.C.E.T Bathinda.
- Microsoft Certified Professional and Red Hat Certified Engineer.

Arun Pandit (CEO)

- MBA (International Business), 2010-12, IIFT Delhi .
- CA, The Institute Of Chartered Accountants Of India.
- Area of expertise Project financing and auditing.

Hemant Prajapati (CFO)

- MBA (International Business), 2010-12, IIFT Delhi .
- Associate, Cognizant Technology Solutions.
- B.Tech. (Mechanical Engineering) VTU.

Anurag Ranjan (CIO)

- MBA (International Business), 2010-12, IIFT Delhi .
- Software Engineer, Newgen Software Technologies Ltd.
- B.Tech.(Computer Engineering) with Honors, Kurukshetra .

Rohit Mittal (CMO)

- MBA (International Business), 2010-12, IIFT Delhi .
- B.Tech. (Mechanical Engineering), IIT Roorkee.
- Procurement Professional, Global e-Procure.

Sudeep Deb (COO)

Technology Description

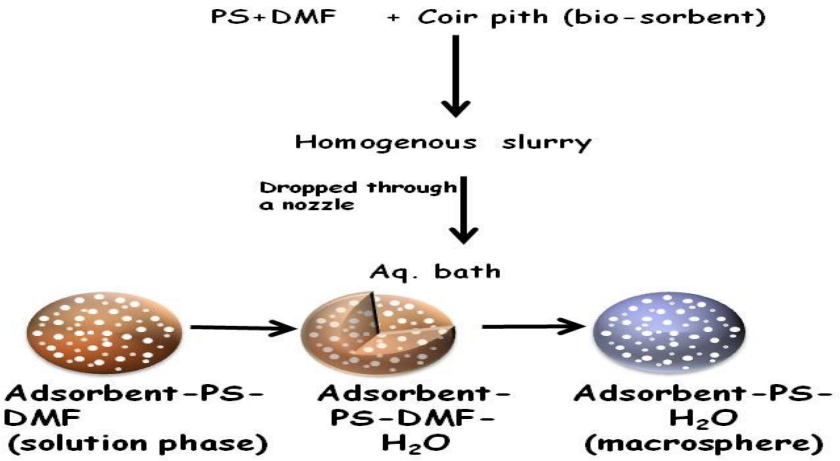
Deionization
- Coir pith washed to remove impurities
- Air dried and ground to make fine powder

Slurry Formation
- Suspended in polysulfone-solvent (N,N-dimethyl formamide) solution to make a homogenous slurry

Phase inversion polymerization
- Solution dropped into water bath to make polymeric beads

Metal Ion Removal
- Synthesized beads washed with water and used for removal of toxic metal ions from waste water streams

Synthesis of Coir-Pith Polymer Composite Beads



Will apply for patents for the product

Invest in R&D on a continuous basis

Laboratory Samples

Resin @ Lab

Resin Cross section @ Lab

Market Traction

Collaborators

S.No.	Name	Owner	Address
Dyeing Houses			
1	Pratibha Dyeing and Printing mills Limited	Mr. Pramod Chaudhary	Plot no. 1/121, Road No.5, G.I.D.C. Pandesara. Surat-394221
2	Siddhi Vinayak dyeing and printing mills Limited	Mr. Sanjay Saravagi	Plot no. 703 Road no.5, G.I.D.C. Sachin. Surat-394230
3	Manish dyeing and printing mills Private Limited	Mr. Manish Agarwal	Plot no.5/171, Road no.7, G.I.D.C., Pandesara, Surat-394221
4	Oriental dyeing and printing mills private limited	Habib bhai	Plot no. 157 Road no.17, G.I.D.C. Sachin, Surat-394230.
5	Jay Bhagwati dyeing and printing mills private limited	Mr. Vinay Chaudhary	Plot no. 28/108, Road no.37, G.I.D.C. Pandesara, Surat-394221
Machine Supplier			
1	Sparrow Tax engineers private limited	Mr. Manohar Saini	Plot no.1/1314 Road no.4, G.I.D.C. Pandesara Surat-394221
Chemical Suppliers			
1	Atul chemicals private limited	Mr. Ankur Sharma	2150/166 Ganeshpura, Trinagar, Delhi-35
2	Naresh chamicals private limited	Mr. Naresh Patel	Shop no.225-228 Mahavir market Ring road, Surat-395002

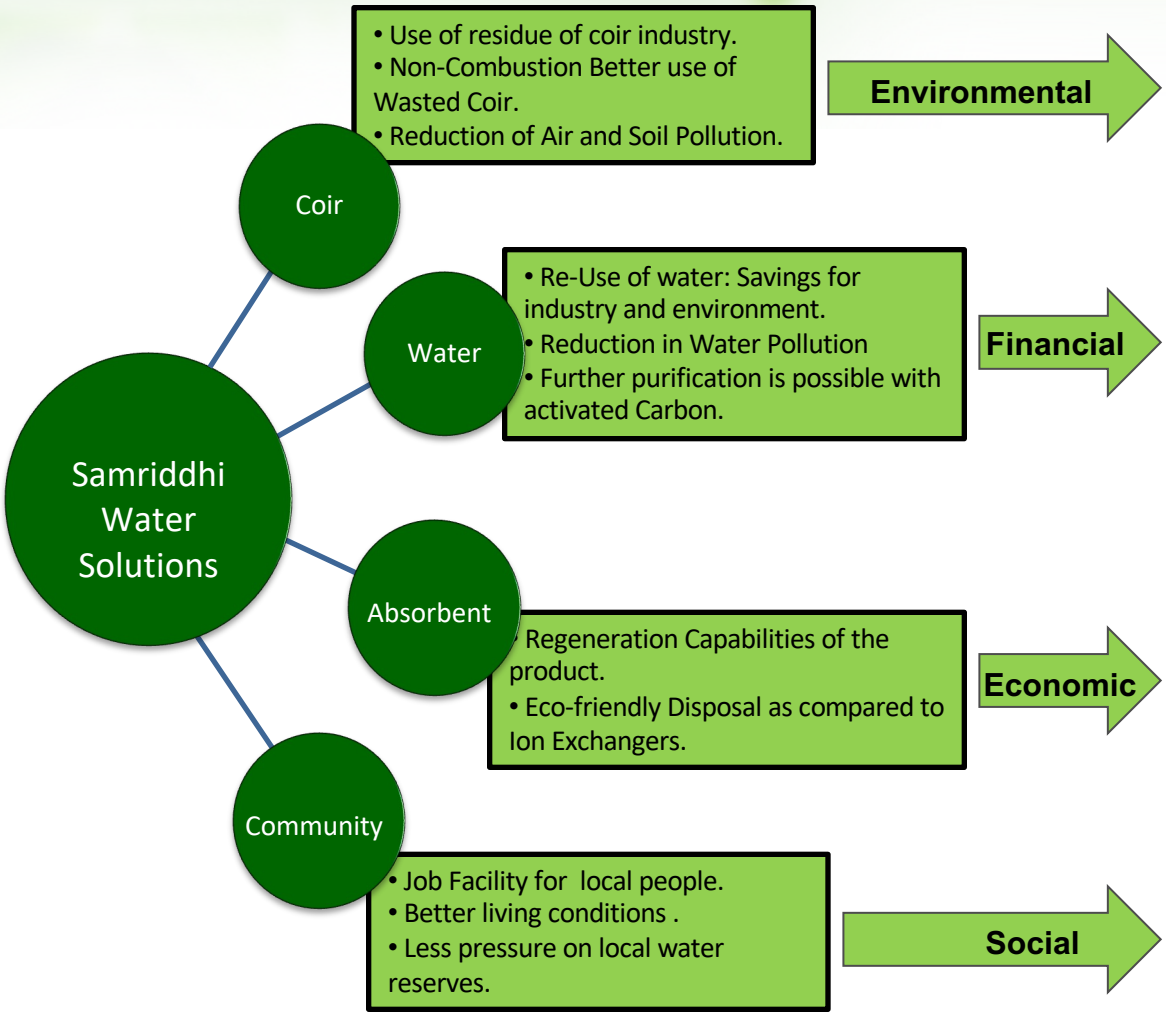
Competitive Advantage

Advantages of CoirAd:

- Significant cost savings in comparison with existing competing technology.
- Abundance of raw material which otherwise will lead to disposal problems.
- Water treated can be reused.
- Low sensitivity to environmental & impurity factors, which make this widely usable.
- Recovery of heavy metals possible and leads to higher cost savings.
- The process is even economically viable for the recovery of metals as a stand-alone activity for more “expensive” metals

Current ETP

Sustainability Benefits



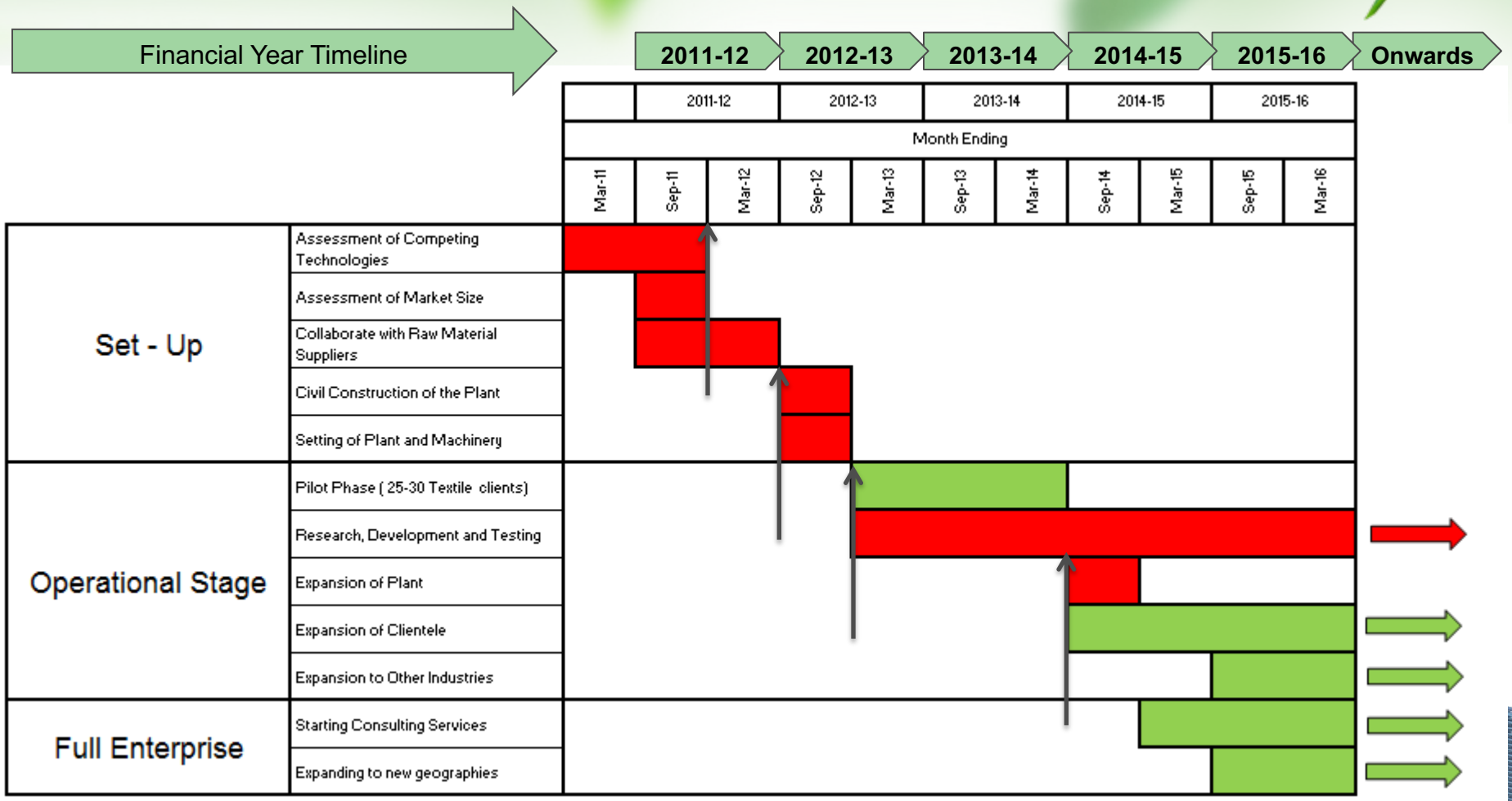
- Coir Pith used in 1st year = 5000 kgs.
- Carbon Dioxide emissions/kg of coir pith burned = 1.276 kg
- Total Carbon Emission reduced = 6380 kg

- Water recycled = 1,80,000 KL /yr (approx)
- Cost Reduction = 2.7 crore/yr (@ 15 paise/ ltr)
- Higher market value of recovered metal and lower costs of biomass.

- Cheap Waste product of coir industry.
- Current ion-exchange resin price: $50-70/kg
- Estimated biosorbent cost: $ 7-10/kg
- Viable for SSIs and SMEs to apply cleaner practice without high capex.

- Increasing requirement of jobs and skills.
- Invaluable benefits to the society and the local community.
- Agro Productivity will increase.

Roadmap for implementation



Marketing & Selling Arrangement

Short Term Strategy :

- Understanding the requirement , fostering relationship with suppliers, and focussed R&D effort
- Broaden the scope and implementation of "CoirAd"
- Use different marketing channels such as Trade Fair, Industry Specific Exhibitions and Seminars to market the product

Long Term Strategy :

Assessment of latest technologies & market opportunities	• New unconventional biosorbent-based processes • A quantitative review of the potential clientele
Formulation of biosorbent materials and client based field tests	• Construction of Greenfield project • Optimization of biosorbent granule properties, application mode – Customization
Fully commercial biosorbent enterprise	• Well organized corporate structure, scaled-up production facilities, and engineering services • A healthy operating profit margin & cash flow

Expansion Plan

Phase 1

Plant Location:
Surat
Market Locations:
Ahmedabad
Vadodara
Surat
Nagpur

Phase 2

Plant Location:
Tirupur
Market Locations:
Tirupur
Bengaluru
Chennai
Coimbatore
Madurai

Phase 3

Plant Location:
Kolkata
Market Locations
Kolkata
Guwahati
Kanpur

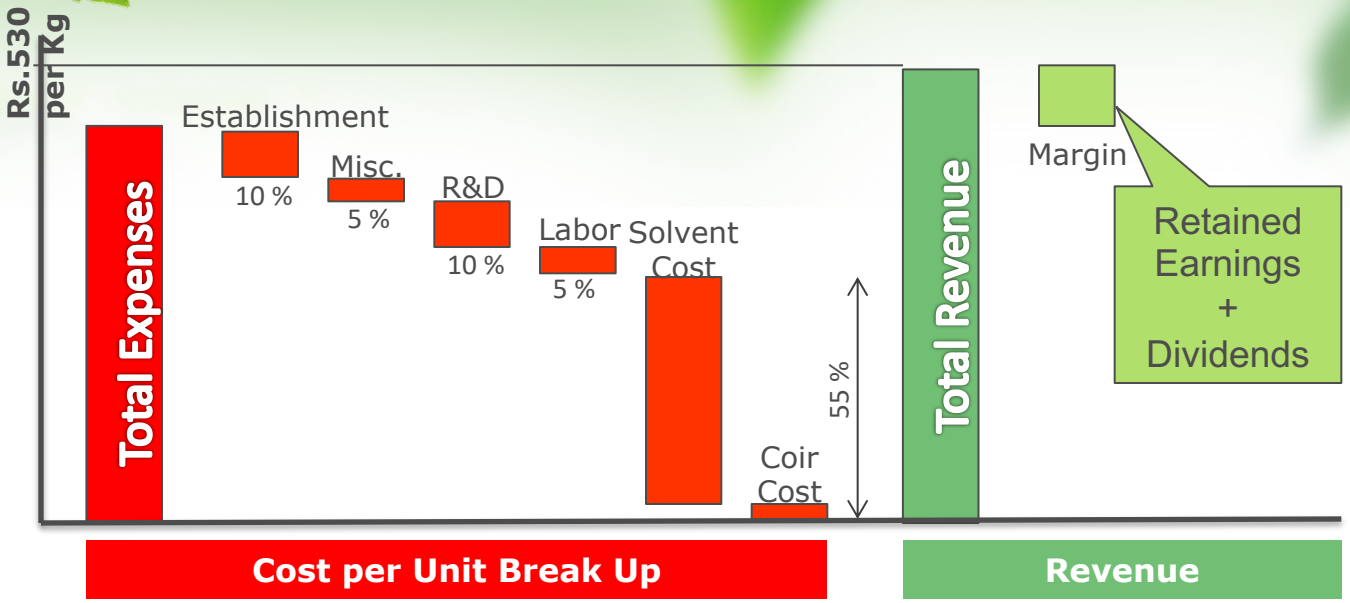
Rationale

- Better Collaboration
- Huge Markets for Expansion
- Diversified Industries

Other Industries

- Mining
- Ore Processing
- Power Generation
- Leather Tanning

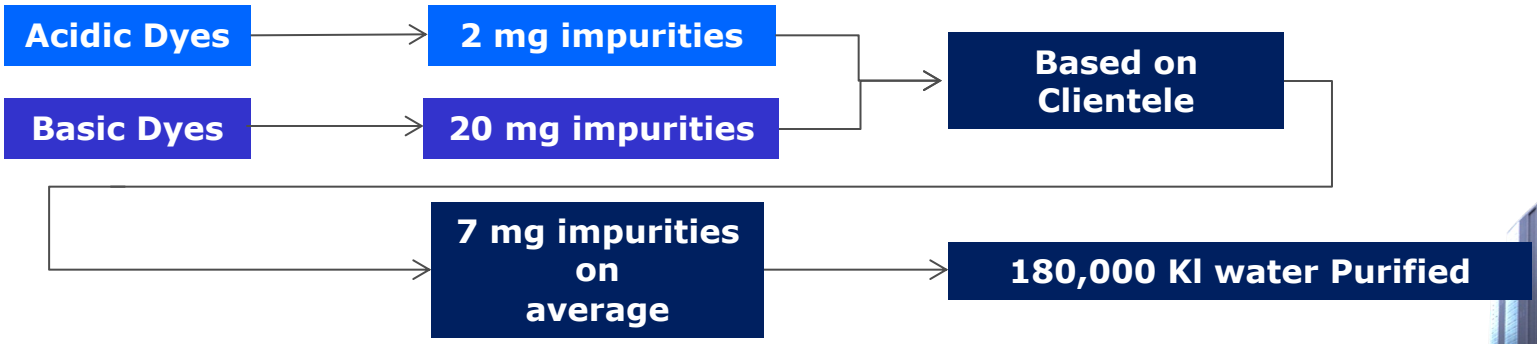
Costing Break Up



Operational Details

- Water purified by 1kg of solution= 1000 L
- Total no of clients expected = 25
- Water purified/day = 25x20,000 =5,00,000 Litres
- Total Solution produced / day = 500 KG

Types of Impurities



Phase 1 Investments & Subsidies

Phase 1

Project Cost	
Plant and Machinery	70.00
Civil Construction	25.00
Other Statutory Expenses	2.00
Land	10.00
Distribution Network	10.00
Training for workers	5.00
Contigencies (incl WC Margin)	40.00
Prelimnary & Preoperative Expenses	5.00
Interst During Construction	0.00
Total	**167.00**

Key numbers at a Glance

Inputs	
Project Start Date	1-Apr-12
Construction Period	6 months
Completion date	1-Oct-12
Revenue generation from	1-Oct-12
Project Cost	167.00
Debt %	0%
Equity %	100%
Preference Capital %	0%
Debt	0.00
Common Equity	167.00
Preference Capital	0.00
Coupon on Preference Capital	16.00%

Capital Subsidies

Gujarat State Government Subsidy

Scheme for financial assistance to common environmental facilities by Gujarat infrastructure development board

- 25% of eligible fixed capital investment.

Central Government Subsidy

Credit linked capital subsidy scheme.

- 15% upfront capital subsidy.

Interest Subsidy

Credit linked interest subsidy in technical textiles.

- Maximum interest rate subsidy of 6% p.a. up to maximum Rs. 125 Lakhs.

Financials Snapshot

Project Cost	
Plant and Machinery	172.08
Civil Construction	20.00
Other Statutory Expenses	1.00
Land	10.00
Distribution Network	5.00
Training for workers	0.00
Contingencies (incl. WC Margin)	60.00
Preliminary & Preoperative Expenses	0.00
Interest During Construction	0.92
Total	**269.00**

Key numbers at a Glance	
Average DSCR	**3.47**
Minimum DSCR	**2.56**
Project IRR	**17.25%**
Equity IRR	**29.89%**
NPV	**133.43**

Inputs	
Project Start Date	1-Apr-12
Construction Period	6 months
Completion date	1-Oct-12
Revenue generation from	1-Oct-12
Date of Start of Repayment	1-Apr-15
Project Cost	269.00
Debt %	58%
Equity %	42%
Preference Capital %	0%
Debt	156.02
Common Equity	112.98
Preference Capital	0.00
Coupon on Preference Capital	16.00%
Interest Rate	5.50%
Moratorium on repayment	8 months
Repayment Period	5 years
Contingencies (as % of Costs)	4.00%

- Investment divided in two phases
- 1st phase, to be financed through equity
- For the 2nd phase a suitable debt: equity structure
- Total project cost =Rs. 2.69 Crores including WC for 6 months.
- Project IRR =17.25% ,
- Equity IRR = 30%
- NPV = Rs. 1.33 Crores.
- Break even = 3.5 years

Subsidies Available

- Gujarat Government - Capital Subsidy 25% of eligible fixed investment.
- Central government – Credit link capital subsidy scheme (15%).
- Gujarat Government – Technical Up gradation Fund Scheme.(6% interest subsidy)

Potential Risks

Commercial Venture Risks	Risk Category	Risk Level	Comments
New biosorbents will not work properly in the industrial environment	●	🟢	Preliminary tests indicate good performance even with industrial solutions
Difficulties with the process application scale-up	●	🟢	No difficulties perceived due to long-time experience with well established sorption
Biosorbent life-time will be too short	●	🟢	Physical granule reinforcement technology known will be further optimized
Biosorbent price will not be competitive	▶	🟢	Their low price is guaranteed
The market has been overestimated	▶	🟢	The biosorbent share of the market has been estimated very conservatively
"Soft" environmental market	▶	🟢	All agree that environmental market will not diminish - strong long-range growth forecast
The competition is too strong	▶	🟡	Established and strong ion exchangers are in a different higher-priced "league“.
The projected Company growth is too high	○	🟢	Very realistic estimates based on the current status of the technology and market needs.
The return on the investment is too distant	○	🟢	Biosorption is a very significant technology with far reaching perspectives.

Risk Category

- ● - Technological risks
- ▶ - Market risks
- ○ - Enterprise/management risks

Risk Level

- 🔴 High Risk
- 🟡 Medium Risk
- 🟢 Low Risk

Exit Strategy

- Environment is the key concern for the governments these days.
- Solutions for managing waste water which are environment friendly are going to be an important part of the sustainable initiatives of governments around the world.
- Samriddhi Water Solutions has the potential to grow at a much faster rate as is demonstrated from the numbers. So the promoters have no intention of exiting the business.

- For Capital requirements and expansion:
  - Bringing in Venture Capitalist with strategic interest
  - Going public

THANK YOU

SAMRIDDHI WATER SOLUTIONS

Key Partners

- Pool of Raw Material Suppliers.
- Pool of Chemical Suppliers.
- Pool of Machinery suppliers.
- Pool of First Phase Dyeing Houses.

Key Activities

- Research & Development
- Phase Wise Capacity Building.
- Expansion units.

Key Resources

- Raw material available at Zero Cost of procurement.
- Superior R&D tie-ups with research institutions.

Value Proposition

- Current ion-exchange resin price: $50-70/kg
- Estimated biosorbent cost : $ 7-10/kg
- Preservation of the environment.
- Recovery of resources – water & heavy metals.
- Smaller firms can be catered to which do not have the capex of installing effluent plants.

Customer Relationship

- Customized Solutions
- Consultancy Services
- Flexibility to meet the scale of operation.

Channels

- Collaborated Development.
- Large Scale production and sales by B2B channels
- Trade Fairs / Catalogue.

Customer Segments

- Phase 1 Dyeing Houses in Gujarat.
- Phase 2 Dyeing Houses in Assam, Karnataka.
- Phase 3: Other Industries:
  - Leather Tanning
  - Mining
  - Ore processing
  - Battery
  - Power Generation

Cost Structure

- The investment is divided in two phases :
  - I Phase: Equity.
  - II Phase: Debt – Equity structure.
  - Total Project cost = 2.69 crores.

Revenue Streams

- Sale of Product and services to the target markets.
- Providing consultancy services for waste management needs.
- Project IRR = 17.25 % (Conservative Estimates)
- Equity IRR = 29.89 % (Conservative Estimates)

APPENDIX

All the monetary figures are in Rs Lakhs	0	1	2	3	4	5	6	7	8
	Mar-12	Mar-13	Mar-14	Mar-15	Mar-16	Mar-17	Mar-18	Mar-19	Mar-20
Profit & Loss Account									
Revenue		**472.50**	**945.00**	**1323.00**	**1512.00**	**1701.00**	**1795.00**	**1795.00**	**1795.00**
Other Income		1.26	3.51	2.76	5.16	8.07	11.25	14.47	18.15
Expenses		**364.38**	**728.75**	**1014.25**	**1158.00**	**1301.75**	**1374.25**	**1376.25**	**1378.25**
Manpower Expenses		23.63	47.25	66.15	75.60	85.05	89.75	89.75	89.75
Establishment Expenses		47.25	94.50	132.30	151.20	170.10	179.50	179.50	179.50
Raw Material Expenses		259.88	519.75	727.65	831.60	935.55	987.25	987.25	987.25
Miscellaneous Expenses		23.63	47.25	66.15	75.60	85.05	89.75	89.75	89.75
Land rent		10	20	22	24	26	28	30	32
Operating Profit (PBDIT)		**109.38**	**219.76**	**311.51**	**359.16**	**407.32**	**432.00**	**433.22**	**434.90**
Depreciation as per SLM		**7.46**	**7.46**	**12.31**	**12.31**	**12.31**	**12.31**	**12.31**	**12.31**
PBIT		**101.92**	**212.30**	**299.20**	**346.85**	**395.01**	**419.69**	**420.91**	**422.59**
Interest Payment		0.00	0.00	8.51	7.22	5.51	3.79	2.07	0.43
PBT		**101.92**	**212.30**	**290.69**	**339.63**	**389.51**	**415.90**	**418.83**	**422.16**
Tax		30.65	69.00	91.26	109.51	127.84	138.01	140.03	142.04
R&D exp.		47.25	94.5	132.3	151.2	170.1	179.5	179.5	179.5
PAT		**24.02**	**48.80**	**67.13**	**78.92**	**91.56**	**98.39**	**99.31**	**100.62**
Carried forward to B/L		24.02	48.80	67.13	78.92	91.56	98.39	99.31	100.62

Balance Sheet

Source of Fund	Mar-13	Mar-14	Mar-15	Mar-16	Mar-17	Mar-18	Mar-19	Mar-20
Equity	167.00	167.00	112.98	112.98	112.98	112.98	112.98	112.98
Reserves	24.02	72.82	67.13	146.06	237.62	336.01	435.32	535.94
Net Worth	**191.02**	**239.82**	**180.11**	**259.04**	**350.60**	**448.99**	**548.30**	**648.92**
Preference Shares	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Secured Loan	**0.00**	**0.00**	**145.62**	**114.42**	**83.21**	**52.01**	**20.80**	**0.00**
Total Source of Fund	**191.02**	**239.82**	**325.73**	**373.45**	**433.81**	**501.00**	**569.10**	**648.92**
Application of Fund								
Land	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Fixed Assets	117.00	117.00	199.00	199.00	199.00	199.00	199.00	199.00
Less: Depreciation	7.46	14.92	12.31	24.62	36.92	49.23	61.54	73.85
Net Block	**109.54**	**102.08**	**186.69**	**174.39**	**162.08**	**149.77**	**137.46**	**125.15**
Current Assets excluding Cash	40.00	40.00	60	60	60	60	60	60
Less: Current Liabilities								
Net Current Assets	**40.00**	**40.00**	**60.00**	**60.00**	**60.00**	**60.00**	**60.00**	**60.00**
Cash Balance	31.48	87.74	69.04	129.07	201.73	281.23	361.64	453.77
Total Application of Fund	**191.02**	**239.82**	**325.73**	**373.45**	**433.81**	**501.00**	**569.10**	**648.92**

Cash Flow Statement

Source of Cash		Mar-13	Mar-14	Mar-15	Mar-16	Mar-17	Mar-18	Mar-19	Mar-20
Revenue Receipts		472.50	945.00	1323.00	1512.00	1701.00	1795.00	1795.00	1795.00
Movement in Current Liabilities		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Income		1.26	3.51	2.76	5.16	8.07	11.25	14.47	18.15
Working Capital Margin		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**473.76**	**948.51**	**1325.76**	**1517.16**	**1709.07**	**1806.25**	**1809.47**	**1813.15**
Uses of Cash									
Cash Expenditure		411.63	823.25	1146.55	1309.20	1471.85	1553.75	1555.75	1557.75
Income Tax		30.65	69.00	91.26	109.51	127.84	138.01	140.03	142.04
Movement in Current Assets		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Term Loan		0.00	0.00	8.51	7.22	5.51	3.79	2.07	0.43
Principal Repayment		0.00	0.00	10.40	31.20	31.20	31.20	31.20	20.80
Preference Capital Redemption Principal		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Preference Capital dividend		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**442.28**	**892.25**	**1256.72**	**1457.13**	**1636.40**	**1726.75**	**1729.05**	**1721.02**
Changes in Cash Balance and Bank Balance		31.48	56.26	69.04	60.03	72.66	79.50	80.41	92.13
Opening Balance		0	31.48	0	69.04	129.07	201.73	281.23	361.64
Closing Balance		**31.48**	**87.74**	**69.04**	**129.07**	**201.73**	**281.23**	**361.64**	**453.77**
Calculation of DSCR									
PAT		24.02	48.80	67.13	78.92	91.56	98.39	99.31	100.62
Add: Depreciation		7.46	7.46	12.31	12.31	12.31	12.31	12.31	12.31
Add: Interest Payment		0.00	0.00	8.51	7.22	5.51	3.79	2.07	0.43
Cash Flow for Debt Service Requirement	**87.74**	**31.48**	**56.26**	**87.95**	**98.45**	**109.37**	**114.49**	**113.69**	**113.36**
Debt Service Requirement	**0.00**	0.00	0.00	18.91	38.43	36.71	34.99	33.28	21.23
DSCR		**0**	**0**	**4.65**	**2.56**	**2.98**	**3.27**	**3.42**	**5.34**
Average DSCR	**3.47**								

Key Ratios

Cash Flow for Project IRR									
PAT		24.02	48.80	67.13	78.92	91.56	98.39	99.31	100.62
Add: Depreciation		7.46	7.46	12.31	12.31	12.31	12.31	12.31	12.31
Add: Interest payment		0.00	0.00	8.51	7.22	5.51	3.79	2.07	0.43
Cash Flow	**-167.00**	**31.48**	**56.26**	**87.95**	**98.45**	**109.37**	**114.49**	**113.69**	**113.36**
Project IRR	**17.25%**								

Cash Flow for Equity IRR									
PAT		24.02	48.80	67.13	78.92	91.56	98.39	99.31	100.62
Add: Depreciation		7.46	7.46	12.31	12.31	12.31	12.31	12.31	12.31
Less: Repayment		0.00	0.00	10.40	31.20	31.20	31.20	31.20	20.80
Cash Flow	**0.00**	**31.48**	**56.26**	**69.04**	**60.03**	**72.66**	**79.50**	**80.41**	**92.13**
Equity IRR	**29.89%**								

Gujarat Pollution Control Board

- **No. 1/2(71)/87 Plg.--**In exercise of the powers conferred under Section 4(4) of the Water (Prevention and Control of Pollution) Act, 1974, the Central Board for the Prevention and Control Water Pollution pursuant to Section 17(1) (m) of the said Act lays down the following standards for compliance by small-scale industries

- http://www.envfor.nic.in/legis/water/no1-2-71-87.html

Gujarat Pollution Control Board

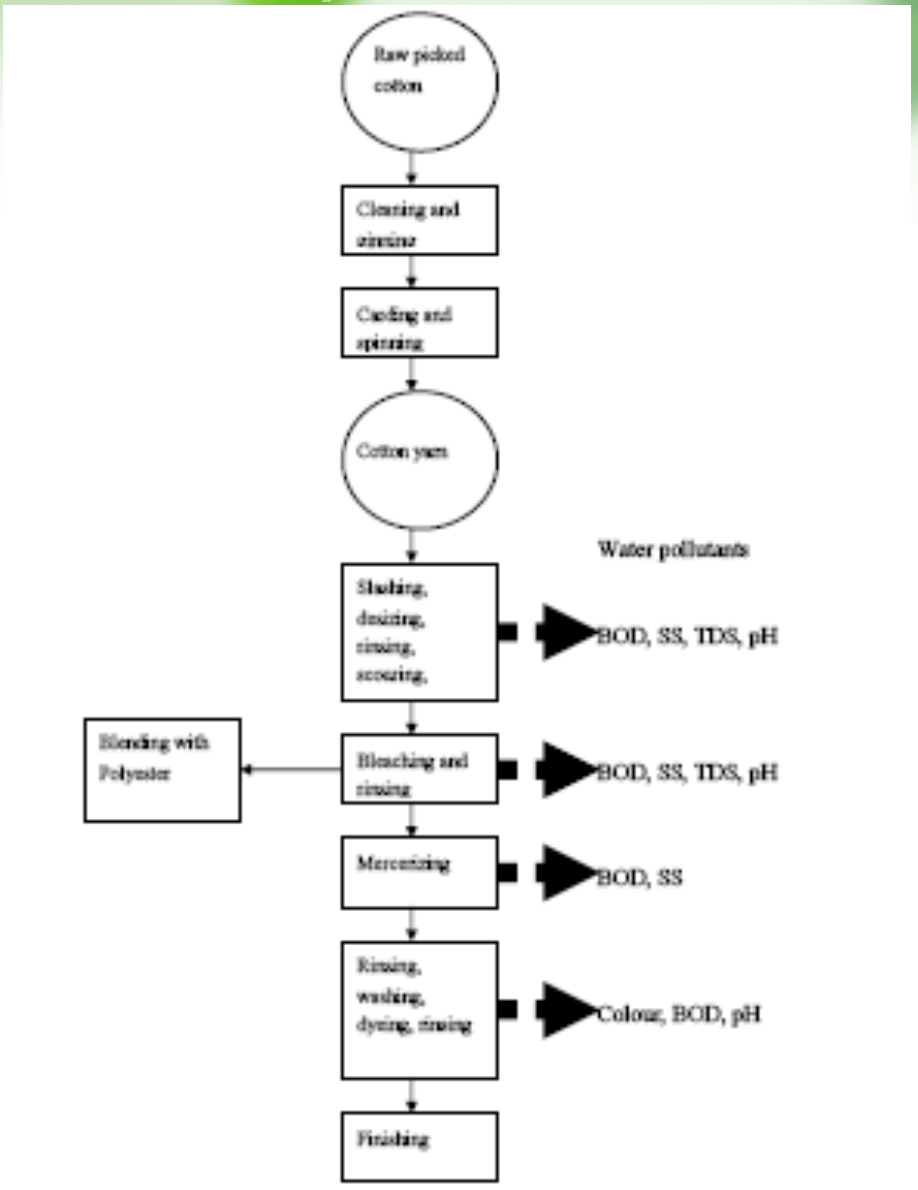
S No.	Parameters	Concentration not to exceed
1	Total Concentration of Mercury (Hg.) in the final (Combined) effluent	0.01 mg/l
2	pH	5.5--9.0
3	Suspended Solids	250 mg/l
4	Biochemical Oxygen Demand	150 mg/l
5	Temperature	Shall not exceed 5 degree C above the ambient Temp. of the receiving body
6	Free available chlorine	0.5 mg/l
7	Oil & Grease	10 mg/l
8	Cu (Total)	3.0 mg/l
9	Iron (Total)	3.0 mg/l
10	Zinc	5.0 mg/l
11	Cr (Total)	2.0 mg/l
12	Phosphate (as P)	5.0 mg/l
13	Bio-assay test	90% of test animals after 96 hours with 1:8 dilution
14	Sulphide (as S)	2 mg/l
15	Phenolic compounds (as C6H5OH)	5 mg/l
16	Hexavalent Chromium (as Cr)	0.1 mg/l
17	Nickel (as Ni)	3.0 mg/l
18	Cadmium (Cd)	2.0 mg/l
19	Chloride (as Cl)	9000 mg/l
20	Sulphate (as SO4)	1000 mg/l
21	Cynides (as CN)	0.2 mg/l
22	Ammomtacal Nitrogen (as N)	50 mg/l
23	Lead (as Pb)	0.01 mg/l
24	Total Metal	10.0 mg/l

Source: http://www.envfor.nic.in/legis/water/no1-2-71-87.html

Instruments Used for Testing

- ATOMIC ADSORPTION
- SPECTROMETER FOR METAL ION DETECTION,
- UV- VISIBLE SPECTROPHOTOMETER FOR DYE DETECTION

Textile Industry : Process



Textile Industry : Effluent Types

Process	Effluent composition	Nature
Sizing	Starch, waxes, carboxymethyl cellulose (CMC), polyvinyl alcohol (PVA), wetting agents.	High in BOD, COD
Desizing	Starch, CMC, PVA, fats, waxes, pectins	High in BOD, COD, SS, dissolved solids (DS)
Bleaching	Sodium hypochlorite, Cl_2, NaOH, H_2O_2, acids, surfactants, $NaSiO_3$, sodium phosphate, short cotton fibre.	High alkalinity, high SS
Mercerizing	Sodium hydroxide, cotton wax	High pH, low BOD, high DS
Dyeing	Dyestuffs urea, reducing agents, oxidizing agents, acetic acid, detergents, wetting agents.	Strongly coloured, high BOD, DS, low SS, heavy metals
Printing	Pastes, urea, starches, gums, oils, binders, acids, thickeners, cross-linkers, reducing agents, alkali.	Highly coloured, high BOD, oily appearance, SS slightly alkaline, low BOD

Textile Industry : Effluent Rates

Parameter	FMENV. Limit	Mill 1	Mill 2	Mill 3	Mill 4	Mill 5
Flow rate (m^3/day)		10,900	17,800	35,000	17,280	16,200
pH	6-9	10.21	11.23	11.04	11.53	10.47
Temperature (°C)	40	31.8	35.7	33.5	26.7	26.7
Colour (Pt-Co)	7	2275	612	3537	4637	968
TDS	2000	1130	2200	1480	848	250
TSS	30	245	35	471	1200	49
Sulphide	0.2	0.64	0.11	0.58	1.94	0.1
Free chlorine	1	0.01	0.01	1.14	1.06	0.76
COD	80	2120	1650	2430	2190	1067
BOD_5	50	227	382	645	242	163
Oil & Grease	10	6.0	8.3	ND	ND	ND
Dissolved Oxygen	-	2.5	2.9	3.08	1.2	7.0
Nitrate	20	7.97	0.8	ND	ND	ND
Ammonia	0.2	1.82	2.01	1.28	0.05	2.72
Phosphate	5	3.42	0.09	2.63	0.74	0.36
Calcium	200	2.21	1.8	1.24	0.26	2.4
Magnesium	200	1.21	1.76	1.04	0.17	2.1