DRDO has developed and patented an anaerobic process for treating human waste and converting it into water and gas: *ABT is a key alliance partner of DRDO for the process*

Company	Comments
DRDO	■ Developed by Gwalior based Defence Research and Development Establishment (DRDE) and Tezpur based Defence Research Laboratory (DRL), both laboratories of DRDO uses anaerobic microbial bacteria ■ The key input in the process is DRDO's proprietary bacteria that can be made available only to **50 approved licensed holders** (also called TOT holders)
Amritasa Solutions Delivered	■ Shri Rajesh Prasad and Shri Atul Sinha acquired Shree Ram Raja Wood Packers (SRRWP), one of the original TOT holders from the DRDO, to make a widespread impact on the livelihood of people, rechristening the enterprise as **Amritasa Bio-Technology (ABT)** ■ Promoters of ABT are aiming to provide the scale, focus and impetus to do business with institution, corporate enterprises, NGOs and industrial units to curb the menace of open defecation ■ ABT is engaged in manufacturing of bio toilets and bio tanks of various configuration using the DRDO technology

Our Value proposition is to address your catchment area's sanitation needs utilising the same anaerobic process

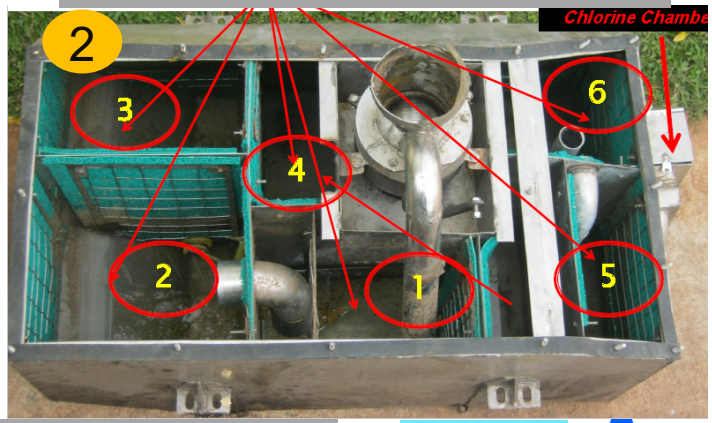
Process flow:

1 Bio Digester

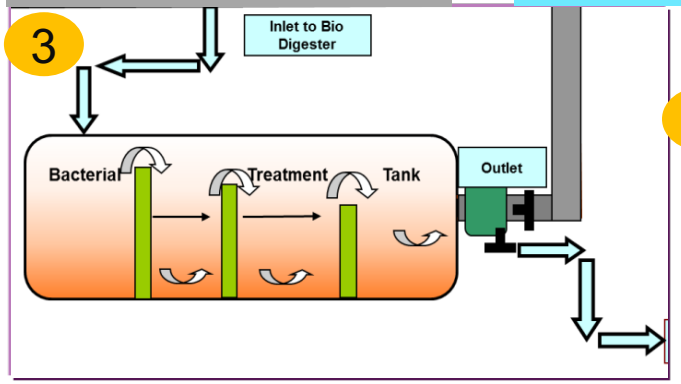
- Waste is collected in the bio digester wherein waste is fed to the bacteria
- Inside the bio digester, the inoculum is fed. ABT has a plant for the seeding bacteria
- The mixture continues within the bio digester over multiple cycles
- Time lag for first output generation is one month

Bio digester

Top view bio digester



Internal view of digester



Gas(CH_4))

A

4 Outputs

B

Water

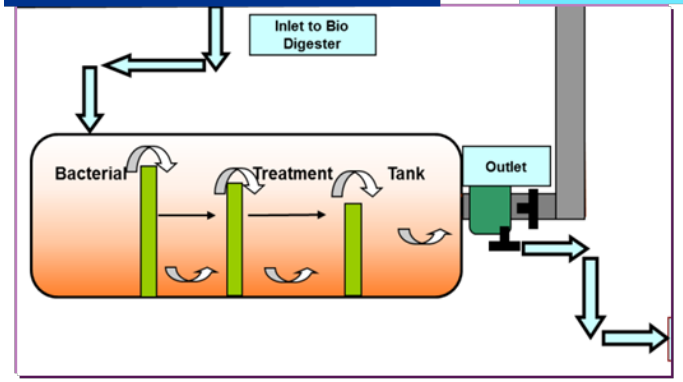
Comments (internal view)

- Bio digester consists of a stainless steel tank with 6 partition walls in side tank
- Poly grass mates for protection of bacteria inside the partition walls
- By pass system with handle for operation during the emergency for making toilet direct discharge in case of choking
- SS fasteners in place of MS on tank covers
- Stronger bonding of rubber mat with vertical walls

For further purifying the resultant water (output B) another variant of the product is the option of bio tank with a Reed Bed

Another process addition-Reed Bed:

Internal view of digester



Bio digester

B

Water

Computerised image

Bio digester view– Railway Coach

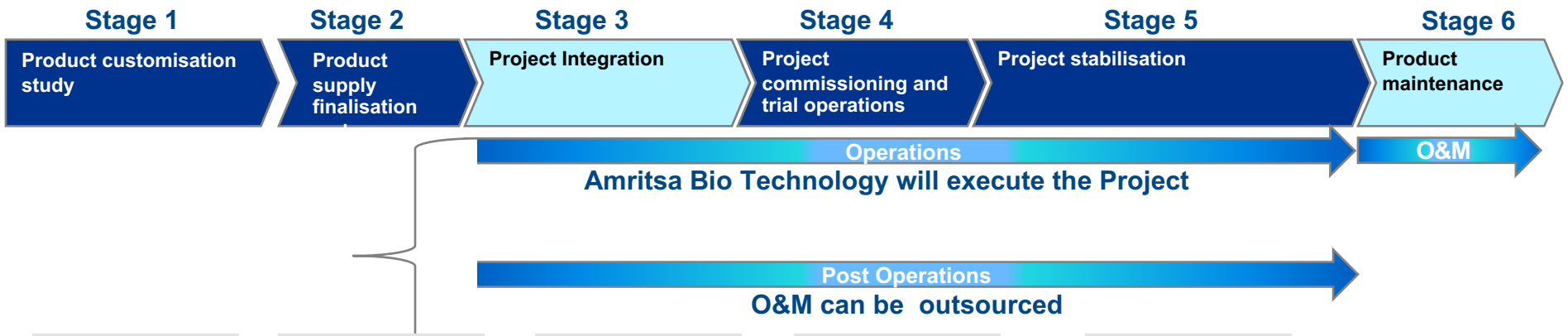
- Water generated before being diverted for any usage is passed through a reed beds(aquatic plant based systems which allow bacteria, fungi, algae to digest the sewage and clean water)
- Two types of beds: vertical flow and horizontal flow that allows process to breakdown pollutants including toxic ammonia into nitrates
- Such a process also prevents blocking and operates more efficiently
- Vertical flow red beds require about 2 sq. m per person served while horizontal bed requires 1 sq m per person
- Maintenance of reed bed is very basic: no additional expense

Choosing the variant with Reed Beed is recommended for most areas especially where the water generated may find usage in drinking, cooking or sanitation process

We have mapped the key technical criteria's for all three processes (septic tank, bio digester with and without reed bed)

Technical comparison: traditional process vs bio-digester				
Criteria	**Prescribed range**	**Septic** tank	**Bio digester**	**Bio Digester with Reed bed**
pH	Ph level should be ~5.5-9	6.7-7.5	7.0-7.2	7.0-7.5
Turbidity(NTU)	~500	500-800	70-90	2.5
Total Suspended (Mg/L)Solids	100(in land surface water) 600 (public sewerage) 200 (irrigation)	150-300	90-120	50-80
TDS(Mg/L)	TDS upto 200 is permissible	500-850	350-450	100-300
Vs(Mg/100ml)		50-60	20-30	5-12
COD(Mg/L)	250 (acceptable limit for inland surface)	1200-2000	250-300	15-25
BOD(Mg/L)	30 (inland surface) 350 (public sewerage) 100 (irrigation)	350-500	70-120	2-4
Coli forms(MPN/ml)		>3000	300-350	0-12

Operating Model: *Amritasa Bio Technology will execute the Project*



Timelines and deliverables

Week 1	Week 2-3	Weeks 4-12	Weeks 13-15	Weeks16
■ Discussion on existing situation-soli condition, water and power availability ■ Finalising the appropriate User Model.	■ Submission of Business Proposal ■ Finalization of Order and terms and receipt of Advance. ■ Commencement of Product design of Digester and Shelter	■ Handing over of the site. ■ Civil work execution, plumbing, water supply arrangement. ■ Equipment receipt and Integration	■ Plant commissioning ■ Feeding of bacteria. ■ Firming the O&M Arrangement. ■ Commencement of Usage.	■ Project stabilisation

ABTL believes that bio digester technology can emerge as the panacea to the growing menace of sanitation needs

Benefits of the technology

Key USP

- No bad smell in toilets from the tanks
- Faecal matter in the tank not visible
- No bugs infestation
- No clogging of digester
- Effluent is free from off odour and solid waste
- No need of removal of solid waste
- No manual scavenging required (sludge free disposal)
- Relatively low cost
- Can do with low water requirement
- Suitable for all terrains
- Useful by-products: Bio gas (only Methane and water)
- No need of any sewage connection
- Promotes ecological way of digesting organic solids preventing contamination of ground water
- Alternative to dumping of wastes in rural and semi-rural areas that lacks adequate sewage systems