FUTURISTIC SAFE INJECTION SYSTEM

RESCITECH VISION PVT. LTD. (OPC)

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Uttar Pradesh, INDIA

PRODUCT

'Futuristic Safe Injection System' provides two variants of reusable injectors, multiple variants of safely disposable drug-cartridges, and a fluid-collector, each one functioning distinctly depending upon various operational situations and requirements.

Drug-Cartridge

A fixed dose of the drug/vaccine is packed between the piston head and needle assembly.

Drug-cartridge is attachable to reusable Injector to constitute Self-retractable syringe operable like ordinary syringe.

After the completion of injection procedure, needle retracts within the empty cartridge automatically.

Empty Drug-cartridge is safely disposable without any risk of needle stick injury.

It provide a 'smart packaging technology' to pack fixed dose of medicines/vaccines

Fluid Collector

Fluid-collector is attachable to reusable Injector to constitute Self-retractable fluid collection device operable like an ordinary syringe.

It ensures the safe collection of the fluids without contamination and can be withdrawn in pathological labs.

Needle once used cannot be reused or exposed to the atmosphere. No risk of needle stick injury.

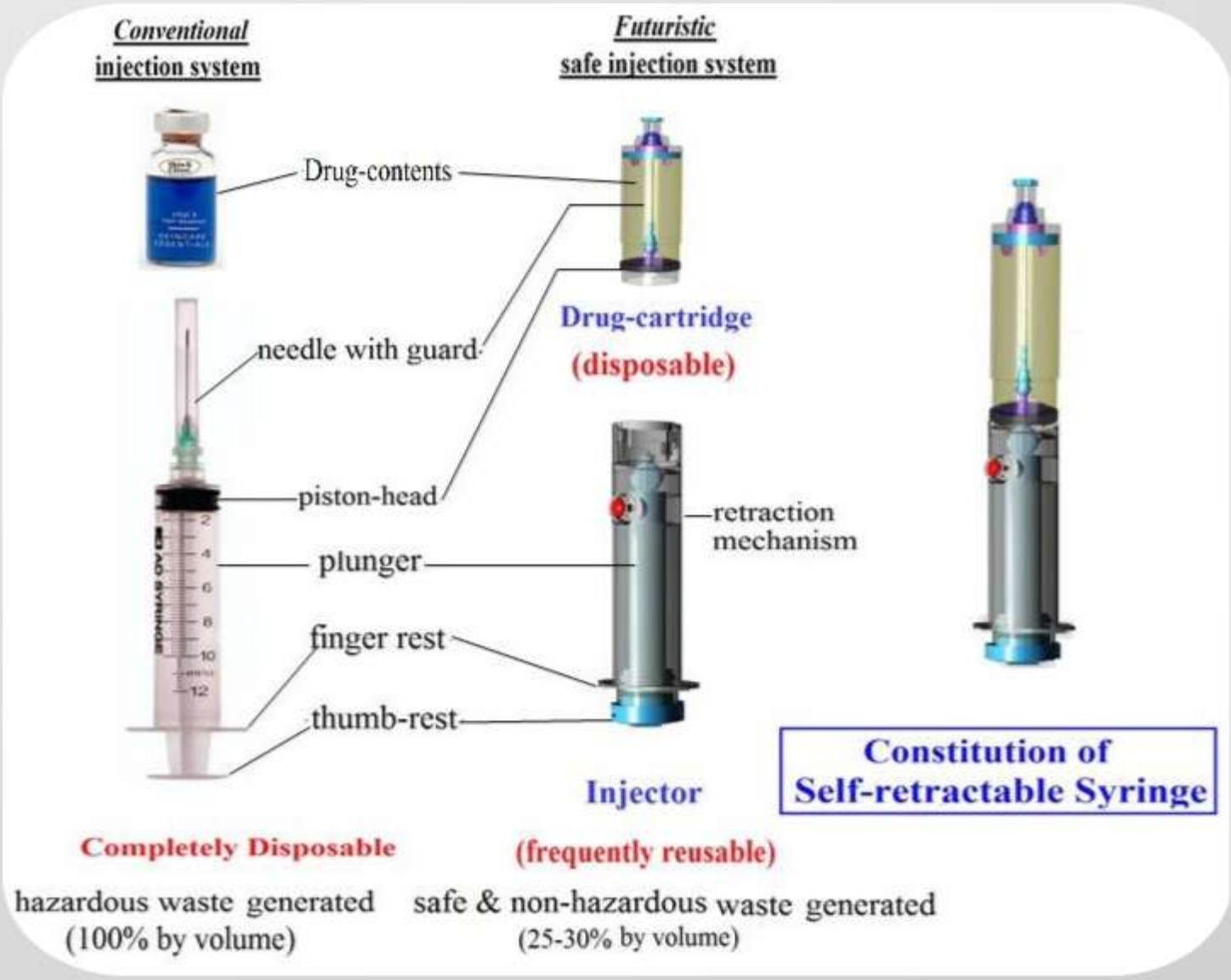
Reusable Injector

It is equipped with an efficient reusable retraction mechanism operated by vacuum

Reusable Injector for multiple injection procedure

The LED provided in injector regulates, keeps vigil on the entire injection procedure and illuminate the injection site to facilitates the injection procedure during the dark hours

Neither of the parts per se is syringe but constitutes an efficient, simple and user-friendly self-retractable safety syringe, when coupled with injector.



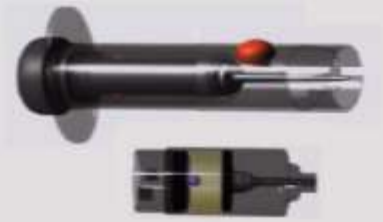
What actually we did....

- converted the ***drug-container*** (vial/ampule) into ***drug-cartridge*** by incorporating the ***needle*** snatched from syringe
- converted the ***syringe*** into a ***frequently reusable injector*** containing efficient vacuum operable ***retraction mechanism***

....both combine together to constitute an efficient, safe and user-friendly ***self-retractable syringe***

No doubt! We successfully reinvented the syringe.

HOW TO USE DRUG-CARTRIDGE?

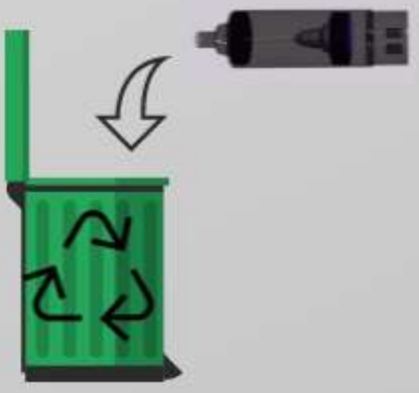


1. Attach the Drug-Cartridge with Injector. Pull the plunger to expose the needle.

2. Remove needle cover. Now its ready for injection procedure

3. Press plunger to inject medicine/vaccine. Needle will automatically retarct to Drug-Cartridge when the last drop of medicine/vaccine is administered.

4. Remove and discard the used Drug-Cartridge safely encapsulating once used needle.



Reuse Injector for next injection procedure

HOW TO USE FLUID-COLLECTOR?

1. Attach the Fluid Collector with Injector and pull the plunger. Break the seal of the Fluid Collector and remove the cap.

2. Pierce the blood vessel and push the plunger. Blood will get collected automatically in Fluid Collector.

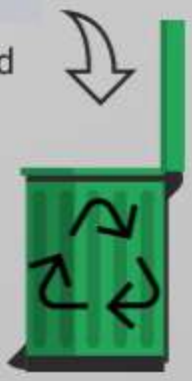
3. Apply the cap and remove Fluid Collector from Injector.

4. Blood is collected safely and preserved in Fluid Collector. Injector can be reused.

5. To transfer blood in a test-tube, attach the Injector and pull the plunger. Remove the cap which safely locks the used needle. Push the plunger to transfer the sample.

Reuse Injector for next injection procedure

Apply the cap on used Fluid Collector to dispose



FEATURES

'Futuristic Safe Injection System provides 'Smart Packaging Technology' to pack fixed dose of vaccine/drug in drug-cartridge containing retractable needle, which on attaching with re-usable injector constitutes an efficient self-retractable syringe. After procedure, needle automatically retracts in empty cartridge and may be discarded. It ensures safe, rapid and easy administration of drug/vaccine dose without syringe in less than 30 second.

SAFE

- No jerk being vacuum operable
- Ensures 'Single-dose, single needle'
- No needle stick injury
- No needle/syringe reuse
- No hazardous medical waste
- No risk of infections of HIV, Hepatitis B, C etc.
- No counterfeit medicine/ vaccine
- No spread of superbug

SIMPLE

- No training required
- Easy to couple with Injector
- Usable like syringe

AFFORDABLE

- Reusable injector for Injection
- Simply required to purchase Drug-cartridge containing fixed dose of medicine/ vaccine
- Single reusable Injector to administer more than 1000 doses
- 80-85% cheaper than available products

RAPID

- Simple 'ATTACH ➡ INJECT ➡ DETACH' procedure
- Just 30 seconds injection process
- Directly transfer of medicne/ vaccine from the manufacturing unit to patient's body
- No need to fill syringe for injection
- Increase in frequency of procedure
- Saves enormous time and effort of medical professional

EFFICIENT

- Maintains original efficacy of medicine/vaccine
- No under/over dosage
- No contamination of medicine/vaccine during injection
- No air-embolism

VERSATILE

- Injector for all injectables medicines and vaccines
- Reusable Injector can be used for drug-cartridge as well as fluid-collector
- LED to indicate completion of process and illuminate injection site in dark hours

SUSTAINABLE

- Ensures saving of 5-15% of over-fill quantity of medicines/vaccine
- No wastage of medicine/vaccine
- Decrease Global Diseases cum Healthcare Burden
- Meet Sustainable Development Goals (SDGs)
- Fight climate-change

INCLUSIVE

- Affordability ensures last mile reach
- Accessibility to all
- Democratize healthcare system
- No technological divide between rich and poor

GREEN

- No sharp waste
- Safe disposal of once used needle encapsulated in empty drug-cartridges makes 25-30% safe waste
- Cut 70-75% of hazardous medical waste
- Saves plastic raw material
- Curb carbon-footprint of Pharma industry

CHEAP. SAFE. GREEN

REDUCTION OF BIOMEDICAL WASTE AND SAVING OF RAW MATERIAL (by volume)

Drug delivery by Conventional syringe

Bio-waste Generated

Reusable

Syringe and Drug container (100%)

Used Syringe and Drug container (100% by volume)

None

Drug delivery by Proposed method & device

Bio-waste Generated

Reusable

Injector and Drug-cartridge (100%)

Empty Drug-cartridge (25-30% by volume)

Reusable Injector (70-75% by volume)

Sr. No.	FEATURES	CONVENTIONAL SYRINGES				FUTURISTIC SAFE INJECTION SYSTEM-2020
		Sterilisable Syringes	Disposable syringes	Auto-disable AD syringes	AD/Retractable safe syringes	
1.	Risk of Needle Stick Injury	Yes	Yes	Yes	Yes	No
2.	Risk of failure of AD/RM features	---	----	Yes	Yes	No
3.	Risk of under/over dosage	Yes	Yes	Yes	Yes	No
4.	Unnecessary Wastage of medicine	Yes	Yes	Yes	Yes	No
5.	Risk of contamination of Medicine	Yes	Yes	Yes	Yes	No
6.	Ease of injection process	Very low	Very low	Very low	Very low	High
7.	Frequency of Injection process	Very low	Very low	Very low	Very low	High
8.	Indicator to monitor injection process	No	No	No	No	Yes
9.	Illumination of injection area in dark	No	No	No	No	Yes
10.	Generation of Biomedical waste	100% by volume	100% by volume	100% by volume	100% by volume	25-30% by volume
11.	Economic burden on end-user	Low	High	Higher	Maximum	Minimum
12.	Manufacturing, storage, transport, care costs etc.	High	low	Higher	Highest	Very low
13.	Care, carriage etc. Burden on healthcare worker	High	low	Higher	Highest	Very low
14.	Risk of Air-embolism	Yes	Yes	Yes	Yes	No

WHY FUTURISTIC SAFE INJECTION SYSTEM?

PHARMACEUTICAL INDUSTRY

SMART PACKAGING TECHNOLOGY FOR INJECTIBLE MEDICINES/ VACCINES

- No overfill of medicine required at all
- No contamination of medicine possible
- Original efficay of medicine remains intact
- Automation checks on counterfeit medicine
- Smart and aesthetic packaging adds value to the product

REUSABLE INJECTOR FOR MULTIPLE INJECTION PROCEDURES

- Makes injection procedure user-friendly, safe and affordable
- No risk of needle stick injury, needle/syringe reuse

CUSTOMER/BENEFICIARIES

SAFE

- No jerk being vacuum operable
- Ensures 'Single-dose, single needle'
- No needle stick injury
- No needle/syringe reuse
- No hazardous medical waste
- No risk of infections of HIV, Hepatitis B, C etc.
- No counterfeit medicine/ vaccine
- No spread of superbug

EFFICIENT

- Maintains original efficacy of medicine/vaccine
- No under/over dosage
- No contamination of medicine/vaccine during injection
- No air-embolism

CHEAPER

- Simply required to purchase Drug-cartridge containing fixed dose of medicine/ vaccine
- Reusable Injector for multiple injection procedure
- Single reusable Injector to administer more than 1000 doses
- 80-85% cheaper than available products

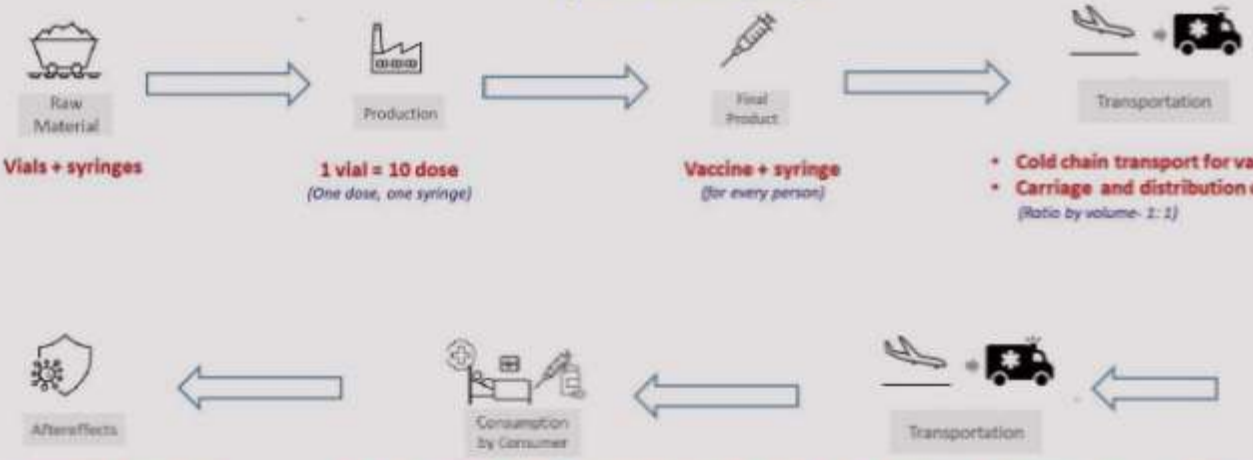
What expert says...

> “The complete transfer of drug substances from vial / ampoules is never possible as some quantity of drug remain be inside of bottle, therefore FDA recommend to fill additional quantity about 5-15% of extra quantity to ensure the label potency / prescribed amount of drug has been comfortably transferred into syringes for injection. Therefore, to compensate the dispensing losses, it is always necessary to add addition 5-15% additional drug substance in final formulation dosage form i.e. vials, ampoules. This additional drug quantity is called ‘overfill amount’, is mandatory and Drug Companies do submit validation report for the their addition quantities to regulatory agencies. The ‘overfill quantity’ is mandatory disclosure and drug companies do submit data to regulatory agencies for final IND approval for any injection. Because of this, any vials or ampoules for injection always contains about 5-15% addition drug substances to confirm and ensure that recommended dose gets transferred into syringe for IV/IM injection. This additional extra drug quantity is absolutely a waste of drug product and cost of this extra mount huge. The minimum of 5% saving of drug substance is enormous and unimaginable saving to drug companies and it is a direct input cost saving. In comparison to this savings the packaging material saving and initial cost is simply peanut, A Game Changer. Further, this overfill quantity goes with packaging material waste and required extra care, if not compromised during plastic recycling....this further leads a more impure and contaminated recycled plastic.....the hazards of this multi drug contaminated plastics is very unknown and as of now there is no study matrix available to visualize and estimate the danger situation. In light of above facts, the Futuristic Safe Injection System is a extraordinary achievement and gives solution to many critical problem along with a better economical choice.”

Dr. Anand Pandey
General Manager
Nectar Lifesciences Ltd, India

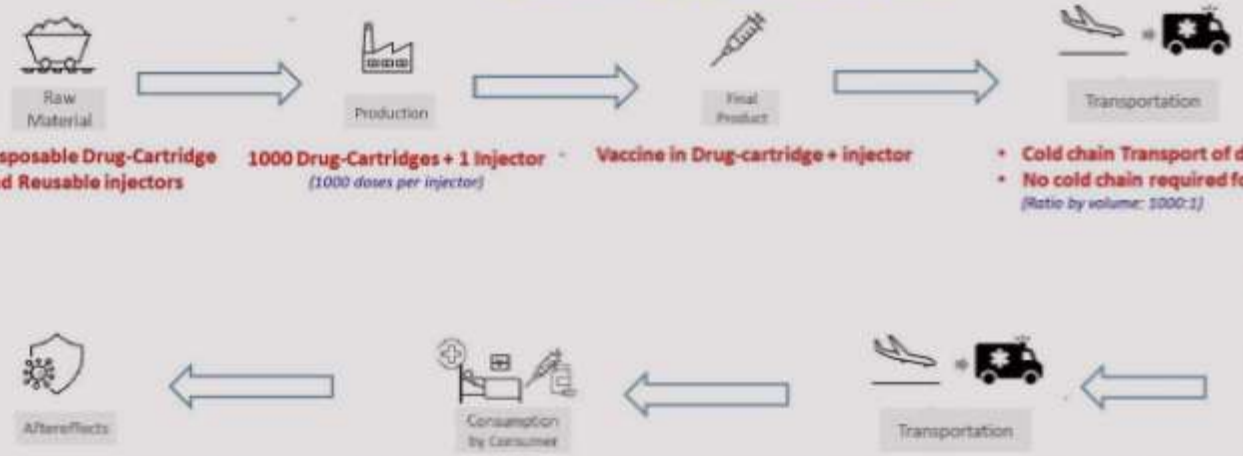
FOR COVID-19 VACCINATION

COVID-19 Vaccination for 1000 doses
(by conventional syringe)



- Vials + syringes
- 1 vial = 10 dose *(One dose, one syringe)*
- Vaccine + syringe *(for every person)*
- Cold chain transport for vaccine
- Carriage and distribution of syringes *(Ratio by volume- 1: 1)*
- Cold chain storage for vaccine
- Storage of syringes *(Ratio by volume- 1: 1)*
- Distribution to administration sites
- 5 to 10 Medical Professionals for 1000 doses /day *One Needle, One Syringe, Only One Time* *(Frequency: 100-200 doses/day/professional)*
- Difficult Last mile reach
- Needle stick injury (NSI)
- Reuse of dirty syringes/needles
- Wastage of precious vaccine
- Huge hazardous medical waste
- Spread of Superbug

COVID-19 Vaccination for 1000 doses
(by Futuristic Safe Injection System-2020)



- Disposable Drug-Cartridge and Reusable injectors
- 1000 Drug-Cartridges + 1 Injector *(1000 doses per injector)*
- Vaccine in Drug-cartridge + injector
- Cold chain Transport of drug-cartridges
- No cold chain required for injector *(Ratio by volume: 1000:1)*
- Distribution to administration sites
- 1 to 2 Medical Professional for 1000 doses/day *One Needle, One Syringe, Only One Time* *(Frequency: 600-800 doses/day/professional)*
- 75-80% decrease in manpower
- 5 times increase in efficiency
- Last mile reach of vaccine + injector
- Cold chain Transport of drug-cartridge
- No cold chain required for injector *(Ratio by volume: 1000:1)*
- No needle sick injury (NSI)
- No reuse of dirty syringes/needles
- No wastage of precious vaccine
- No spread of Superbug
- Only 20-30% safe medical waste

100% REUSABLE INJECTOR FOR MULTIPLE INJECTION PROCEDURE FOR MASS VACCINATION

75% REDUCTION IN MEDICAL PROFESSIONALS REQUIRED FOR MASS VACCINATION

70% REDUCTION IN HAZARDOUS MEDICAL WASTE

...a move to ensure safe COVID-19 Vaccination of all

The Consortium for Affordable Medical Technologies (CAMTech) of Massachusetts General Hospital

"The proposed novel syringe has great potential to reduce medical waste and increase safety for medical professionals. It is responsive to the WHO call for reduction in reused syringes. This is clearly a breakthrough technology as evidenced by their patent applications and their early recognition."

The reviewers' opinion in the final stage in ***First Mile Innovation Challenge – CAMTech*** organized by **Massachusetts General Hospital** in association with **GE Sustainable Healthcare Solutions**

FUTURISTIC SAFE INJECTION SYSTEM

Sustainable & inclusive technology

100%

SAFE

fight Pandemic

fight Climate -Change

meet Sustainable Development Goals

70%

REDUCTION IN HAZARDOUS MEDICAL WASTE

Save the lives of millions!

0%

RISK OF INFECTION

NO TECHNOLOGICAL DIVIDE

ENSURES COVID-19 VACCINATION OF ALL

FUTURISTIC SAFE INJECTION SYSTEM-2020 meets SUSTAINABLE DEVELOPMENT GOALS

SAFE. GREEN. AFFORDABLE

MARKET

EEPC India
@eepcindia

India's 'Futuristic Safe Injection System-2020', is ready for industrial commercialization.

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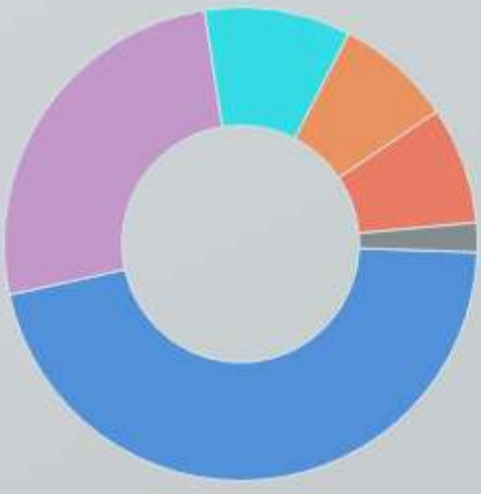
GLOBAL PHARMA MARKET SHARE (2017)



USA 46% ROW 26% EU 10%
JAPAN 8% CHINA 8% INDIA 2%

Our Patents cover

70%

Global Pharma Market

PATENTS

- 'A Fluid Injecting System with Needle Retraction by Vacuum" 2015
  - U.S. Patent No. 10729857 [PATENT GRANTED]
  - United Kingdom Patent Application No. 201716358 [PATENT GRANTED]
  - China Patent Application No. 2016800144965 [PATENT GRANTED]
  - South Africa Patent No. 2017/06803 [PATENT GRANTED]
  - Japan Patent Application No. 2017-546236 [PATENT GRANTED]
  - India Patent Application No. 645/DEL/2015 [Likely to grant]
- "Auto-retractable Safety Syringe (ARS) for Single Use" 2012, India Patent Application No. 3624/DEL/2012 [Likely to grant]
- "Vacuum-retractable Safety Syringe (VRS) for Single Use" 2012, India Patent Application No. 3625/DEL/2012 [Likely to grant]
- "Self-retractable Safety Syringe (SRS) for Single Use" 2012, India Patent Application No. 3601/DEL/2012 [Likely to grant]
- "Folded-plunger Auto-retractable Single use Syringe" 2012, India Patent Application No. 3476/DEL/2012 [Likely to grant]
- "Folded-plunger Auto-retractable Disposable Syringe" 2012, India Patent Application No. 3475/DEL/2012 [Likely to grant]

> "The technical effect of these features is that the injector is reusable while the only parts to be discarded are the needle hub and the medicament cartridge. As a result a cheaper and friendlier to the environment system is achieved without an increased risk of needle injuries."

- The *Written Opinion* of the **European Patent Office**, the International Search Authority of World Intellectual Property Organisation (WIPO) on *the economic viability and its impact.*

RECOGNITION

- Achieving more than 32000 global votes at #youforG20: Project of an Interconnected World, an initiative by Deutschland on the occasion of G-20 Summit-2017 at Hamburg.

- Featured in The International Sharps Injury Prevention Society, ISIPS Newsletter of USA (Issue: 7th July, 2017).

- Top 100 Entries in 'Create the Future Design Contest 2017' organized by Tech Briefs Media Group, the publishers of NASA Tech Briefs magazine.

- IMC Inclusive Innovation Awards 2017 worth Rs. 100,000 by Indian Merchants' chamber of Commerce & Industry

- Top 20 most promising Social Enterprises of India in Tata Social Enterprise Challenge 2017 by TATA group and the Indian Institute of Management Calcutta

- Top 400 Start-up to transform India in Smart Fifty – India's biggest start-up contest by Indian Institute of Management (IIM) Calcutta

- 'BIRAC-SRISTI Appreciation Award-2017' worth Rs.100,000 by 'Society for Research and Initiatives for Sustainable Technologies and Institution' (SRISTI) and 'Biotechnology Industry Research Assistance Council' (BIRAC) under Ministry of Science and Technology, Govt. of India.

- Shortlisted among few inventions globally in the first stage of 'The First Mile Innovation Challenge' by – The Consortium for Affordable Medical Technologies (CAMTech) of Massachusetts General Hospital in association with GE Sustainable Healthcare Solutions.

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