

DET  XYFI





# Access To Clean Drinking Water

## Should Be A Basic Human Right

## Access | Trust | Equity

**Local**  
NDAY, AUGUST 6, 2017 • SECTION L  
**WATER POLLUTANTS FOLLOW**  
Report: 5 North Jersey systems have contaminants

**E SOBKOWSKY**  
WRITER, @KATESOBKOWSKY

report released recently by an environmental group revealed several systems throughout North Jersey – Lyndhurst, Elmwood Park, Garfield, Wallington and Bloomfield – had harmful pollutants in their water supply. Although all but Elmwood Park and Wallington tested within the national guidelines for contaminants, Environmental Working Group reported Lyndhurst, Garfield and Wallington tested

higher than the group's suggested health guideline, which could put residents at a higher risk for cancer, developmental issues in children, problems in pregnancy and other serious health conditions. The Environmental Working Group's limit for total dissolved solids, which are used in industry as solvents or refrigerants, is 500 parts per billion, with an additional 80 parts per billion in water is 80 parts per billion, with Environmental Working Group suggesting .8 parts per billion would be the necessary level for healthy water.

Elmwood Park's level was 83 ppb. Tests that look for more than 80 contaminants in drinking water are conducted regularly by the U.S. Environmental Protection Agency. Environmental Working Group used the EPA's data on 100,000 public water utilities in the country to compare data. The American Water Works Association and more than 200 water utilities reviewed the testing and violation data and either verified the accuracy of the data or provided

The report named  
Garfield, Wallington

**NEWS** **WATER EMERGENCY IN JACKSON MS**  
**CHALLENGING FOR MANY OF US AS THEY HAVE**

**MAYOR TURNER: BOIL WATER NOTICE IN HOUSTON**  
BREAKING NEWS: SPLENDORA ISD CLOSED ON THURSDAY

**WINTER STANDS FOR HOUSTON**

**NEW AT 6**  
**CAMP LEJEUNE WATER CONTAMINATION**

**REPORT: 5 NORTH JERSEY SYSTEMS HAVE CONTAMINANTS**

**THE TIMES OF INDIA**  
City Bennett, Coleman & Co. Ltd.  
20 + 4 pages of B...

### Water pollution touching dangerous levels in city

**Water pollution touching dangerous levels in city**  
The Bellandur tank, once the city's largest fresh water body is now so polluted, it doesn't sustain life within or without.

The physical character of the soil is sandy loam to skeletal red laterite which facilitate easy absorption. The infiltrated water carries harmful pathogens, heavy metals and carcinogenic chemicals. Over 5000-6000 livestock bring downstream of the drains that course through these valleys and on the banks of the lakes on the outskirts of the city drink only sewage water and feed on grass grown with the same water. Vegetables, fruit and other crops are also grown with the same water. Vegetables, fruit and other crops are also grown with the same water.

**DEVELOPING STORY**

**DOZENS SICKENED IN NEW YORK | REGIONNAIRES' OUTBREAK**

**Water pollution time bomb**  
Alarmed specialists say Durban's water security is not so much threatened by scarcity as by upstream pollution – much of it emanating from Pietermaritzburg's Msimus River. **Fred Kocott and Siboniso Mngadi report**

**FACT BOX**

**Water pollution time bomb**



# Our technology has been developed at MIT over 10+ years of research

## Step 1



### Waste Wood Processing

- Vertically integrated with Winwood Sawmill in Massachusetts

## Step 2



### Chemical Treatment

- Design and prototyping partner (RPM Tech) transforms filters to maximize filtration and flow rate

## Result



Performance classification	Log <sub>10</sub> reduction required			Interpretation (with correct & consistent use)
	Bacteria	Virus	Protozoa	
***	≥4	≥5	≥4	Comprehensive protection
**	≥2	≥3	≥2	
*	Meets at least 2-star criteria for two classes of pathogens			Targeted protection
.	Fails to meet WHO performance criteria			Little or no protection

### 3<sup>rd</sup> party verified

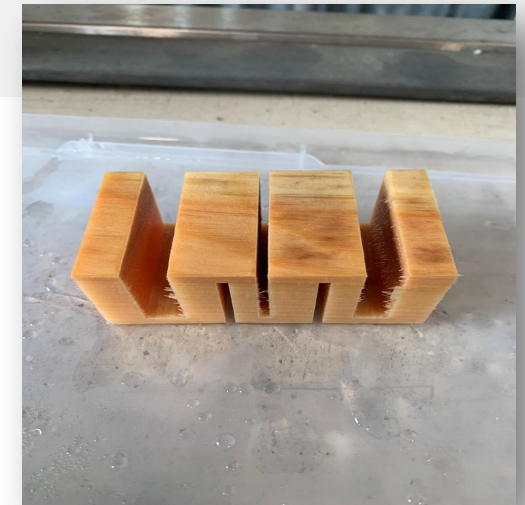
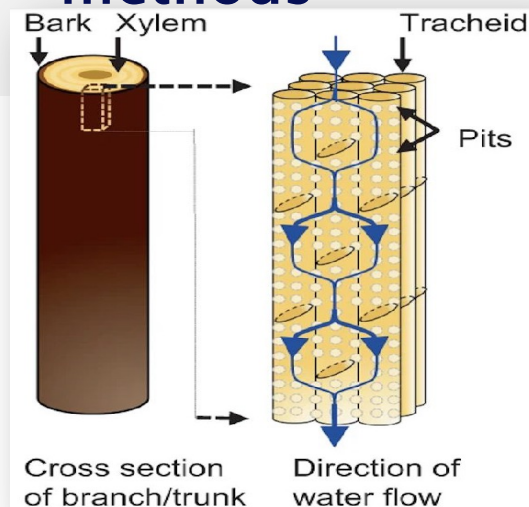
- WHO quality filtration against disease causing microbes



# DetoXyFi


**Our patented, one-of-a-kind water filtration technology inspired by nature.**

- 10 years of lab and field testing in India, Uganda, Madagascar, and the US with high social acceptance\*
- Human-centered design
- 60% cheaper, up to 10x more effective than alternative methods





# Our devices are patent-pending and field tested across 5 countries



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United States Patent and Trademark Office  
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DUANE MORRIS LLP - Philadelphia  
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CONFIRMATION NO. 2087

FILING RECEIPT



0000000195084

Date Mailed

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability until the application is converted to a non-provisional patent application. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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**Power of Attorney:**  
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**Permission to Access Application via Priority Document Exchange:** Yes


**Permission to Access Search Results:** Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/39 appropriate.

**If Required, Foreign Filing License Granted:** 07/11/2022

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 63/367,267**

**Projected Publication Date:** None, application is not eligible for pre-grant publication  
page 1 of 3



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PCT/US22/76211

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H5761-00004

Title of Invention

A COMPREHENSIVE LIQUID FILTRATION DEVICE, FILTRATION SYSTEM, AND METHOD THEREOF

Application Information

APPLICATION TYPE

International Application (PCT) for filing in the US receiving office

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-

CONFIRMATION #

6981

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Kalie Wray

PATENT CENTER #

60955167

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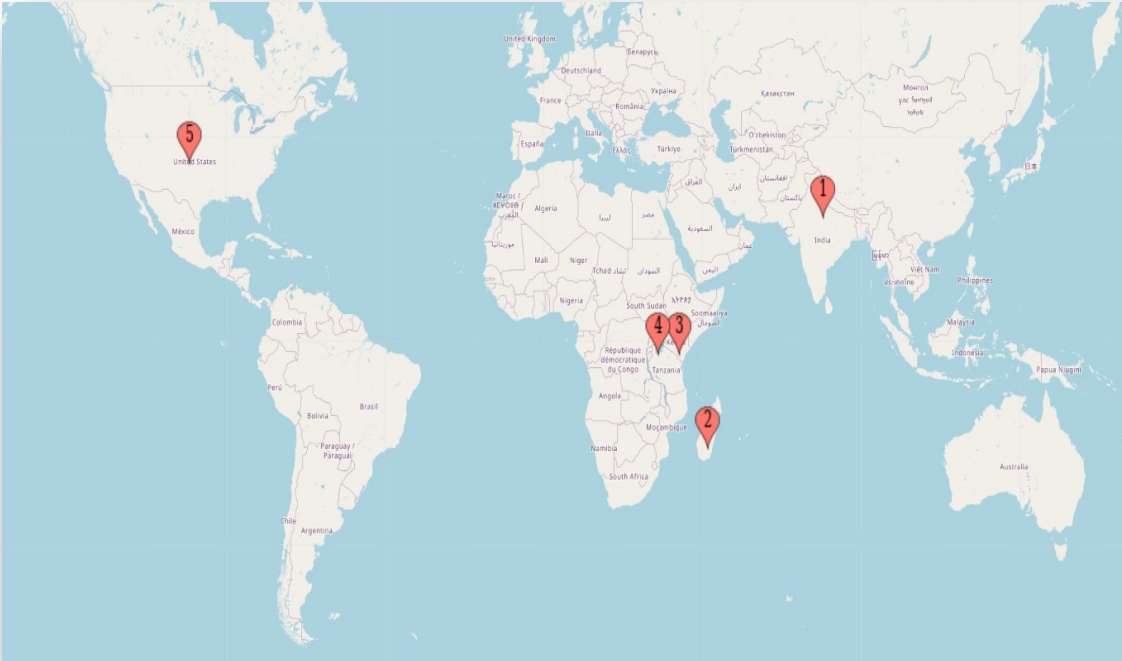
AUTHORIZED BY

Jarrod Gunther

Documents

TOTAL DOCUMENTS: 7

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)	
H5761-00004-MicroEntity-Certificate.pdf	2	Certification of Micro Entity (Gross Income Basis)	168 KB	
H5761-00004-PCT-Application.pdf	112	-	507 KB	
H5761-00004-PCT-Application-SPEC.pdf	(1-101)	101	Specification	444 KB
H5761-00004-PCT-Application-CLM.pdf	(102-111)	10	Claims	156 KB
H5761-00004-PCT-Abstract	(112-112)	1	Abstract	114 KB





# Peer Reviewed and Field Tested

nature communications

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Article | [Open Access](#) | [Published: 25 March 2021](#)

## Engineering and characterization of gymnosperm sapwood toward enabling the design of water filtration devices

[Krithika Ramchander](#) ✉, [Megha Hegde](#), [Anish Paul Antony](#), [Luda Wang](#), [Kendra Leith](#), [Amy Smith](#) & [Rohit Karnik](#) ✉

[Nature Communications](#) **12**, Article number: 1871 (2021) | [Cite this article](#)

**9058** Accesses | **10** Citations | **175** Altmetric | [Metrics](#)

### Abstract

Naturally-occurring membranes in the xylem tissue of gymnosperm sapwood enable its use as an abundantly-available material to construct filters, with potential to facilitate access to safe drinking water in resource-constrained settings. However, the material's behavior as a filter is poorly understood, and challenges such as short shelf life have not been addressed. Here, we characterize the operational attributes of xylem filters and show that the material exhibits a highly non-linear dependence of flow resistance on thickness upon drying, and a tendency for self-blocking. We develop guidelines for the design and fabrication of xylem

### FOUNTAIN VALLEY ANALYTICAL LABORATORY, INC.

1413 Old Taneytown Rd. Westminster, MD (410) 848-1014 (410) 876-4554

### REPORT OF ANALYSIS

Laboratory ID #:	155164	Account #:	7769
Reference:	Bacteria Rejection Testing	Client:	DetoXyFi
Location:	12 E Jarrettsville Road	Requested By:	Rishon Benjamin
	Forest Hill, MD 21050	Source:	E. Coli Standard
Date/ Time Collected:	10/11/2022 1248	Site:	Post-Test Negative
Date/Time Rec'd:	10/11/2022 1526	Treatment:	N/A
Chlorine ppm:	Free: ND Total: ND	pH:	NT
Collected By:	S. Zakielarz	Well #:	N/A

PARAMETERS	RESULTS	UNITS	REFERENCE	METHOD	DATE/TIME/ANALYST
Bacteria, E. coli, MPN	<1.0	MPN/ 100 ml	<1.0	SM20 9223B	10/12/2022 / 1200 / CRS

### NOTES:

- 1 MPN/ 100 ml = Most Probable Number [of viable bacteria] per 100 ml of sample.
- 2 Results less than or within the reference range are considered satisfactory and within potable water limits at the time of sampling.
- 3 ND = None Detected; N/A: Not Applicable; NT = Not Tested
- 4 Sample collected by client, analyzed as received
- 5 Chlorine level tested in lab

Reason for Test : Client's Information



# FILTERS BUILT USING WASTE WOOD

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# PRODUCT FOR INFORMAL SETTLEMENTS

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# DISASTER RELIEF / OUTDOOR

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# Why DetoXyFi?

Shielding household water from chemical AND biological disease-causing agents

	DetoXyFi	Brita	Zero Water	Life Straw	Aqua Gear	Soma
Bacteria	✓			✓		
Viruses	✓					
Protozoa	✓			✓		
Metals	✓	✓	✓	✓	✓	✓
Chemicals	✓	✓	✓		✓	✓
Pesticides	✓			✓	✓	
Micro-plastics	✓		✓	✓	✓	
PFAS	✓		✓	✓	✓	



# Why DetoXyFi?

## Replacing current non eco-friendly, expensive, inaccessible alternatives

### Bottled Water

Expensive to ship  
Occupy high volume  
Plastic waste



*DetoXyFi filters are light-weight, scalable, and biodegradable*



### Boiling Water

Requires external fuel  
High carbon footprint



*DetoXyFi filters without any fuel inputs and uses 30x less wood*



### Chlorine tablets

Does not remove turbidity  
Leaves foul taste  
Harmful carcinogenic byproducts



*DetoXyFi filters provide clean tasting water without any byproducts*



### Pump filters (e.g Sawyer)

Expensive to provide at scale (\$30)



*DetoXyFi filters can be provided globally for <\$5*

# Our Vision: DetoXyFi for our collective futures

## Leveraging the wood-based filter technology as a platform to scale





# Team



**KHUSHI DESAI**  
HARVARD



**RISHON BENJAMIN**  
HARVARD | MIT



**DHANANJAY GOEL**  
IIT DELHI | HARVARD | WHARTON



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## Mentorship:



## Supporters:

