

Minimum-flushing Toilet & Onsite Human Waste Processor

Beijing Sunnybreeze Technologies Inc



Build Something Impossible!

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The Challenges

"Reinvent the Toilet Challenge"

- 1, off the grid
- 2, low cost
- 3, remove all egg/pathogen/virus
4. Resources recovery
- ...

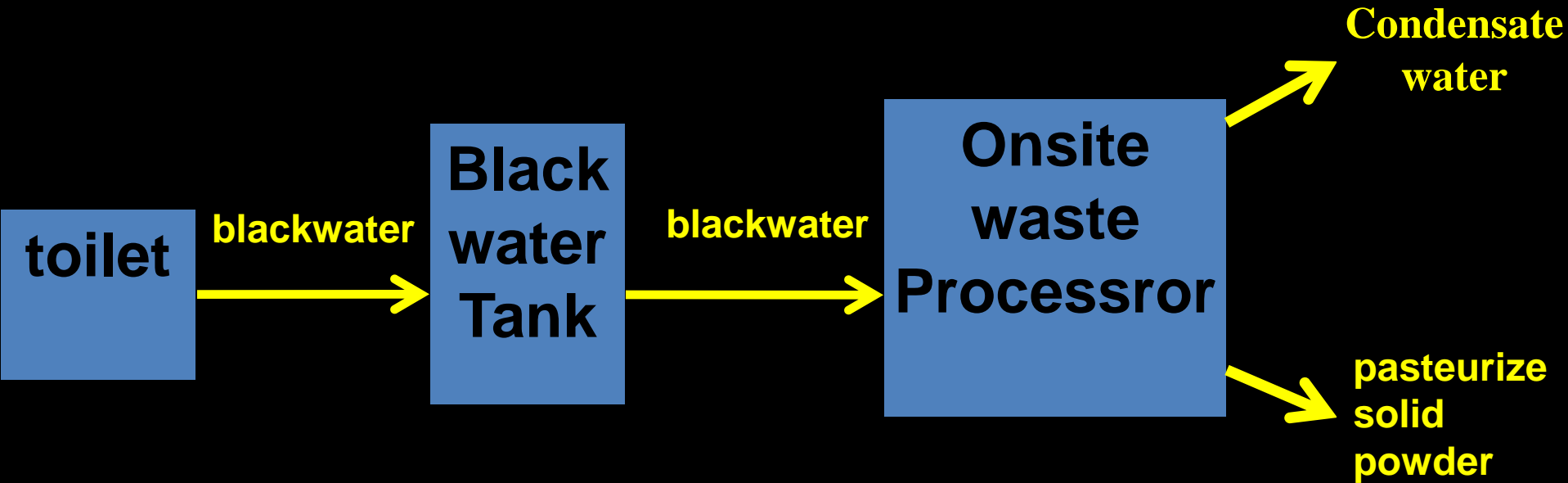


Our idea

1st, remove liquid portion from human waste by evaporation

(1) to limit the total amount of black water from the origin source (2) to evaporate raw sewage to produce dry manure powder, (3) to pasteurize solid manure powder to kill pathogens, and (4) to disinfect fecal sludge as organic fertilizer and to recycle and reutilize resources.

Technique Approach



Low cost & the size suitable for Home

Totally off the grid & Can be powered by Solar Energy

1、Minimu

y?



Macerator pump



Car washing machine
Voltage: DC12V
Power(max): 60W
Pressure(max): 0.85Mpa
Flow(max): 5L/min
PROPUMPS

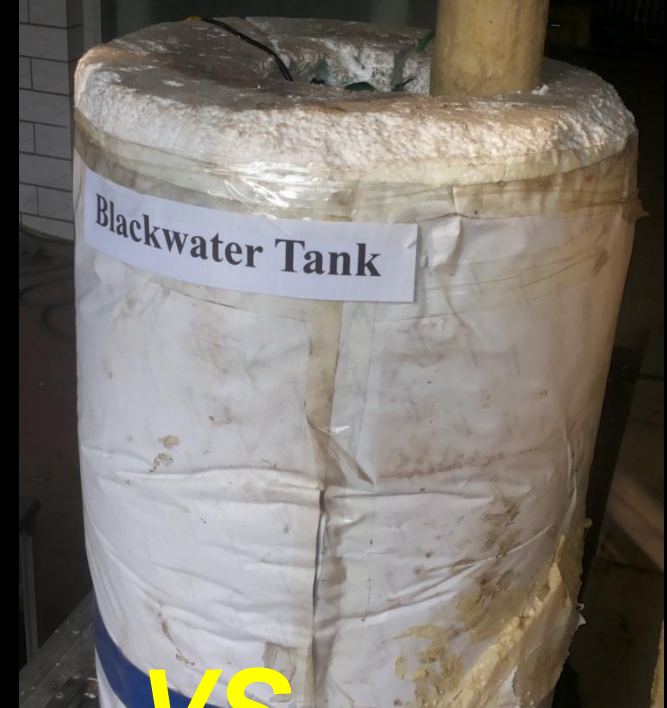
Car washing machine



SURGEFLO
MACERATOR PUMP
MODEL: MP-4500-12
OPEN FLOW: 1-2.0 GPM (45.0 LPM)
VOLTS: 12 VOLTS D.C.
AMPS: 9.0 A
DUTY CYCLE: INTERMITTENT
CE
• Self Priming
• Run-Dry Not Recommended
• Thermal Overload Automatic Reset



2、 black-water tank & Why?



vs.



3、 Onsite human waste processor

Challenge

Solutions

- 1, Energy imbalance** → **A: Minimum flushing toilet
B: MVR evaporator**
- 2, Clogging by Scale** → **Self-clean by screw & ball**
- 3, Low cost strategy** → **Build the equipment as like home appliance**

Challenge-1

Solar Electricity is very limited...

But

Evaporation need a lot of energy

Balance the energy ^{The} Solutions is

A: Minimum flushing toilet- Limiting the amount of black water

But, not enough.....So.....

B: MVR evaporator

evaporation

Vapor →



Evaporator →



Fuel →



MVR technology can save more than 95% engery !!!!)

Vapor



Mechanical
Compressor

Evaporator



Fuel



Heating instead
of the fuel



Distilled
water

MVR technology was applied in heavy Industry 50Y



Sunnybreeze Team effort on low cost/Family scale

MVR Human Waste Processor

last year

Typical industry MVR

***Vs.* Family Scale MVR**

Compressor cost :

~ Millions \$

***Vs.* ~2 Hundreds \$ or less**

Power consumption:

~ Mw

***Vs.* ~800W or less**

Weight:

~Tons

***Vs.* 20~30 Kg or less**

Production Capacity :

~ M Liter/d

***Vs.* Hundreds Liter/d**

Challenge-2 Clogging: Furs & Scale



A simple idea-Screw & Ball build a Self –Clean Onsite Human Waste Processor

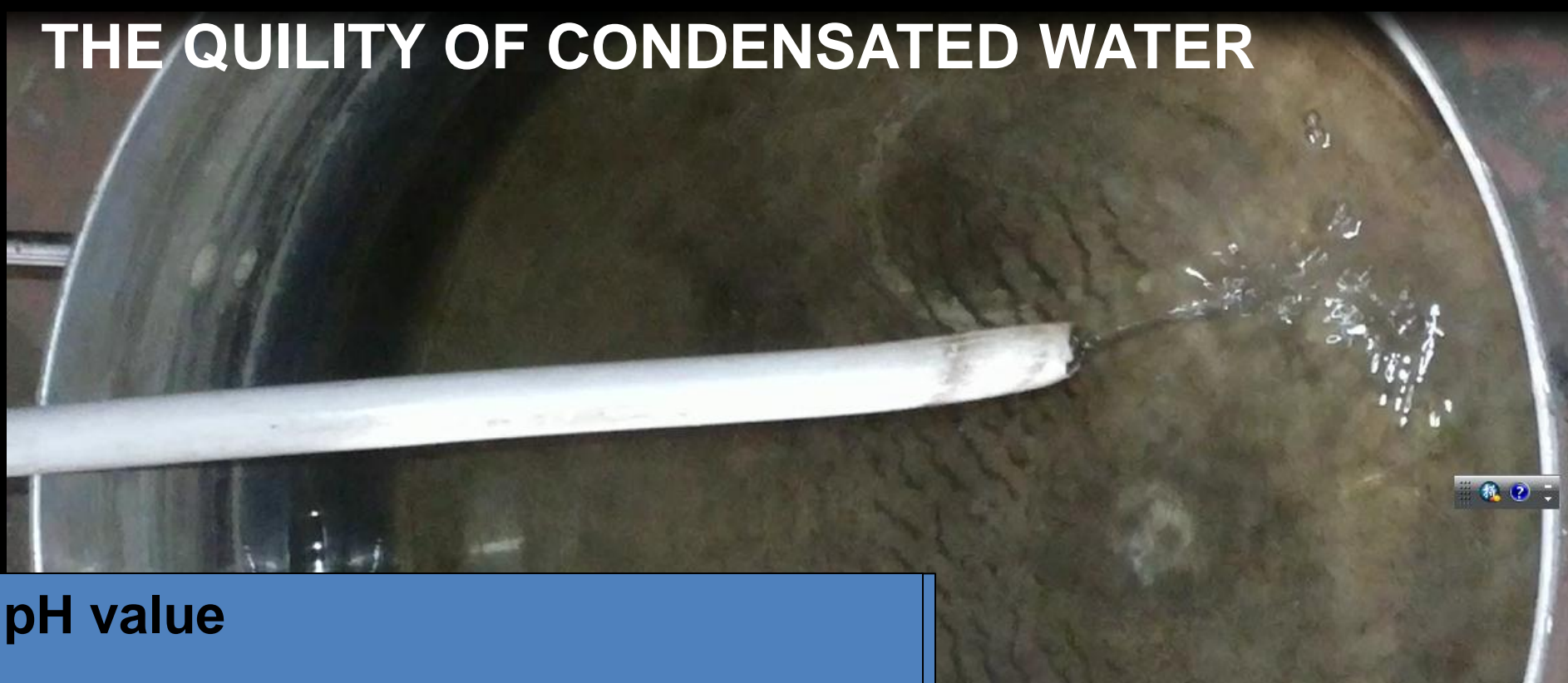
VIDEO



Build A low cost/small size, Home Scale

**Human Waste
(MVR)
Onsite Processor**

THE QUALITY OF CONDENSATED WATER



pH value

**pH of artificial
raw sewerage**

3.4

5.1

8.2

9.1

**processing
capacity @ 1kwh**

12.5 L

11.4 L

13.7 L

9.6 L

**pH of condensate
water.**

7.32

7.25

7.22

7.23

Onsite Human Waste Processor





Summary

- (1). The Minimum flushing system produces fantastic results.**
- (2) MVR technology can be one of the most promising plans to tackle the problems of the energy imbalance.**
- (3). The compressor we used in testing were not optimally designed for MVR and therefore, there is a lot of room for improvements**
- (4). There are still some problems we haven't fully explored. These problems include the stability of the system and effective odor control.**

感谢
光临



Thank
You!

Q&A

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