

MULTIPLE MAGNETRON HEATER

‘MUMAH’

PELICAN THERMOGENICS PVT LTD



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Founder
60% shares

MSc, Ph D
(Natural Products
Chemistry)
15 years of
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Statutory, IPR
and extension



DR MANOJ C N
Founder
40% shares

MSc, PhD
(natural products
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20 years
experience in
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business and
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**MR. BINOD
HARIHARAN**
Advisor

B.Tech, with
20 years of
business
strategy,
planning,
collaboratio
ns and
partnerships



**MR. ROHAN
ABRAHAM
MATHEWS**

B.Tech

OUR TEAM

WHY MUMAH

An offshoot of DBT sponsored, SBIRI project, for drying prawn shell waste

Waste management is an expense, while the prospect is in income. Wealth from waste – will lead to appropriate waste management.

Climate change is real. Sustainable business is the future, also a responsibility

Centralised businesses are in stress. Decentralised local economy is the key – multiple small collaborations.

Energy efficiency is the next competition.

OUR OFFER

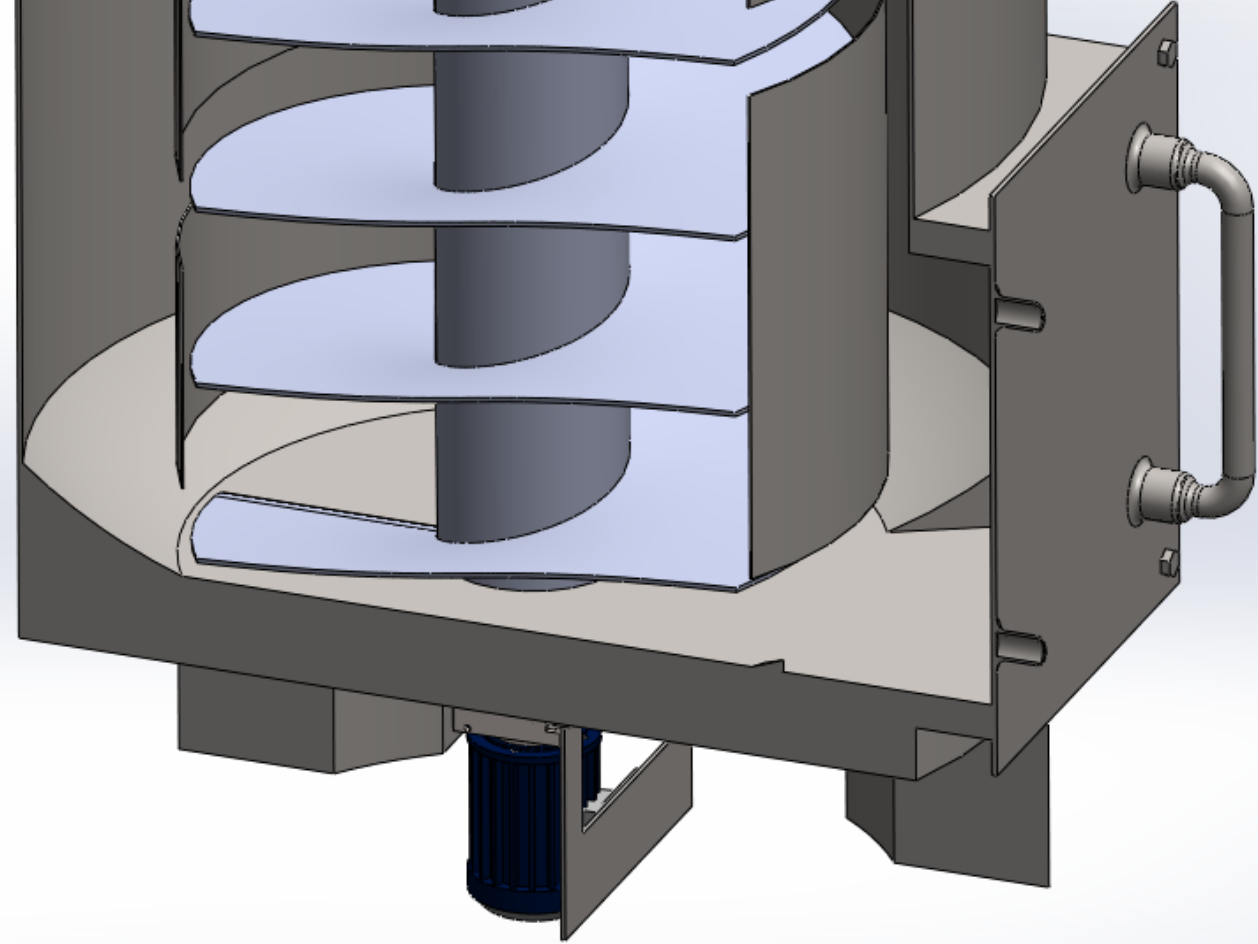
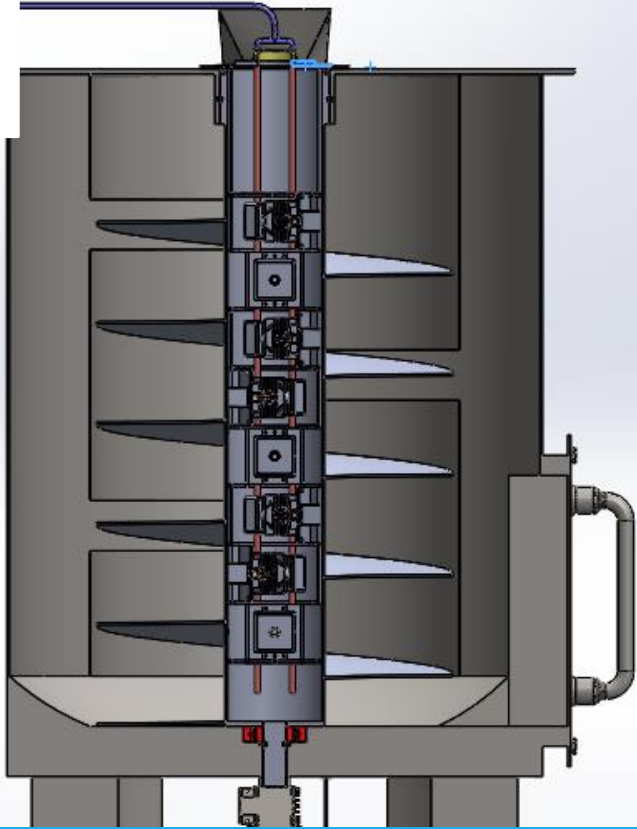
Microwave heating system using low capacity multiple magnetrons in a single chamber with vacuum

High capacity magnetrons are exponentially costlier. We broke the threshold of scaling microwave heating

Microwave now **scalable to many 1000's of Litres.**

Use of **vacuum enhances efficiency** and enables use of solvent

Use of process control systems enables local area heating control – **prevents over-heating and charring**



SOLUTION - MUMAH

**-LOW CAPACITY MAGNETRONS
BRING DOWN THE COST BY 80%**

**-CENTRAL ROTATING
MICROWAVE CORE WILL
PREVENT WAVE INTERFERENCE**

**- SCREW CONVEYOR ASSIST
FURTHER IN UNIFORM HEATING**

PROBLEMS SOLVED

We all know - - -

Conventional heating systems like hot air, heating coil, steam jacket/coil, heating oil are inefficient due to conduction and convection loss, and biological materials in contact

Statutory requirements of boilers and similar accessories inhibit small scale decentralised processing units

MICROWAVE HEATING

We all know - - -

It heats the matrix and not the container, thereby heat loss is considerably reduced

The nutrients of the matrix is not altered by the microwave

One of the most efficient and proven heating technologies in terms of reaction time and energy consumption

CHALLENGES IN THE PRIOR ART

But - - -

Microwave/ radiofrequency wave heating, the most efficient heating, has not scaled up beyond 200L because

- Exponentially costlier high capacity magnetrons,
- Prior art - Multiple low capacity magnetrons opening into a single chamber will create wave interference
- Inflammable solvent-based reactions face a threat of explosion due to arcing in microwave reactor

MUMAH ASSEMBLY



ADVANTAGES

Lesser connected load, drudgery, regulations, starting current, heat transfer loss, possibility of solar power

Reduction in process time, enhanced production, use of low capacity magnetrons, reduced capex

Low temperature dehydration under vacuum preserves food nutrients. Sterilisation is additional bonus

Capital cost as in a conventional heating system considerably brought down by avoiding boilers, heat exchangers, water treatment requirements, steam coils/steam jackets

This is a stand alone plug and play system. Enables decentralised pasteurisation, reduce carbon footprint of transportation and packaging

CURRENT STATUS

PATENTS

China: Patent granted

Europe and Australia: accepted

India and USA: Final office action completed

PRODUCT DEVELOPMENT

All the components designed and under simulation

Technical collaborators for components identified

Prototype under development



Sale of equipment to bulk generators – **one time**



Co-processing and value addition – JV's – animal feed, dehydrated food, alcohol production – **repeat business**



Technology transfer and JV with similar industries for scale up - **repeat business**



Product and process development with waste generating industries like agro, meat, fish processing industries **one time and repeat business**



Waste management service – for apartment complex, markets, slaughterhouse - **one time and repeat business**

BUSINESS MODEL



Solid Waste Management



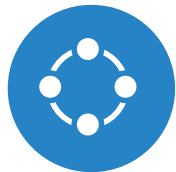
Dehydrated Food Industry



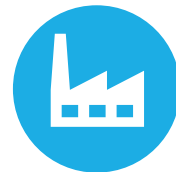
Mould Drying Equipment For Ceramic And Clay Industry



Solvent Extraction Units For Herbal Industry



Microwave Core Modification In Reactors



Equipment Supply To Chemical Industry

TARGET MARKET

PRODUCTS & PROCESSES

- cattle, poultry and other animal feed from biodegradable waste available in slaughterhouses, vegetable markets, households, etc.
- Dehydrated biodegradable waste to bio-fuel
- Dehydrate perishable goods, extend shelf life, helping farmers and fishing community to control market price fluctuations
- Provides improved heating solutions for industries such as waste management, food, chemical, milk pasteurization, ceramics, herbal, etc.

THANK YOU

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