

AAGUN[®]
PCM BASED EFFICIENT 24X7 DRYING.

(n) [aa-goo-n] Derived from, Agni, of Sanskrit origin, meaning fire in Bengali.

**INCREASE
YOUR
INCOME
MINIMIZE
WASTE**



With Integrated Thermal Energy Storage Solution based on save^E® Phase Change Materials

PLUSS[®] | TECHNOLOGY FOR A BETTER WORLD


murugappa


CUMI

Founded in 1994, Pluss Advanced Technologies started with R&D and manufacturing of specialized polymers. In 2007 Pluss commenced development in the field of Phase Change Materials (PCMs) technology. In 2012, the company raised equity funds from Tata Capital Innovations Funds and expanded R&D, developed and commercialized first of its kind temperature control solutions using proprietary materials, addressed unmet need of temperature control across refrigeration, cold storage, cold-chain logistics, HVAC, and healthcare sectors. The company today has a global presence with its own subsidiary in Netherlands. Pluss has received several awards and recognitions, including the CII Innovation award twice, in 2014 and 2017. It has also received the Massachusetts Institute of Technology's Innovators under 35 awards, in 2016 and 2017. Since 2021, Pluss is a subsidiary of Carborundum Universal Limited (CUMI), which is a Murugappa Group company.



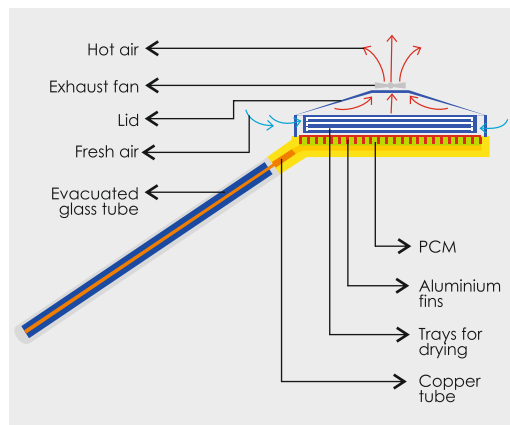
About Aagun[®]

Aagun[®] - the PCM based 24x7 dryer enables consistent drying, even after sundown. It has the potential to alter the landscape of food drying by replacing inefficient fuel based drying for industrial food processing units and improving value proposition of solar drying for commercial and domestic drying units.



The Technology

- Phase Change Material (PCM) integrated solar dryer offers an advantage of 24x7 consistent drying.
- PCMs are products/ chemicals which enable energy storage during sunshine hours in the form of latent heat.
- Efficient system design of Aagun[®] allows storage of solar energy in PCM which gets harnessed during non-sunshine hours. Aagun[®] uses low wattage fans for its efficient working.
- The thermal energy transfer occurs when the material changes phase from solid to liquid or vice versa. The latent heat of these materials is typically 100 times the specific heat. This enables large amounts of energy storage in relatively small spaces.
- Copper heat pipe sleeve is soldered to the aluminium container with PCM. The container has a low profile so heat distribution throughout it will be even.
- The container has an aluminium lid that serves as the heating surface for the fresh air entering the chamber.



Thermal Storage - Revolutionizing Solar Dryer Utilization

PLUSS[®] innovative efficient 24x7 dryer - Aagun[®] helps preserve the environment, provide higher remuneration to farmers, create entrepreneurship opportunities for women and control food inflation.

Aagun® Applications

Fruits, Vegetables & Herb Drying

35% of the fruits and vegetables produced in India do not reach the consumer and are lost due to a lack of adequate cold storage and food drying infrastructure.

The spoilage translates into lost income for the farmers and results in higher prices for the consumers. In a country stricken with farmer poverty and persistent food inflation, reducing this loss is of immediate importance.

Dried fruits and vegetables have shelf lives of 1-2 years and sell at significantly higher prices. The processed food market is currently at 10% in India and has the potential to reach 25% by 2020. The dried fruits and vegetables may be eaten plain as a wholesome snack, incorporated into baked goods or sweets, or seasoned to make pickles. Additionally, they can be reconstituted by soaking in water.

A co-operative business model with adequate market linkages can be established in village clusters, wherein farmers aggregate dried produce using low cost, small

independent units. Individual farmers would not have to bear the capital costs and the drying centers would provide entrepreneurship opportunities to women.

The controlled drying provided by Aagun® would result in a better-quality dried product with higher nutritional value as compared with conventional solar drying.



Fish Drying

With a coastline of over 8000 kms, India produces 12 million MT of fish per year of which 30% is exported. Fresh fish rapidly deteriorates and 20-25% of this production is lost to rotting. Drying is the most common method for fish preservation that works by removing the water from the fish.




Currently the market for dried fish is 6% of the \$8.5 billion domestic fish market and 8% of the \$4.0 billion export market. Dried fish maintains its original nutritional value and is a rich source of protein. It also fetches a higher price for the fishermen.



Current usage of open sun drying is most often inefficient, unhygienic, and results in a poor-quality product.

Use of Aagun® for fish drying would provide excellent quality dried fish and reduce the drying time from 5-7 days to less than a day.



Advantages over conventional solar dryer

-  Continuous 24/7 drying operation with significantly higher drying efficiency.
-  Drying duration is one-fourth of the conventional solar dryers resulting in reduced food wastage enabling higher farm productivity.
-  High-strength and rust-proof body made from fibre reinforced plastic. Also has available cabinet space for storage.

-  Better quality dried product with higher nutritional value, aroma and taste due to controlled drying with no temperature fluctuations.
-  Backup electric heater supply to cater drying during cloudy days or rainy season.

Testimonials

"Farmers are getting over 5 times the price of fresh pineapples for sale of dried pineapples (a single dried pineapple is fetching the farmer Rs. 50 as against Rs. 10 for the fresh one)."

– **Mr. Andrew**, Balmoram Training Centre, East Garo Hills, Meghalaya

"Aagun® dryer works very well. We have dried pineapple, persimmon, Naga chilli, gooseberry, banana, Naga- tree tomato and many more. We can certainly see ourselves offering tough competition to dried products from anywhere in the world because Aagun® dried products are excellent in original color retention, texture and refreshing aroma."

– **Shri. Meyasashi**, Deputy Director, Directorate of Horticulture, Nagaland

"We have tested the system by drying apple, banana, tomato etc. The dried products are excellent in original color retention and texture. The slow and consistent drying in Aagun® is helping to give a fresh aroma to dried products."

– **Vikrant Yadav**, Project Engineer, NISE



Recognition for PLUS[®]



TCL- Supply Chain Innovation Award or pharmaceuticals



ASSOCHAM- Innovative Technology Award – 2015 Healthcare category



FICCI- DST Lockheed Martin Award – 2015



CII Confederation of Indian Industry

CII- Industrial Innovation Award – 2014 & 2017



MIT- Innovators under 35 India Award – 2016 & 2017



WWF- Climate & Energy – 2021



GITA- Global Innovation & Technology Alliance – 2022



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A BETTER WORLD

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