



Refrigeration System Pusa-FSF

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Why in News

Scientists from the **ICAR-Indian Agricultural Research Institute (IARI)** have developed an **on-farm green energy refrigeration system (Pusa-FSF)** and a **technology for extraction of gluten from wheat dough** and its **regeneration in bajra (pearl-millet) and makka (maize) flour**.

Key Points

- **Pusa-FSF:**
 - **Pusa Farm Sun Fridge (Pusa-FSF) is a 100% solar-powered battery-less cold store that can preserve around 2 tonnes of freshly-harvested produce** at 3-4°C during the day and 8-12°C at nighttime.
 - It has rooftop solar panels that **generate 5 kilowatt (KW) power**, which helps in running air conditioning.
 - The panels **also power a 105-watt submersible pump** circulating about 1,000 litres of water from a tank through overhead PVC pipes.
 - At night, there is **only passive evaporative cooling**, with the water chilled during the day acting as a natural heat sink.
 - All **farmers with solar pumps are a potential market** for the Pusa-FSF. India has **an estimated four lakh-plus installed solar water pumps**.
 - An average 5-horsepower pump costing Rs. 2.5 lakh **attracts 70-90% subsidy**.
 - **Benefits:**
 - Farmers can **store and preserve their own produce**. It can **avoid distress sales and help improve prices**.
 - It will help **minimise post harvest losses**.
 - **More room to grow perishable items** such as tomatoes, fruits, other than Paddy and Maize.

- **Technology for Extraction of Gluten from Wheat Dough:**
 - **Need:** Bajra, maize, jowar (sorghum), ragi and other **millets contain comparable levels of protein and more vitamins, minerals**, crude fibre and other nutrients than wheat. But **they don't have any gluten proteins**, which results in poor dough quality.
 - **About the Technology:** The technology **imparts elasticity and structural strength to bajra and maize dough**, making their chapattis as soft as from regular wheat atta flour.
 - The proteins extracted and dried into powder have the capacity for regeneration or forming gluten networks in non-wheat dough.
 - Scientists have **developed gluten based 'Hallur' soft bajra flour**, with the help of technology.
- **Other Technological Developments in the Field of Agriculture:**
 - **Happy Seeder** - machine for in-situ management of paddy stubble (straw).
 - **Precision Agriculture Technologies** - Precision Agriculture (PA) is an approach to farm management that uses information technology to ensure that crops and soil receive exactly what they need for optimum health and productivity.

Gluten

- Gluten is a family of storage proteins — formally known as **prolamins** — that are naturally found in certain cereal grains, such as wheat, barley etc.
 - The **two main proteins** in gluten are **glutenin and gliadin**.
- Gluten offers a variety of functional culinary benefits and is responsible for the **soft, chewy texture** that is characteristic of many gluten-containing, grain based foods.
- When heated, gluten proteins form an elastic network that can stretch and trap gas, allowing for optimal leavening or rising and maintenance of moisture in breads, pasta, and other similar products.
- **Celiac disease**, also spelled as coeliac disease, is the **most severe form of gluten intolerance**.

Source: IE