

CONVENTION ON ENERGISING ENTREPRENEURSHIP IN
ACADEMIA THROUGH INNOVATION
BITS-Pilani; October 6-7, 2006

Format for Submission of Project Synopsis

Title:

Team

Project Leader-

Team Members-

Address for correspondence-

Phone/ Cell No.-

e-mail-

Objective/ Aim

Technical details

Innovativeness & Usefulness

Current Status of Development

Market Potential & Competitive advantage

Anything else which one may want to add on

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Sample Project Synopsis

Natural Refrigerator

Team

Project Leader-

Team Members-

Address for correspondence-

Phone/ Cell No.-

e-mail-

Objective/ Aim

This project aims at developing a highly cost-effective natural refrigerator which would cater to the needs of the people of the rural society. The refrigerator uses non-polluting natural resources and so is eco friendly. It can easily be customized as per requirements and available resources to suit the needs of different rural households. It is easy to construct and operate and can even be built by a farmer himself as per his needs. The idea has been successfully tested and a working prototype has been developed.

Technical details

The underlying principle is the phenomenon of *natural convection* that takes place due to density gradient. Density gradient describes the movement of air which results from the buoyancy forces imposed on air when it's density in the proximity of the heat transfer surface is decreased as a result of cooling process.

Water and natural air are used as refrigerants. When air flows through running water, sufficient cooling is created in the surroundings. This in turn results in the extraction of heat from the contents kept in the refrigerator.

The standard setup consists of 2 tanks with a capacity of 55 litres each and having dimensions of 20cmx65cmx65cm. One tank is kept at a higher level with respect to the other. The upper tank is fixed to a casing made of mild steel sheet metal of dimensions 52cmx52xcmx80cm while the lower tank is detachable. Commodities are to be stored in the casing. One side of the casing has a wooden door while the other three sides have a wire mesh consisting of grass and hay (similar to mesh of an air cooler). Water runs from the upper tank to the lower tank through the casing.

The upper tank has holes through which the amount of water flow can be regulated. When water from the upper tank and fresh air flows through the mesh in a random manner, it cools down the inner side of the casing by absorbing the heat. The water stored in the lower tank can then be reused again. Some water loss occurs over time due to evaporation of the water from the mesh.

Using this setup, it is possible to attain a temperature difference of about 5 degrees in summer and 3 degrees in winter. This would ensure freshness of commodities kept inside for about 1-2 days which would be adequate for rural households.

Innovativeness & Usefulness

The refrigerator is the first of its kind, developed on the lines of convection heat transfer. Some features and benefits offered by the refrigerator are –

- Highly economical (Costs around only Rs. 600 to build).
- Eco friendly.
- Zero power consumption.

- Easy to operate and maintain.
- Wide range of commodities such as vegetables, fruits, milk, curd etc. maybe stored.
- Can be produced locally by rural households.

Current Status of Development

1. Trail design and prototype development is completed
2. Testing of various variables using the prototype is going on

Market Potential & Competitive advantage

Since no cheap refrigerator is available for rural households, such a cheap and simple refrigerator would surely create a market boom. It can be built and used anywhere since it requires no power and the raw materials are easy to obtain. Although performance is bad when compared to a conventional refrigerator, it is adequate for rural households who have never used refrigerators before. Mass production can further reduce costs and lead to a sustained profitable venture for the manufacturer.

Since the refrigerator is the first of its kind and priced much cheaper than conventional refrigerators, there are no direct competitors present in the market. Being the first to offer such a product, future competitors may not be a major problem due to longer presence of our product.

Anything else which one may want to add on

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