



SEED COMMUNICATIONS

A Quarterly News Letter from
Society For Energy, Environment & Development

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FROM THE DESK OF EDITOR

April-June 2016

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Telangana & A.P. Farmers in great distress 'SEED' offers solution

Prof. M. Ramakrishna Rao
Society for Energy, Environment & Development (SEED)



GLUT IN TOMATOS
the financial owes to the farmers and are committing suicides very often.

Recently the fluctuation of the prices in the whole sale market is so high in Carrot, Tomatoes, Onion and other crops which are unbelievable. We see the farmers of A.P. & Telangana were in great distress condition when tomatoes are sold at Re.1/- per kg, Carrot Rs.4/-, Onion as low as Rs.4/- per kg, Cabbage, Potato Cucumber and Brinjal are being sold at very low prices.

We very often feel such distress position for the farmers. This is the result of not utilizing modern Science & Technology in food processing technology in a proper perspective to solve the farmers' plight.

Society for Energy, Environment & Development (SEED) has been working on the appropriate technology to reduce the post harvest losses of fruits and vegetables and came out with an excellent results with the ground breaking technology of the design

Indian agricultural farmers are facing many hardships in recent years. The crops have failed due to lack of rains and water resources and the crops are sold at distress value. This resulted

and development of solar cabinet dryer. This is the most suitable and appropriate technology for producing value added products of fruits and vegetable in our country. A wide range of Solar cabinet dryers were designed and developed starting from 8 kg to 400 kg drying capacity which are commercialized and available in the market.

The basic principle of these dryers is Green House effect which resulted in the cabinet temperatures are at 60 – 70°C when the ambient temperatures are 30 – 35°C. For example, 1500 kgs of Tomatoes can be dried in 10 hours in Solar Cabinet Dryer - SDM- 400 model per day to get it in the slices or powder form. The monthly capacity of production of this dryers is about 3 tonnes of Tomatoes. Similarly, the other crops can be dried as value added products in these dryer. The figures show the results of the dryer for Tomatoes & Carrots.

SOLAR DRYER SDM-200 MODEL



TOMATO



TOMATO SLICES



TOMATO POWDER

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The Andhra Pradesh & Telangana Governments have better to utilize the technology available here at 'SEED' Hyderabad by starting solar food processing centres in every district as a cooperative movement to serve the farmers.

Even though Society for Elimination of Rural Poverty of Andhra Pradesh is fully knowledgeable about this new technology, unfortunately no action was initiated. Now Khadi & Village Industries Commission is contemplating to take some action with Solar dryers.



CARROT



CARROT SLICES



CARROT POWDER

Let us hope some positive action will be taken to help the farmers to process the agricultural products for value addition products.

ACADEMIC PROGRAMMES AT SEED

Internship Programmes for University Students

Project Students (2015-2016 Batch)

GITAM University (Vishakapatnam), **Satavahana University** (Karimnagar) & **Osmania University** (Hyderabad).

In continuation of our Academic programmes in solar food processing and dryer technologies, this academic year -2015-16, three universities sent 7 M.Sc., students for internship programme in research on various aspects of solar dehydration processes of fruits and vegetables. These students are 3 from osmania University, Hyderabad, 2 from Gitam University, Visakhapatnam and 2 from Sathavahana University, Karimnagar. They are trained in new product development, analysis of the properties, analysis of bio-active elements, sensory evaluation and shelf life of the product etc.



From left to right: Ms. Debasmita Saha, Ms. Kurid Feroza Begum, Ms. B. Sindhuja, Ms. B. Rajitha, Ms. S. Priyanka, Ms. V. Sathya Radhika and Ms. Jangabelli Mounika

FUTURE ACTIVITIES

SEED is planning to organize a 5-day Training program on '**Solar Dehydrating Technology in Food Processing Industry**'. This program has been planned to empower Faculty of Food, Science and Technology and R&D Institutes in the country on opportunities for

potential for Solar Energy in food processing to add value to agricultural and horticultural crops in India. This program will be conducted between 21-25-June, 2016 at 'SEED' facility in Hyderabad.

VIP COMMENTS

"Excellent & Innovative has mindset to encourage new entrepreneurs"

- Mrs. Sumathi, Asst. Director (Chemical), MSME-DI, Hyderabad

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R & D Activities

SEED's Research Log Book - FRUIT EMBEDDED CHOCOLATES (Pineapple, Guava, Banana)



Chocolate consumption is the useful practice on all occasions. It has been a favorite for all age groups. Chocolate products have recently attracted the attention of many investigators

and the general consuming public because of their potential nutritional, medicinal and mystical properties. Recently, chocolate has gained a reputation as being a good combination with, walnuts, peanuts, almonds, cashew nuts, fruit flavored creams of composite chocolates. But dry fruits in composite chocolates are not yet seen in Indian market.

Hence the development of fruit embedded chocolate (guava, pineapple, banana) is an innovative product in taste wise and nutritionally rich. Fresh fruit contains 70-90% of moisture content and chocolate contains below 10% moisture contents. When in combination of fresh fruit and chocolate with the wide difference in moisture contents lead to more perishable products. In order to increase the acceptability of the product and to preserve the composite chocolate for longer shelf life, fruit moisture content should be brought down below 20%. In this process the drying of fresh fruit is done. Conventional Dehydration of fresh fruits can lead to loss of heat sensitive nutrients. So switching on to solar cabinet dehydration was done to retain maximum macro and micro nutrients.

Benefits: Recent studies by scientists in abroad revealed that consumption of chocolates improves greater memory, analytical thinking, higher capacity of analysis among all age groups of population. Fruit has been recognized as a good source of vitamins and minerals, and for their role

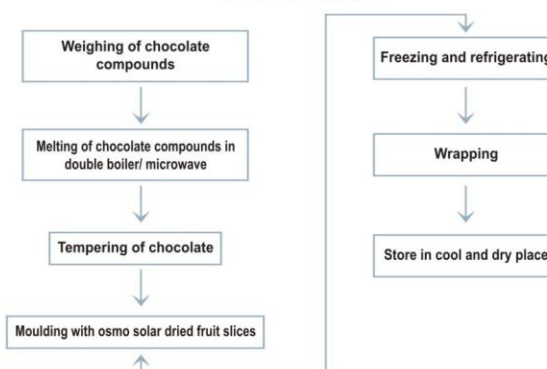
Ingredients: Fruits (Banana, Guava, and Pineapple), Sugar, Potassium metabisulphite, Ascorbic acid, citric acid and chocolate compounds (dark compound, milk compound and white compound) Osmo-Solar drying of fruits: In order to reduce process time and energy saving the new method of osmo-solar dehydration was taken up as new method of dehydration. In osmo-solar dehydration fruits are initially subjected to osmosis by dipping in sugar syrup (osmotic agent) then the fruits are dried in a solar dryer till the



acceptable moisture content is achieved. This method is most suitable for fruits guava, pine apple, banana dehydration.

Chocolate compounds like milk chocolate, dark chocolate and white chocolate are blended, melted, tempered and moulded in suitable moulds.

FLOW CHART



Osmo solar drying data of fruits (pineapple, guava, banana):

Loading capacity (kg/m ²)	Yield (%)	Product Moisture (%)	Drying hours	Cabinet temp.	Ambient temp.
2	15.86	12	10	41-55	32-39

Nutritional values of fruits (per 100gm)

Total carbohydrates	23 g
Vitamin C	17.7 mg
Fat	0.8 %
Crude fiber	7.5 %
Sodium	139.6 mg
Calcium	208.9 mg
Iron	79.3 mg

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The four days Training Programme "Solar Dehydration Processing of Fruits & Vegetables For Value addition & Preservation" (Capsicum, Carrot, Peas, Tomato & Mango) 16-19th February 2016 at 'SEED' Hyderabad



The training programme was conducted with the objectives of bringing awareness about the new innovative solar dehydration process of fruits & vegetables for value addition and long shelf life, skill development in solar food processing sector among rural women and entrepreneurs and also hands on experience to the participants on food processing of the above mentioned fruits & vegetables with the application solar energy.

16 (Sixteen) participants have attended the four days training programme and they are faculty members from K.L. University, Vignan University, Vigyan Asram, Local NGOs, Dabur Industry, Private entrepreneur, Entrepreneurship Development Institute, Individual farmers, organic farmer, and one overseas member from Mauritius.

This heterogenic group was taught basics of dehydration process with 9 classes of theory and 14 classes of practicals and supplied them with Training manual. The theory classes consists of General dehydration process, Solar dehydration process with pretreatments, Analysis of the products, Analysis of nutritional facts such as Minerals and Vitamins, Microbial properties, Orgnoleptic properties and Bioactive elements analysis were taught with the examples of the products, processed in the practical classes. **The participants are exposed to six processing techniques of Solar Dehydration process of underutilized fruits & vegetables**, Osmo-Solar processing of fruits & vegetables, Formulations of Nutrient Supplementary Drink, Processing of Organic fruit bars with no preservatives., Special process of non-timber forest produce, process of

chocolates enrobed with dried fruits of Mango, Guava, Banana and Pineapple. Presentations also on Food Security & Safety, Packaging, shelf life studies, Quality control in Micro, Small and Medium Scale industries were presented for the benefit of the participants. The faculty are from reputed educational institutions & distinguished Scientists. They are Prof. M. Ramakrishna Rao, Dr. K. Vidyasagar, Dr. I. Suresh, Ms. R. Shyamala, Sri A. Satyanarayana, Sri Ch. Srinivasa Rao, Prof. Anurag Chaturvedi, Prof. Kavita Waghray, Dr. B.K. Karna, Sri GDV Prasad and R & D staff.

The internship students of M.Sc., (Food, Science & Technology) from different universities like Osmania University, Gitam University & Sathavahana University who are attending internship programme at SEED Laboratories have done innovative approach in utilizing the solar dehydrated fruits & vegetables such as Grapes, Pine apple, Carrot, Tomato etc, processed by them. These products are used in preparation of snacks like Upama with full of dehydrated vegetables, Custard with dehydrated fruits, Pumpkin Halwa & Nutritive drink and served them to the participants. They enjoyed innovative snacks and appreciated well. This is a notable feature of the training programme.

A Field visit for half a day was arranged to 'SEED' Rural Extension centre where Biogas plant, Vermi compost, Rain harvesting technology for borewells, Solar street lighting systems are provided and 'SEED' Solar Cabinet Dryers-SDM-50 & SDM-400 are available and they are used for processing of Tomatos, Carrots and Ragi malt and green leafy vegetables in bulk quantities on large scale. The participants exprienced a thrilling experience with the renewable technologies display which are available in the centre.

Finally, the training programme was concluded with valedictory function where the participants expressed a great satisfaction for the course and their appreciation for the training programme organized by 'SEED'.

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