



International Association
of Rice Bran Oil



IARBO- SEA India Innovation Award

Name:

Ms. Olivia Dhara

Organization details:

Department of Oils, Lipids Science and Technology.

CSIR-Indian Institute of Chemical Technology.

Uppal Road, Tarnaka, Hyderabad - 500007, India

Name the innovation:

Innovative Use of By-Products
- Improving the Economy of Rice Bran Oil Industry

Approach:

Utilizing the otherwise neglected by-products of the rice bran oil industry - crude rice bran gums, lyso-gums, and rice bran oil meal.



Rice bran oil extraction & refinery by-products

Gums obtained after water degumming

Glycolipid - Phospholipid Mixture

Lyso- Gums obtained after enzymatic degumming

Oil meal obtained after extraction

Rice Bran Lecithin suitable for various applications

COVID Vaccine / Pharmaceutical Formulations

Value addition to low-valued by-products

Import Substitution

Non-GM Alternative

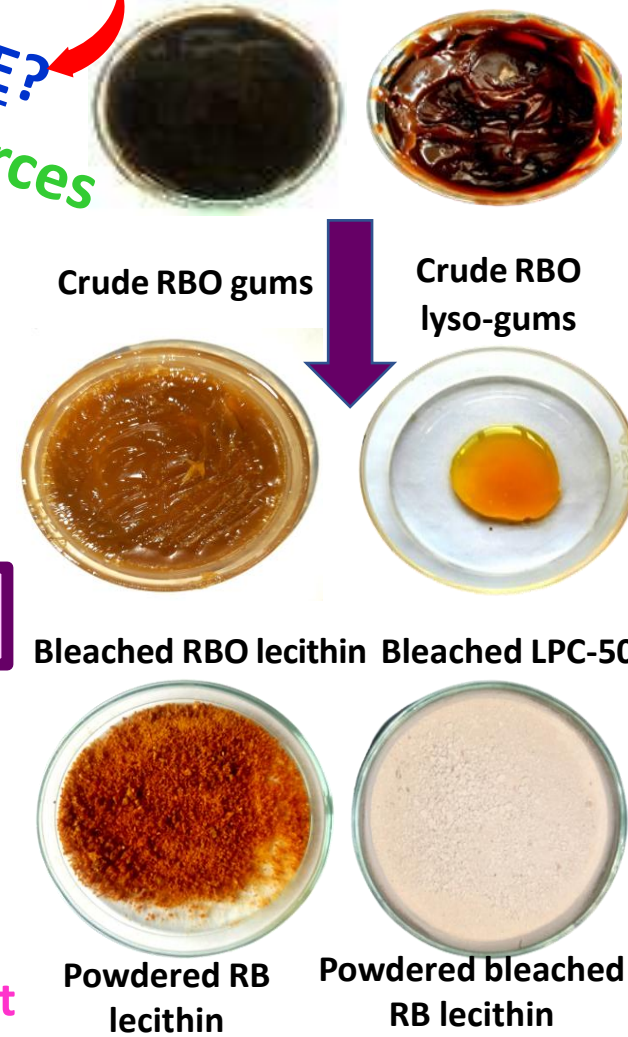
Processes developed for production, upgradation & modification

- I. Selective removal of the impurities from crude gums & lyso-gums- ready for utilization
- II. Achieving colour ($\approx 13-15$ Gardener's units) using suitable mild reagent
- ✓ Sticky to powder: Process development for making high phospholipid content lecithin
- ✓ Enriching PC-content (50% phosphatidylcholine - PC-50) & LPC-50 : Process development

Background of work

Global demand for lecithin increased dramatically- **COVID-19 being a big factor**. India depends on **imported soya lecithin**- increasing her import bill considerably

What is the **ALTERNATIVE?**
-Looking for Indigenous sources



Crude RBO gums

Crude RBO lyso-gums

Bleached RBO lecithin

Bleached LPC-50

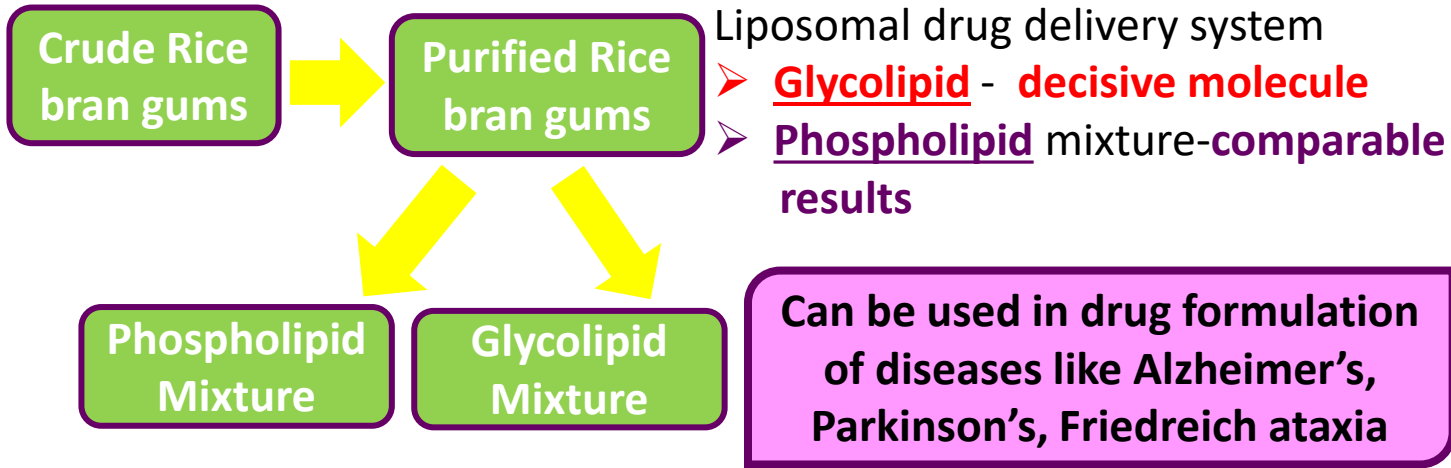
Powdered RB lecithin

Powdered bleached RB lecithin

Glycolipid -Phospholipid Mixture

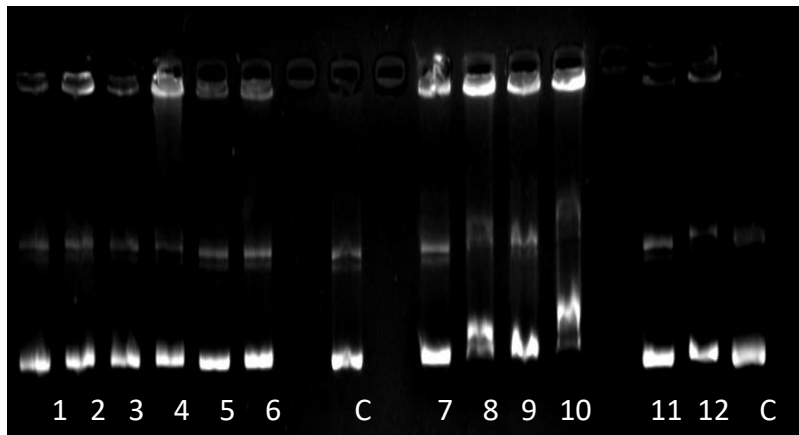
Oil meal

I. Subjecting Crude Rice bran oil gums to simple technological -isolation of glycolipid and phospholipid mixture

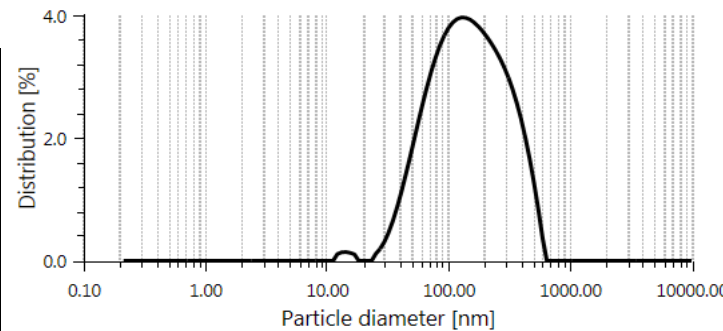


I. How to utilize this by-product?
 I. Development of an environment-friendly benign process for the production of protein hydrolysate-rich fractions replacing conventional highly polluting alkali extraction

I. Development of Solvent system - Isolation of PE
 II. Replacement DOPE with Rice bran PE as vaccine excipient: Preliminary studies



Gel Retention Studies (Assay)



Delivery system for vaccine formulation

Natural Vegan surfactant -
 Food application
 Surfactant in cosmetic, paint, & coating industries



De-oiled RBO meal



Protein Hydrolysate fraction

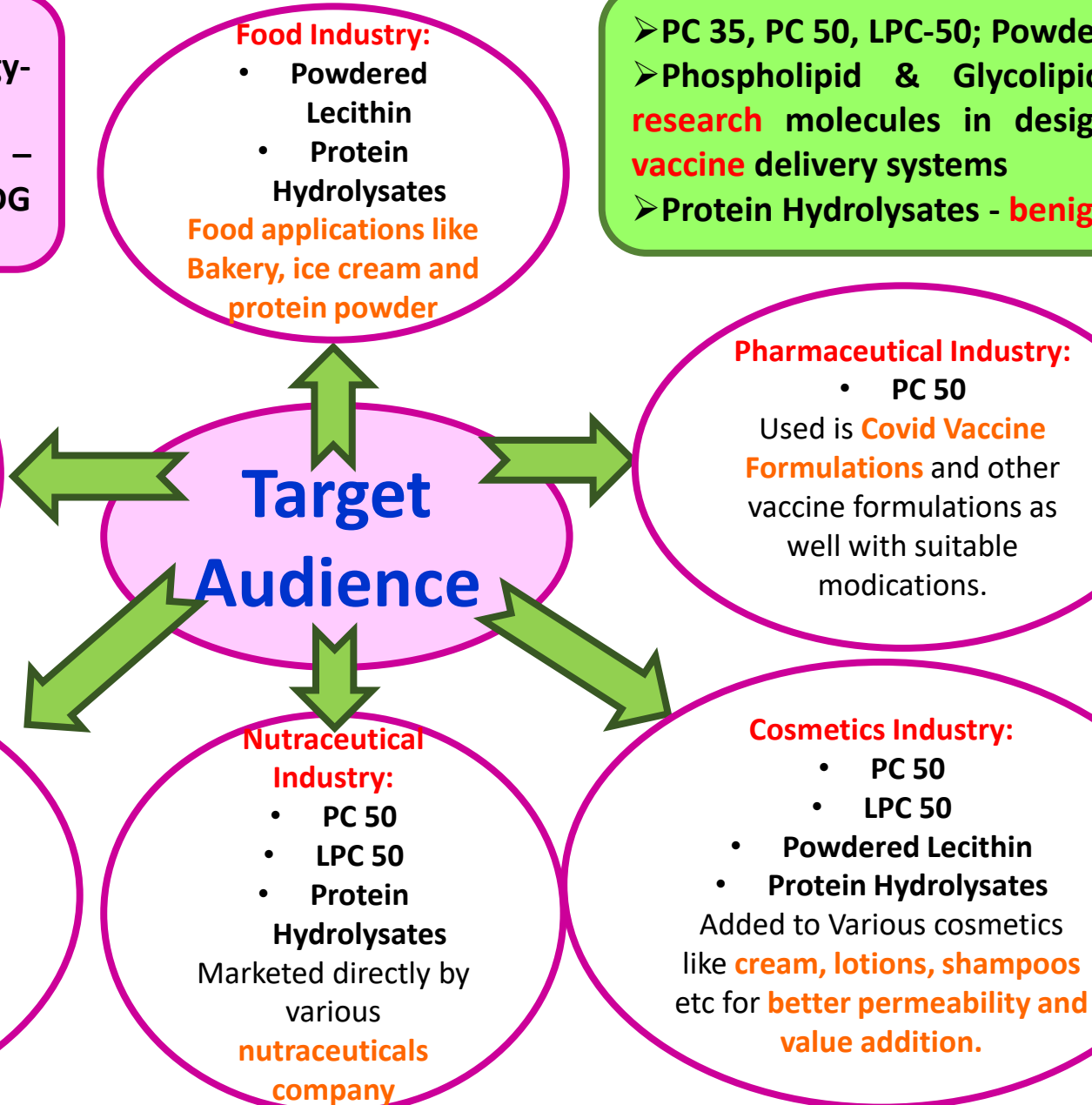
Features of the innovation

Technical Approach

- Simple Technological Processes
- mild & food-grade chemicals- no energy-intensive step
- Development of benign process – Environment-friendly approach- fulfilling SDG goals

Products/Processes Developed

- PC 35, PC 50, LPC-50; Powdered Lecithin
- Phospholipid & Glycolipid mixtures – pioneer research molecules in designing liposomal drug & vaccine delivery systems
- Protein Hydrolysates - benign technology



Food Industry:

- Powdered Lecithin
- Protein Hydrolysates

Food applications like Bakery, ice cream and protein powder

Edible oil Industry:

- PC 50
- LPC 50
- Powdered Lecithin
- Bleached Lecithin

Edible oil industries to prospective end users

Pharmaceutical Industry:

- PC 50

Used is Covid Vaccine Formulations and other vaccine formulations as well with suitable modications.

Paint & Leather Industry:

- Bleached Lecithin (emulsion paints and powder paints as an emulsifier)
- PC 50, LPC 50 & Bleached Lecithin (leather softening agent & cheap source of emulsifier)

Nutraceutical Industry:

- PC 50
- LPC 50
- Protein Hydrolysates

Marketed directly by various nutraceuticals company

Cosmetics Industry:

- PC 50
- LPC 50
- Powdered Lecithin
- Protein Hydrolysates

Added to Various cosmetics like cream, lotions, shampoos etc for better permeability and value addition.