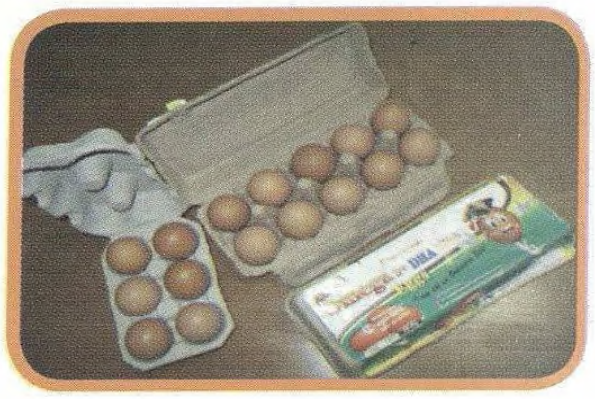
Award category 5 - Transfer of technologies either developed or adapted to industry inclusive of SMEs

Developing and Commercializing of a *Designer Egg*

The Industrial Technology Institute (ITI) has successfully transferred a technology to develop a new chicken egg with beneficially modified nutritive composition for the first time in Sri Lanka. The product is rich in essential omega-3 fatty acids including all important DocosaHexaenoic Acid (DHA). Also with a golden yolk the special designer egg is now marketed with the ITI logo by its commercial producer, Arogya Farms Pvt Ltd.



Egg that nourished mankind over the years has the highest biological value of all foods in terms of net protein utilization by the human body. Therefore, it shall be an essential component in our diet. Yet, there has been much publicity about relatively high cholesterol content in the egg which prevent people from consuming this delicious food. The circumstance led scientists to think of a healthy egg. Designer eggs with various health and/or nutritional claims differentiated colourfully and termed fashionably as *Omega Egg, Diet Egg, Selenium Egg,* etc hit supermarket shelves in Europe in early 1990s.

One of the major nutrients being enriching egg is omega-3 fatty acids such as DHA, EPA (ecosapentaenoic acid) and ALA (alpha-linolenic acid). These omega-3 oils are vital for normal metabolism of man. Most of them cannot be synthesized by human body and must be ingested with the diet. It is duly established that omega-3 fatty acids reduce normal fat levels (triglycerides) in blood. Regular intake of them reduces risk of heart attack, lowers systolic blood pressure, prevents inflammatory diseases and associates with mental wellbeing. DHA is the predominant structural fatty acid in the brain, central nervous system and retina.

Sri Lanka has the highest per capita consumption of eggs (60 eggs per annum) in South Asia representing cost-wise the best value for the food rupee. Despite the chaos about health risks the consumption pattern is increasing gradually. However, importation of eggs is not allowed except under unavoidable circumstances due to quarantine issues. Other countries produce *omega eggs* mainly by using feed ingredients of plant origin which are not grown here. Therefore, the country was waiting for its own designer egg.

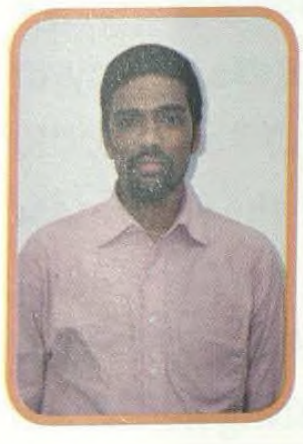
ITI worked on locally available fatty acid sources and finally accomplished the task with a fish by-product. Fish is considered to be a primary source of omega-3 oils. Utilization of fish surplus material for value addition of egg not only provides a cheap fatty acid source, but also opens the door for the fish by-product industry. The two-year research study with field trials, medium and large scale was carried out at two leading poultry farms situated in different regions of the country. Variability, repeatability and reproducibility of the enrichment process under different environmental conditions and raring systems were monitored. ITI obtained the patent rights under Intellectual Property Act of Sri Lanka for the source of specific feed ingredient.

The developed egg contains 200-300mg of omega-3 (per 100g of egg), a four to five fold improvement compare to the normal egg (60-70 mg). DHA content of the ITI egg is 130-230mg (per 100g of egg) whereas the normal egg contains 50-60mg (per 100g of egg), a two to four fold increase. Omega-6 to omega-3 ratio in the normal egg is around 15-20:1. Nutritionists suggest a proper balance (4:1) of the two categories to keep up cardiovascular health. ITI researchers have achieved the ratio which is a challenge to maintain.

The usual properties and characteristics of the normal egg is not deteriorated by the omega-3 enrichment which is achieved through a natural process – feed manipulation. It is widely reported that the modification often lowers productivity and the size of egg. Also, fatty acids of omega-3 chain are known for their objectionable fishy smell and/or aftertaste. But, none of these disadvantages occur with the newly enriched egg. On the other hand, no adverse effects on performance, behaviour or short/ long term physiological disorders were detected by administering new diet formular to the bird (hen).

"Arogya Farms" has been established with feed milling facility to produce the omega egg generating 37 employment opportunities. The product is marketed throughout country.

About the winners



Mr S.S.K. Medage

A Research Scientist at the Food Technology Section of ITI. Holds a BSc (Agriculture) specializing Food Science & Technology and currently completing his MPhil in the field of Animal Science at the Post Graduate Institute of Agriculture (PGIA), University of Peradeniya. He has 09 years work experience in food research & development including areas such as Fish and Meat Processing, Animal Nutrition, Animal Feed Development, By-products Utilization and Food Safety.

He also engages in food & feed processing, factory & plant layout designing and industrial troubleshooting. He is an inventor to five patents in the field of fish waste value addition.

Mr W.U.D. Medis

A Technical Officer at the Food Technology Section of ITI. He holds a Laboratory Technicians' Certificate (Diploma in Laboratory Technology) of Institute of Chemistry, Ceylon specializing Food Chemistry. He has 28 years of work experience in the fields of fruit processing, fish & meat processing, food packaging & labelling, food quality & safety. He is an inventor to twelve patents in field of food product development.

Ms G.D.S.K. Rajapakse

A Laboratory Technologist at Food Technology Section of ITI. Holds Laboratory Technicians' Certificate (Diploma in Laboratory Technology) of Institute of Chemistry, Ceylon. She has 30 years work experience in the fields of Oils & Fats, Processing of Fish and Fishery Products and By-products, Processing of Meat Products, Dairy Products Processing, Food Analysis, Sea Food Safety, Upgrading dry fish processing industry with novel products. She is an investor to ten patents in the field of fish product development.

Mr R.A.P. Perera

Worked as a Technical Assistant at the Food Technology Section of ITI. He graduated from Institute of Chemistry, Ceylon. Currently works as a Chemist in the Middle East.

Dr (Ms) Y. Sultanbawa

Worked as a Senior Research Officer at the Food Technology Section of ITI. Holds a MSc in Food Science from University of British Colombia, Canada and a Ph.D, University of Reading, UK. Currently works as a Senior Research Fellow at the Center for Nutrition and Food Science, Queensland Alliance for Agriculture and Food Innovation, University of Queensland, Australia. She is an inventor to ten patents in the field of fish product development during her tenure at the ITI.