

The Good Oil

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Leading scientific congress endorses DHA for infants

Nu-Mega presents results of research at ISSFAL congress

Leading international scientists at the ISSFAL congress (the International Society for the Study of Fatty Acids and Lipids) held in Stellenbosch, South Africa have concluded that Docosahexaenoic Acid (DHA) is likely to be essential for preterm and term infants, as major infant brain growth occurs during pregnancy and throughout the first two years of life.

Dr Samaneh Ghasemi Fard, Nu-Mega's R&D Technologist and Research Liaison Officer said during these times, infants have the greatest need for DHA. DHA is transferred to infants through the placenta, and later through breast milk. Therefore, it is essential mothers have sufficient DHA in their diets. For mothers who do not eat enough oily fish such as salmon, trout, and tuna every day, fish oil supplements (with high level of DHA) are necessary. For those infants born from mothers with a low level of omega-3 during pregnancy, DHA-enriched infant formula is recommended.

Professor Thomas Brenna (ISSFAL president) and Professor Michael A Crawford (2016 Alexander Leaf Distinguished Scientist Award Winner) had highlighted studies emphasising that DHA is essential for normal brain development in infants, and that it is best acquired from the diet rather than by the less effective conversion from α -linolenic acid.

These professors, respectively from Cornell University and Imperial College London, also referred to the links between DHA deficiency and cardio vascular disease, inflammatory disorders, mental and psychiatric disease and suboptimal neurodevelopment.

Left to right: Captain Joseph R Hibbeln, Acting Chief, Section of Nutritional Neuroscience, National Institute on Alcohol Abuse and Alcoholism; Dr Samaneh Ghasemi Fard, Nu-Mega R&D Technologist and Research Liaison Officer; Professor Thomas Brenna, Professor of Human Nutrition and Chemistry, Cornell University, and ISSFAL President; Professor William S Harris, Research Professor, University of South Dakota.

Professor Susan Carlson from University of Kansas Medical Centre reported at ISSFAL that lower systolic blood pressure in children was associated with higher maternal DHA during pregnancy.

Professor Philip Calder from the University of Southampton reported that lipid emulsions that include fish oil have been used in parenteral nutrition in adult patients post-surgery. This has been associated with alterations in patterns of inflammatory mediators and in immune function and, in some studies, a reduction in length of intensive care unit and hospital stay.

Ms Katie Wood from Adelaide University reported that maternal DHA supplementation in the second half of pregnancy did not increase the percentage body fat or fat free mass in the DOMInO (DHA to Optimise Mother Infant Outcome) children at seven years.

"This provides reassurance to mothers who are worried about the impact of the high dose of tuna oil supplementation on their child's weight. It is safe and no weight gain was reported," Dr Ghasemi Fard says.

Dr Ghasemi Fard also spoke at ISSFAL, presenting the results of her 2014 IRES (International Research and Exchange Scholarships) Award which compared the bioavailability of omega-3 fatty acids from krill oil versus fish oil in vegetarian females.

"Industry sources, with no evidence, state that krill oil is up to nine times more bioavailable than fish oil, but actual

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evidence from available studies does not support this notion,” Dr Ghasemi Fard says.

Krill and fish oils are the available DHA source with different fatty acid profiles (krill oil often contains lower doses of DHA and more of EPA). Results of her trial showed that there was no significant difference in the absorption of DHA from krill oil and fish oil.

In conclusion, from various research sources, it is highly recommended that mothers have sufficient amounts of omega-3, especially DHA, during pregnancy. This is linked to a reduction in risk of early preterm birth, lowered risks of food allergies and eczema in babies. Internationally, breastfeeding has been recognised to be the best nutritional choice for infants to uptake DHA, but if this option not available, it is recommended to feed infants with DHA-enriched infant formula. ■

China acts on infant formula brands and lifts food safety standards

The Chinese regulatory environment, especially concerning infant formula, has been rapidly changing over the past three to five years. Several milk contamination scandals, including one that involved the hospitalisation of 54,000 children in 2008, have made many Chinese suspicious about their food supply.

In June this year, the China Food and Drug Administration (CFDA) announced details of new regulations aimed at reducing the number of infant formula brands sold across the country. These new regulations, Administrative Measures on Product Formula Registration of Infant Formula Milk Powder, came into force on October 1 and limit registered factories in China and offshore to producing three brands and nine different products.

“In tightening food safety standards, it has been estimated that almost 80% of formula brands on the China market will be eliminated when the new law is enforced,” says Mek Cheng, Innovation Analyst with Nu-Mega Ingredients. “These brands are mostly produced by smaller companies which do not have sufficient manufacturing capability and quality standards.

“The latest reports say that 170 domestic and foreign infant formula producers have been gearing up for this registration and preparing themselves for factory audits by the CFDA’s acceptance, inspection, examination and evaluation agencies.”

These new regulations will not affect the larger cross-border e-commerce channel (CBEC) or the “grey” market until January 1 2018. By then, all imported infant formula



Above: Professor Michael A Crawford, Visiting Professor of Surgery and Cancer, Imperial College London; and Dr Samaneh Ghasemi Fard, Nu-Mega R&D Technologist and Research Liaison Officer at the ISSFAL congress.

products must be registered.

Infant formula sales from products made in China have been small compared to sales of imported products. In Australia, the infant formula market is estimated at AU\$600 million annually, of which more than 60% of product is sent to China via e-commerce channels or couriers.

This demand for milk formula has been driven by the quality of Australian brands, word-of-mouth and the benefits of the 2014 free trade agreement with China. However, in a bid to eliminate the competitive advantage held by offshore retailers who avoided taxes imposed on local sellers, a tax of 11.9% was imposed on goods bought from foreign websites from April 2016.

“The initial impact of the regulatory changes has been a slowdown of sales, as many infant formula manufacturers are being cautious with their raw material orders and inventories in case further changes are imposed by Chinese authorities,” Ms Cheng says.

“However, this should be a short term impact as DHA has long been seen as one of the most vital ingredients for infants’ brain and eye development. The demand for infant formula in China has been increasing year on year.

“We are also positive about increasing sales opportunities because of the new European Food Safety Authority’s infant formula legislation on DHA as a mandatory ingredient with minimum fortification levels.” ■



New EU infant formula regulations predicted to increase demand for Nu-Mega's Driphorm® DHA powders

Global demand for omega-3 fatty acid DHA is expected to increase significantly following new regulations in the European Union which makes DHA a mandatory ingredient in infant formula from 2020.

Other jurisdictions are likely to follow this new regulation, according to Glenn Elliott, Nu-Mega Ingredients Research, Quality and Regulatory Manager.

"Nu-Mega is very well positioned to take advantage of these changes," Mr Elliott says. "The DHA market is growing considerably year on year, and infant formula manufacturers are our major market for Driphorm® microencapsulated DHA powders."

Exclusive global technology licence

Nu-Mega holds the exclusive global license for a patented microencapsulation technology developed by Australia's CSIRO, which enables sensitive DHA oils to be stabilised in a powdered form for dry blending applications. The technology is based on the Maillard Reaction (a natural food chemical reaction which forms stabilising compounds) and allows a higher oil loading within the powder to deliver a higher DHA active dosage.

"Many manufacturers use a spray drying technique for DHA powders. However the biggest downside of this technology in conventional microencapsulation is the low oil loading of the microcapsule (the oil percentage per weight of powder).

"Oil loadings of only 30% are common with conventional techniques. However, Nu-Mega's patented technology allows a 50% oil loading."

This provides a strong antioxidative effect, which means that Driphorm® powders can be stored and transported under ambient conditions and have a minimum shelf life of two years.

Nu-Mega's spray drying process also ensures that the size and morphological structure of Driphorm® powders is similar to infant formula base particles, facilitating the manufacture of these formulas.

While the infant formula market is Nu-Mega's key target, the encapsulated powders are also gaining traction with manufacturers wanting to fortify products ranging from beverages to pasta and bakery goods to instant soups and rice. The key benefits for these markets are that Driphorm® powders are high quality and high potency, and can be heated with little or no impact on product smell or taste. ■

Global Omega-3 Status Map shows low levels for most of the world



Above: GOED 2016

Nu-Mega™ Ingredients

Nu-Mega Ingredients is a wholly owned subsidiary of publicly-listed Australian company, Clover Corporation. It specialises in the manufacture and supply of omega-3 DHA and omega-6 ARA powders, the nutritional ingredients which are added to infant formulas, general foods and pharmaceuticals.

Clover Corp has a tuna oil refinery in Melbourne, where it takes crude tuna oil from various supply sources and converts it into a food and infant grade quality tuna oil.

Nu-Mega's spray dried microencapsulated powders use a CSIRO patented technology to stabilise the sensitive omega 3 and 6 oils which can then be dry blended into a variety of foods, infant formulas and pharmaceutical products. The oils can be cooked, have no smell or taste, and have a shelf life of two years.



Clover Corp targets sports nutrition market with Nu-Mega DHA powders

While the international market for omega-3 DHA supplements in sports nutrition is in its infancy, a growing body of evidence about its potential to improve sports performance has prompted Clover Corp to align itself with a specialist distributor in the US sports nutrition market.

“A number of studies link omega-3 DHA to improvements in exercise performance and in reducing inflammation,” says Peter Davey, Managing Director/CEO of Clover Corporation Limited. “We believe it is only a matter of time before manufacturers of sports nutrition products begin supplementing them with DHA, in much the same way infant formula manufacturers have done.

“Our Nu-Mega microencapsulated powders are particularly well suited to this market, as they have a much higher level of DHA than competitor products.”

The sports nutrition market includes sports drinks, protein supplements that are reconstituted into beverages, body building powders and high protein sports bars.

The US market is a more mature one than other international markets, including Australia, hence Clover Corp’s decision to target this market.

Dr Samaneh Ghasemi Fard, Nu-Mega’s R&D Technologist and Research Liaison Officer, says that over the past few decades there has been substantial interest in the therapeutic potential of fish oils for inflammatory conditions including rheumatoid arthritis, inflammatory bowel diseases and asthma.

“Attention has more recently turned to the anti-inflammatory and immune system benefits of fish oil in sports performance. There is growing evidence that it may be useful as a nutritional countermeasure to exercise-induced inflammation and immune dysfunction in athletes,” Dr Ghasemi Fard says.

“For instance, a study of 27 untrained males involving a single 1.8 g dose of omega-3 showed beneficial treatment effects on delayed onset muscle soreness 48 hours post-exercise, suggesting that omega-3 probably had anti-inflammatory effects (Tartibian et al, 2009).”

Omega-3 can assist with increased muscle oxidative stress, muscle fatigue, delayed-onset muscle soreness and the resulting reduction in performance.

Studies have also shown that dietary fish oil has positive effects on heart function in well-trained men, enhancing cardiac energy efficiency during exercise and possibly enhancing the efficiency of oxygen use. Better strength and prolonged performance may result. Omega-3 can also affect cognitive function and emotional states and may act as a mood stabiliser. It may therefore have potential to enhance the decision-making abilities of athletes who engage in sports in extreme and stressful environmental conditions.

Outcomes in recent double-blind studies into the effects of high DHA fish oil on human beings included:

- In a study of 16 well-trained male cyclists, 8 g per day of high DHA tuna oil supplementation for 8 weeks lowered the heart rate during incremental workloads to exhaustion, submaximal exercise heart rate and oxygen consumption (Peoples et al, 2008).
- In a study of 26 male subjects, 2 g per day of high DHA tuna oil supplementation for 8 weeks reduced the mean exercise heart rate and improved heart rate recovery (Macartney et al, 2014).
- In a study of 11 nonprofessional volleyball athletes, 3 g per day of high DHA fish oil for 2 months increased red blood cell membrane\ omega-3 content and reduced significantly body-mass index and total body fat (Malaguti et al, 2008).
- In a study of 24 female elite soccer players, 3.5 g per day of DHA-rich fish oil for 4 weeks showed improvements in complex reaction time and efficiency (Guzman et al, 2011). ■



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