

Fly larvae protein

now a commercial reality for aquafeed



By David 'Wilco' Drew, Managing Director, AgriProtein, Cape Town, South Africa

After five years of research and development, and developing production skills on first a pilot, and then demonstration plant, AgriProtein's first commercial factory, will come on line in April 2015. Each day 100 tonnes of traceable spent organics will be used to produce 24 tonnes of natural animal protein. The company uses billions of flies housed in its factory to lay eggs that hatch into larvae and recycle the waste nutrients in the organic waste into larvae protein. The commercial facility will process 22 tonnes of larvae a day (2 tonnes are kept back for maintaining the fly colony) into 7 tonnes of MagMeal and three tonnes of MagOil.

Magmeal is an insect based protein powder: no additives or chemicals, just dehydrated fly larvae – the natural feed of chickens in the wild and fish in our rivers. The larvae are reared in a 9,000

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square meter biotech facility just next to Cape Town airport where, after years of Environmental Impact essays and joint collaboration with the Department of Agriculture and Fisheries, registered, quality controlled animal and fish feed ingredients are produced.

AgriProtein is a natural protein feed business. Mimicking nature, using exciting new technology, the company is spear-heading the new industry of nutrient recycling. Today we don't think twice

about re-purposing and re-using our old plastics and glass, but little traction has been gained in saving our waste food from landfill. It is not common to discuss the nutrient value or energy cost of producing our organic waste.

The company raised private capital in 2014 to build its two commercial-scale factories, enabled by a seed funding partnership with the Alliance

for Green revolution and the KPMG administered AECF venture fund.

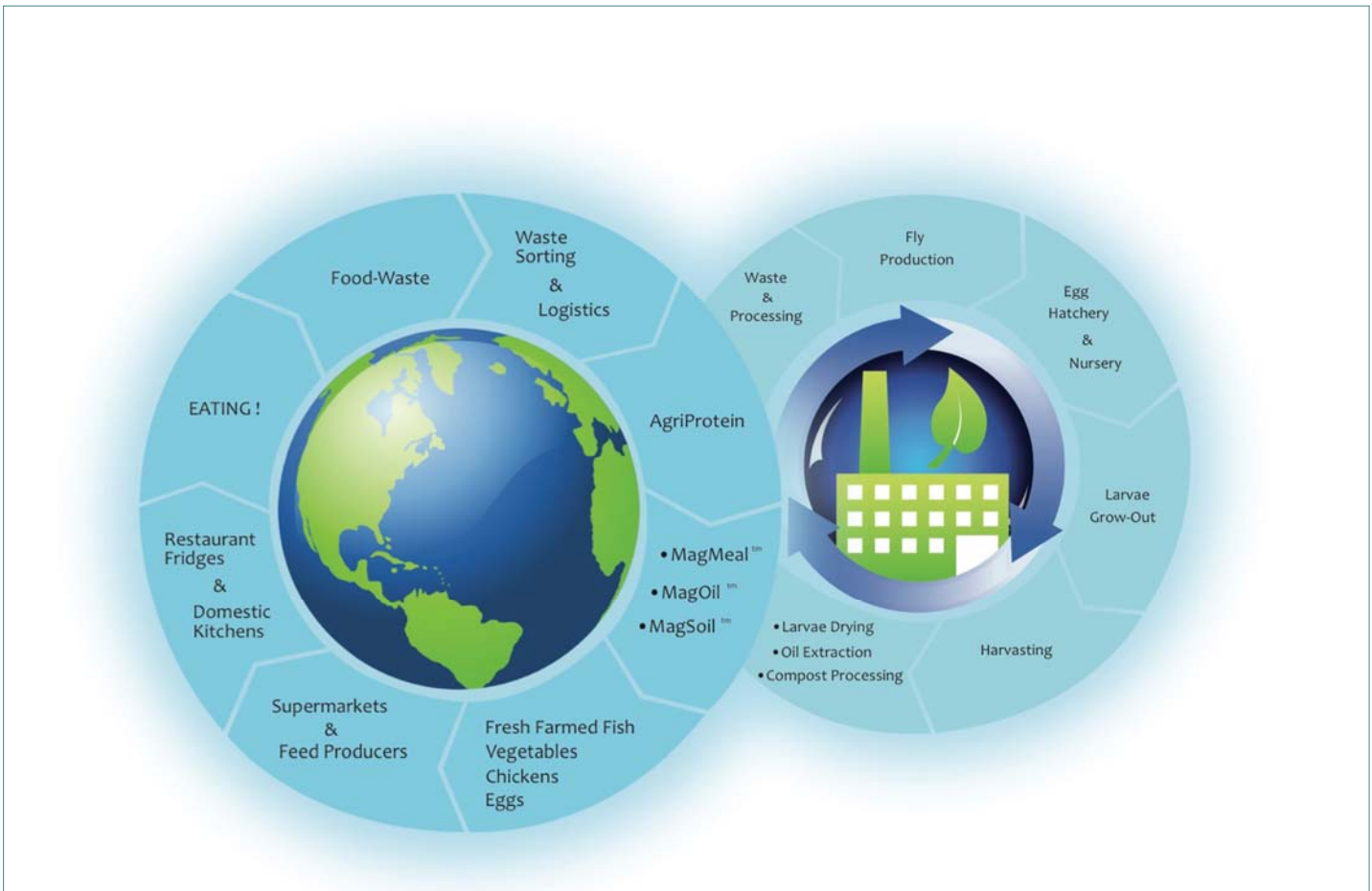
Larvae protein production

The factory process starts with a vast fly rearing colony where the flies are maintained in a secure set of rooms at exacting temperature and humidity levels to create the optimal conditions for mating and, crucially, egg production. Each day, just under three kilos of eggs are collected and placed into the hatchery before being moved into the nursery

and eventually to the large grow out rooms. The basics steps of the process are almost identical to the spawn-fingerling-fish processes common aquaculture. At the end of the 20 day cycle, the larvae are separated from the substrate in which they are grown and are cleaned and heated before being pressed to remove the naturally high levels of fat, creating a flow of a significant parallel product MagOil, a simple, natural sustainable lipid.

In collaboration with the University of Stellenbosch, AgriProtein has for many years been running deep and broad tests into the benefits of their natural meal as a substitute for fishmeal in starter diets for pigs, chickens and in fish feed mixes.

The research examined inclusion levels, digestibility, gizzard erosion, growth and even end product meat quality and sensory tests. In all cases it was shown conclusively, and unsurprisingly that the



MagMeal™ Data

Appearance

Color	Dark brown
Aroma	Nutty
Palatability	High
Form	Ground meal
Shelf Life	12 months

Contents

Protein (%)	54
Moisture (%)	9
Ash + minerals (%)	11
Fat (%)	12
Fibre (%)	14
Energy (MJ/kg)	22

Amino Acid Content

Alanine	6.71% CP
Arginine	5.48% CP
Aspartic acid	7.45% CP
Cystine	0.60% CP
Glutamic acid	10.37% CP
Glycine	4.48% CP
Histidine	3.63% CP
Isoleucine	4.60% CP
Leucine	6.88% CP
Lysine	3.14% CP
Methionine	0.83% CP
Phenylalanine	4.03% CP
Proline	5.20% CP
Serine	4.08% CP
Threonine	3.31% CP
Tryptophan	1.46% CP
Tyrosine	8.79% CP
Valine	5.60% CP



MagOil™ Data

Appearance

Colour	Yellow & clear
Aroma	Yeast extract
Palatability	High
Gel Point	15°C

Saturated Fatty Acids (%)

57.47 -> total	
Lauric, 12:0	31.56
Myristic, 14:0	5.36
Palmitic, 16:0	16.28
Stearic, 18:0	3.12

Monosaturated Fatty Acids (%)

23.68 -> total	
Palmitoleic, 16:1n - 7	3.32
Oleic, 18: 1n - 9	20.12

Polyunsaturated Fatty Acids (%)

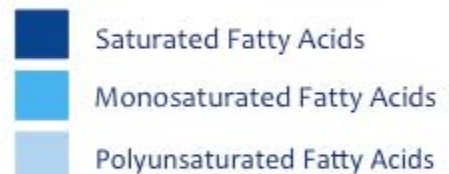
18.84 -> total	
Linoleic, 18:2n - 6	17.22
Linolenic, 20:5n - 3	0.82
Eicosapentaenoic, 20:5n - 3	0.22

Total omega-6 fatty acids 17.80

Total omega-3 fatty acids 1.04

Energy (KJ/kg) 40

Flash Point 215°C



simple meal, made only of the natural wild feed of many mono-gastric animals, including fish, provided a powerful blend of the essential amino acids and crude protein necessary for healthy development.

AgriProtein works with different flies to derive slightly different products and to digest varying waste streams. In its natural form the larvae of one of the key insect species, the Black Soldier Fly has an extremely high fat content – up to 35%, which is extruded from the larvae in

the post processing phase to bring the meal down to just under 12 % fat to counter potential rancidity and increase shelf life. The extracted oil is far more than just a by-product and is a significant product line with excellent palatability and wide reaching application as an in-

redient and coating in animal and fish feeds.

Permitting and availability

The company will build its second factory in South Africa, breaking ground on the last quarter of 2015. First licensees have been agreed in North America, Chile and Australia and the company is tentatively reviewing operations in Europe, waiting on developments in the EU legislation as regards insect meal.

MagMeal is not banned in the EU, however it is also not permitted! As an important reaction to the BSE crisis the EU banned the feeding of all processed animals to other animals to arrest the issue and new potential sources of contamination, only fishmeal was exempted. At the time there was no insect meal lobbying or central representation and as a result no larvae – exemption was sought. The EU is however currently reviewing the governing laws, and MagMeal is already permissible in fish and pet feeds, under certain slaughterhouse conditions. DG Sanco, the European Union's Health and Food Safety unit has asked EFSA, the food safety body, to convene a specialist scientific group to review the situation and a statement is expected in September. AgriProtein is confident of a positive outcome, after all – every free-range chicken, and fresh caught fish sold in the EU will without doubt have eaten flies or larvae, their natural feed source. The insect meal

producers do now have a presence in Europe and AgriProtein is a founding partner of the Brussels– based organization [International Producers of Insects for Food and Feed \(IPIFF\)](#).

On-going development

AgriProtein's market development team continue to run in house trials and fish and poultry growth projects with global agriculture and aquaculture businesses. Specialist explorations have also been run on more niche markets such as quail, and abalone. AgriProtein also supplies product to Universities and has supported local aquaculture research with the Stellenbosch University and on Tilapia in Swaziland. The international community of academics have also published results of insect feed inclusions covering catfish, trout, and many other species of fish and fowl on all continents.



More information

For trial data and other details, as well as ground breaking journals from organizations such as the United Nations FAO and similar institutes, contact David 'Wilco' Drew:
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