

Mac Equity Partners

Equity Capital Markets



UNIVERSAL BIO SECURITY LIMITED - IPO Note

A GLOBAL MARKET RIPE FOR CHANGE

Universal Biosecurity Limited (UBL) is a Western Australian company that has developed and patented a fumigation delivery system called "Fume8". Fume8 uses food grade ethyl formate to produce a very effective gas fumigant that is safe to use, cost effective and environmentally friendly. Ethyl formate is known to be a very effective fumigant but has not been widely used because of its flammable qualities when a gas. The Fume8 technology completely overcomes this issue by mixing non-flammable nitrogen gas with liquid ethyl formate to generate a non-flammable ethyl formate vapour. The delivery system can also be used to deliver traditional liquid fumigants.

The reason why this new technology is so important is because most of the fresh produce we consume on a daily basis is fumigated using one of two main toxic chemicals, being either methyl bromide or phosphine. Both of these fumigants are highly toxic to humans, costly to use and administer and leave residue on the food they fumigate. Despite these negative effects our food is still being fumigated using methyl bromide and phosphine.

UBL's fumigation delivery system uses ethyl formate (classified by the FDA as "generally recognised as safe") and nitrogen gas. Ethyl formate is a food grade product which breaks down into naturally occurring compounds of ethanol (found in alcohol) and formic acid (used as a food additive and naturally found in honey). As consumer awareness drives the "organic food" movement, Governments around the world are increasingly regulating the use of toxic chemicals used in fumigation, paving the way for UBL to commercialise the Fume8 technology within a global market desperate for change.

INVESTMENT HIGHLIGHTS

PATENTED FUMIGATION SYSTEM

- Safe fumigation without the use of toxic fumigants and pressurised fumigation vessels.

FOOD GRADE FUMIGANT

- Ethyl formate is very effective against insects and pests and breaks down into naturally occurring compounds commonly found in food and alcohol.

FAST, COST EFFECTIVE AND SAFE

- Very fast fumigation times with an easy to handle food grade product.

LARGE GLOBAL MARKETS

- The value of agricultural fumigant chemicals alone was US\$1.42bn in 2016. Clients include bulk grain handlers, Government biosecurity agencies, fruit/vegetable distributors, hotel chains, commercial fumigators.

HIGHLY EXPERIENCED BOARD

- Prof McKirdy and Prof Ren are internationally recognised biosecurity and fumigation experts. Simon Andrew has a wealth of capital markets experience at Deutsche Bank, Merrill Lynch and multiple ASX listed companies.



OFFER DETAILS

Shares issued at IPO	25.0m
Listing Price	\$0.20
Amount to be raised	\$5.0m
No. shares at listing	58.5m
Market capitalisation (undiluted)	\$11.7m
Cash post IPO	\$5.0m
Enterprise Value	\$6.7m

CAPITAL STRUCTURE AT IPO

Seed Shares	7.5m
Total Shares at IPO	58.5m
Options, 30c Dec 2020	26.5m
Management Ownership	23.94%

MANAGEMENT

Prof Simon McKirdy	Non-Exec Chairman
Simon Andrew	Managing Director
Prof Yong Lin Ren	Non-Exec Director
Ms Danielle Lee	Non-Exec Director

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GLOBAL FUMIGATION MARKET - DESPERATE FOR AN ALTERNATIVE

The fumigation market in Australia and Internationally has been heavily criticised for its use (and overuse) of toxic and environmentally damaging fumigants. Toxicity to humans, increasing pest resistance and environmental issues have put significant pressure on the industry to find alternative fumigants to reduce reliance on highly toxic chemicals. Despite an international ban on methyl bromide in 2005 and tighter food and border security regulations, no cost effective alternative fumigant/fumigation system has been developed to address these issues. Two common fumigants currently used are methyl bromide and phosphine, both of which encounter the following problems:

Methyl Bromide

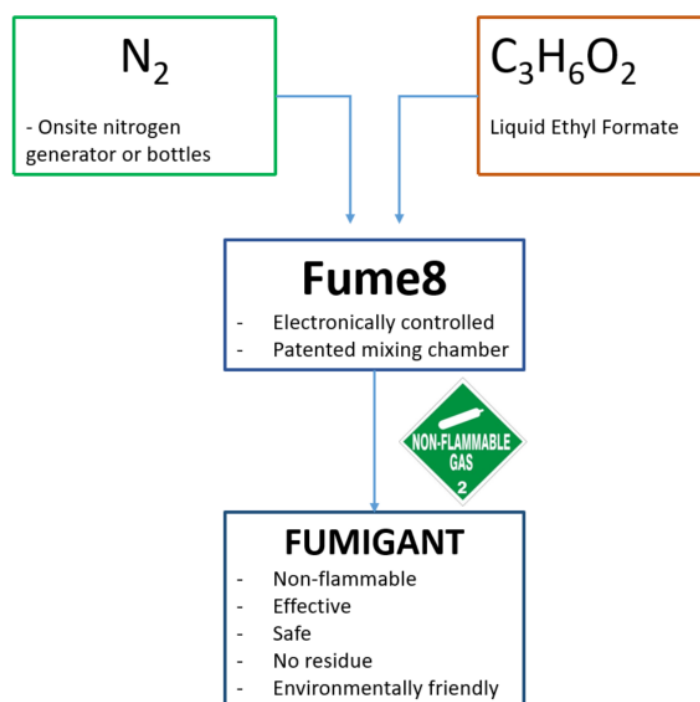
- Banned since 2005 under Montreal Protocol except for quarantine, pre-shipment and specific use cases
- Highly toxic to humans
- Ozone depleting substance
- Leaves residue on food produce

Phosphine

- Highly toxic to humans
- High security risk chemical
- OH&S risk
- Increasing reports of pest resistance.
- Reacts with many metals

ETHYL FORMATE - SAFE, EFFECTIVE, CHEAPER ALTERNATIVE

Ethyl formate is a very effective fumigant but has not been widely used due to its flammability when ignited in the presence of air. Fume8 overcomes this issue by heating and injecting inert nitrogen gas into a stream of liquid ethyl formate within a patented mixing chamber, suppressing ethyl formate's flammability and producing a safe, effective, cheap and environmentally friendly fumigant gas. Ethyl formate is a food additive registered as safe for human consumption in Australia. It breaks down into ethanol (found in beer) and formic acid (used as a food additive and naturally found in honey). Ethyl formate is also easy to handle and a very fast acting fumigant that dissipates in air rapidly post fumigation. These favourable properties significantly reduce fumigation and post fumigation aeration times, saving time and money.

**KEY MANAGEMENT****Simon Andrew****Managing Director**

- Over 20 years' experience as an equity research analyst for several global investment banks including Deutsche Bank and Merrill Lynch.
- Previously Commercial and Finance Manager of ASX Listed Yowie Group (ASX:YOW).

Simon McKirdy**Non-Executive Chairman**

- International expert in biosecurity.
- Experience covers research, policy development and the management of biosecurity within Government and private sectors.
- Previously Biosecurity and Risk Manager at Chevron Australia.
- Deputy Chairman of WA Biosecurity Council and consultant advisor to WA Government through Minister for Agriculture.

Prof Yong Lin Ren**Non-executive Director**

- Internationally recognised scientist with expertise in management and commercialisation strategies for grain pest technology.
- Co-author of numerous biosecurity/fumigation publications.
- Australian representative to the 'Plant Health Quadrilaterals Scientific Collaboration Working Group: Methyl Bromide Alternative Project.'

FUME8 TECHNOLOGY ADVANTAGES

The Fume8 fumigation system has been designed and built to comply with Australian standards. The system is compact, transportable and very easy to use. Fumigation is precisely controlled using an integrated electronics system that meters the amount of ethyl formate and nitrogen required depending on the size of the chamber/area being fumigated. Fume8 can be used to fumigate a small 20 foot shipping container all the way to large grain silos. The volume of fumigant that can be supplied is only limited by the quantity of ethyl formate on hand, negating time consuming and costly “batched fumigation” processes. Unlike other liquid fumigation systems on the market today, Fume8 does not use a pressurised mixing vessel which dramatically increases the operational safety to the fumigator and significantly reduces the potential for gas leaks. Fume8 has also been designed to be a cost effective fumigant delivery system for a wide range of produce and is also compatible with existing liquid fumigants on the market today.

Summary comparison of ethyl formate with other fumigants commonly used in the market

	Methyl Bromide	Phosphine	Fume8 Technology using Ethyl Formate
Toxicity	- Toxic to insects and pests - Highly toxic to humans	- Toxic to insects and pests - Highly toxic to humans	- Toxic to insects and pests - Very low toxicity to humans
Fumigation time	Up to 24 hours total fumigation time (including post fumigation aeration)	3-4 days at high concentration for effective fumigation of grain, aeration required	Acts rapidly, exposure time 1-8 hours depending on produce, minimal aeration required
Residue	Leaves detectable residue after use	Classified as “residue free”, however new technology can now detect residue	No residue - breaks down into naturally occurring elements
Insect resistance	No resistance shown	Increasing pest resistance from excessive reliance and overuse	No resistance shown
Ease of use	- Requires sealed storage during application - Handled with extreme caution, respirator and protective clothing required	- Requires sealed storage during application - High security risk chemical. - Respirator and protective clothing required	- Minimal aeration or withholding requirements - Easy to transport and store - Safely handled
Flammability	Is not considered to be flammable, however, it will burn in air in the presence of a high energy source or ignition	Flammable, may ignite at high concentrations in air	Not flammable

ETHYL FORMATE REGULATION

The use of ethyl formate as a fumigant in Australia is regulated by the Australian Pesticides and Veterinary Medical Association (APVMA). Individual commodity registration typically takes between 6-12 months. In Australia ethyl formate is approved for use on dried fruits in WA, NSW, VIC and SA. The Company is confident of receiving the relevant approvals because ethyl formate as an active ingredient has already received the required approvals from the APVMA across a broad range of commodities (under the brand name “Vapormate”). In South Korea, ethyl formate already has government approval for use on oranges and bananas. China and the EU are increasingly focussed on regulating the use of toxic fumigants.

FUMIGATION TRIALS

The company will conduct trials of its Fume8 technology immediately post IPO which will be used in the registration of the fumigation system’s use with ethyl formate. Each type of produce that is approved opens up another market for use of the system, and should provide consistent news flow post IPO. Of particular importance is the registration of stored grains and vegetables, both of which are substantial markets in Australia and currently use phosphine and methyl bromide fumigants. The company has had preliminary discussions with fumigators and grain storage companies in WA to conduct trials.

UBL also intends to conduct fumigation trials using Fume8 and very high concentration food grade ethyl formate to register Fume8 as an organic fumigation system.

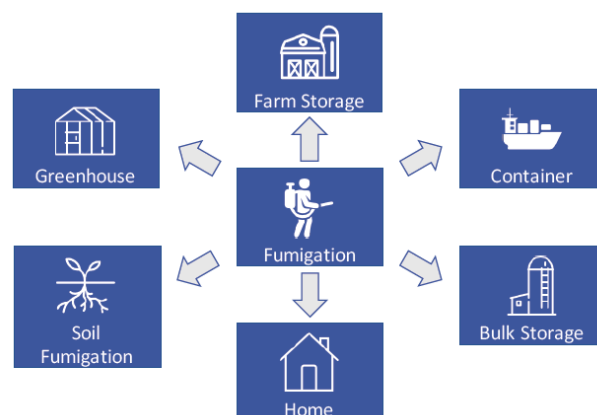
MULTIPLE COMMERCIALISATION OPPORTUNITIES FOR NEAR TERM REVENUE

UBL's business model is to develop multiple revenue streams from the Fume8 delivery system and target global fumigation markets. UBL has received significant enquiries from industries that use fumigation and has presented the Fume8 technology to a number of Australian and international companies and Government departments.

UBL is initially focused on targeting Australia, South Korea and the US with a vertically integrated commercialisation strategy:

1. **Licensing** of their fumigation technology;
2. **Sale and service** of their fumigation technology hardware;
3. Partnering to **supply** branded ethyl formate fumigant;
4. Securing large **onsite fumigation** contracts; and
5. **Consultancy services** to industry groups, universities and Government. Leveraging board experience for **business development and marketing**.

Multiple Fumigation Clients



Licensing and Manufacturing Agreements

UBL has entered into two licence agreements for marketing, distribution and commercialisation of Fume8 in Australia. Over a three year period UBL will earn a stepped royalty based on revenue, with increasing minimum performance requirements the licensee must meet each year.

UBL has also engaged DSM Consulting Engineers to manufacture the Fume8 apparatus to Australian standards. One commercial grade Fume8 apparatus has been built and delivered. A further three units are being built and will be delivered to UBL for distribution to licensees post IPO. UBL intends to enter into a manufacturing agreement with DSM to accommodate large Fume8 orders.

PRIMARY TARGET MARKETS

Stored Grain - regional receival sites and port pre-shipment

Phosphine fumigation is widely used on stored grains to control insect, rodent and rabbit infestation. In Australia phosphine is used for 75% of all fumigation of stored grain. From harvest, to the point of being loaded onto a ship, grain can be fumigated with toxic phosphine up to four times.

UBL has identified the stored grain market as a primary target market to commercialise the Fume8 technology and have been engaged in preliminary discussions with large Australian grain handlers for the trial and regulatory approval of the Fume8 system.

In FY17, Co-operative Bulk Handling Ltd (**CBH**) recorded total revenue of \$3476.9m with 16.6m tonnes of grain handled.¹ CBH recently implemented a chemical residue management system across their network to protect the reputation of WA grain, a signal that grain quality and fumigation residues are of increasing importance in the industry.²

The fumigation of grain being imported into China also presents a very large market opportunity. The Chinese government is increasingly focussed on regulating the fumigation of imported grain, signalling their preference for an alternative fumigant to be used such as ethyl formate.³ UBL can be exposed to the Chinese fumigation market without having the risk of doing business in China, as produce must be fumigated at the country of export (Australia, the US etc).



Figure 2: Large scale grain storage silos

Grain is commonly fumigated by placing phosphine tablets into the silo or grain storage area which reacts with the moisture in the air to produce phosphine gas or the direct introduction of phosphine gas. Depending on the temperature this process can take up to 4 days and be carried out up to 4 times from paddock to port. A larger bulk grain handler in Australia spends between A\$200m to A\$250m on fumigation annually. This is one company in one state. The problem is global.

PRIMARY TARGET MARKETS CONTINUED

Post Harvest Fruit and Vegetable Fumigation

Methyl bromide is the most commonly used fumigant to treat fruit and vegetable produce. Depending on the type of produce and where it is grown fruit and vegetables are fumigated before export, upon import, prior to delivery to retail stores such as Coles and Woolworths and in some cases when produce crosses state boundaries.

The fumigation of fruit and vegetables imported into South Korea has been identified as a primary opportunity. South Korean regulators are very aggressive in reducing their reliance on toxic fumigation chemicals and have already approved ethyl formate for use on bananas and oranges. Local exports of bananas to South Korea average around US\$250 million annually, 97% of which comes from the Philippines and must be fumigated.⁴ In 2010, orange imports from the United States were valued at US\$125 million representing 70% of all orange imports, all of which must be fumigated on export or upon import.⁵

OTHER MARKETS

Ethyl Formate Fumigant Supply

UBL believes the Fume8 technology has the potential to deliver food grade ethyl formate for the effective fumigation of food commodities to an organic standard. Post IPO the Company intends to partner with international gas supply companies to distribute branded Fume8 compounds certified for organic fumigation.

The global market for agricultural fumigants alone was valued at US\$1.42bn in 2016.⁶ Globally, phosphine based fumigation was the most significant type of fumigant used within the agricultural market with a market share of 26%. Methyl bromide accounted for 19%.

UBL has also identified Government biosecurity agencies, ship fumigation, home fumigation and hotel fumigation as secondary market opportunities for the Fume8 technology.

KEY RISKS AND REFERENCES

IP and Competing Technologies Risk - There is a risk that the Company's attempts to secure IP protection through either patents or trade secrets may not be successful. Failure to adequately maintain suitable IP protection may enable other companies to more effectively compete with the Company and may impact the Company's future operations including revenue and profitability.

Funding Risk - The Company may not earn significant revenue through sale or licensing. The Company's ability to attract additional capital is subject to a number of factors that are not within the control of the Company.

Commercialisation Risk - The main commercialisation goal of the Company is to sell and license its fumigation technology. Failure to earn revenue through these avenues will significantly affect the Company's capital position.

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1. CBH Group, 2017 Annual Report p 9.
2. CBH Group, 2017 Annual Report p 13.
3. Grain Trade Australia 'Comments on China's Proposed Grain Law'; Grains Research & Development Corporation 'Fumigation trials for China-bound grain'.
4. <http://www.malaya.com.ph/business-news/business/new-rules-pesticide-threaten-banana-exports>.
5. USDA Foreign Agricultural Service, 'Korea—Republic of: Fresh Produce Market Brief Update' 2011.
6. Mordor Intelligence, Agricultural Fumigants Market—Global Industry Analysis, Growth Trends and Forecasts (2017 – 2022).

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