

Film reduces evaporation

A UNIQUE product designed to reduce evaporation from water storages has been released by Ultimate Agri-Products.

Aquatain is a liquid that forms a thin film on the surface of the water and helps to stop water vapour from escaping, according to Peter Leach from Ultimate Agri-Products.

"Water losses from evaporation are enormous. A typical one hectare dam in central Victoria loses more than 13 million litres every year. In Perth the figure is closer to 19 million litres. Our trials have shown that Aquatain can reduce this evaporation by more than 50%, which is a major saving of such a precious resource," Mr Leach said.

"Aquatain is based on silicone technology. Silicones are used in a wide variety of applications including water-repellent sealers, hair conditioners, lipsticks and in the baking trade for non-stick sprays, but their potential to be used as an evaporation film has not been recognised until now.

"Aquatain is safe to use on all types



Peter Leach of Ultimate Agri-Products says Aquatain can reduce evaporation from dams by more than 50%.

of water storages. Its components are approved for use in food processing by the Australian Food Standards Authority, as well as in the United States.

"Silicones eventually break down into mineral silica, which is quite harmless."

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New product saves water

AN Australian company has patented a new product which is said to greatly reduce evaporation from water storages, by as much as 50 percent in some cases.

The new product, Aquatain, released from Ultimate Agri-Products, is a silicone-based liquid that forms a thin layer across the surface of a dam or ring tank, with the aim of preventing water vapour from escaping.

The product is a silicone-based liquid that covers the surface of the water in a film one molecule thick.

According to director of Ultimate Agri-Products, Glen McDonald, Aquatain is safe to use on all types of water storages.

"Its components are approved for use in food processing by the Australian Food Standards Authority," Mr McDonald said.

"Silicones eventually break down into mineral silica, which is quite harmless as basically it becomes sand.

"The potential for silicone to be used as an evaporation film had not been used until now."

Aquatain is available in 20 litre drums through most resellers, at a recommended retail price of \$360/drum.

Mr McDonald estimated the cost of covering a one hectare dam, over a period of two months, at about \$160.

In trials conducted by the company, the evaporation rate for Aquatain was 95mm, compared to 305mm for a control dam containing no product.

This can extend to a saving of 2.1 megalitres over a 56 day period, at a cost of about \$160. At a price of \$500/ML, it would comparatively cost \$1050 to buy the water.

The University of Southern Queensland is conducting independent trials on Aquatain, but is waiting for the conclusion of their trials before releasing the results.

Glen McDonald, Peter Leach and Graham Strachan of Ultimate Agri-Products.



Putting a thin lid on evaporation losses

Farm dams and larger water storages around Australia lose as much as 40 per cent of their water to evaporation. Research is now concentrating on a safe, cost-effective and innovative way of reducing this loss using a liquid surface layer.

Reducing evaporation losses begins with good dam design – deep, narrow dams retain water more effectively than wide, shallow dams, and well-positioned shady windbreaks mitigate the evaporative effects of both sun and wind.

Another way of reducing evaporation from water storages is to simply put a protective cover over the surface. Plastic or shade cloth covers, for example, can be installed to cover small dams, but are obviously not a feasible solution for larger commercial dams.

The CRC for Irrigation Futures is studying alternative ways of providing protective covers for large dams, focusing on what are known as 'monolayers'.

These spray or pump-on mixtures instantaneously disperse over the water surface, forming a thin protective layer that reduces evaporation loss. The mixtures are usually alcohol-based, which creates the rapid dispersive effect.

Monolayers are easy to apply, cheaper than plastic or shade cloth covers – which cost around \$7–12 per square metre – and have minimal impact on any plants and animals in and around the dam.

But monolayers can only reduce evaporation loss by 10–40 per cent at best compared with shade or plastic covers, which can reduce losses by 70–95 per cent according to a study by the National Centre for Engineering in Agriculture at

the University of Southern Queensland, Toowoomba.¹

Mr Erik Schmidt, who is leading the CRC for Irrigation Futures's research on the use of monolayers for dam evaporation mitigation, points out that farm dams can range in size from 0.25 ha to hundreds of hectares.

application techniques. We are working closely with the CRC for Polymers and the Cotton Catchment Communities CRC in this regard.

The research will assess the performance of a number of different monolayer products, including two prominent brands, the cetyl alcohol/lime-based WaterSavr and

a new silicone-based product called Aquatain (see page 5).

Both products claim to be biodegradable and compliant with Australian food product standards, reducing potential environmental impacts and accidental leakage into potable water systems.

According to Mr Schmidt, even the 30 per cent reduction in evaporation afforded by monolayers could result in sizeable water savings for Australian farmers.

'With just 50 per cent adoption of the technology, we could save 292 000 megalitres of water a year from being lost through evaporation.'

'This could lead to additional crop production of \$146 million a year as well as increased environmental flows.'

The project will also lead to improved technologies and systems for evaluating evaporation and seepage losses from water storages.

Mr Schmidt says the project is one of three within the CRC's program to develop irrigation 'toolkits' to improve the performance of the agricultural sector in irrigation areas.

• Mary-Lou Considine

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More information: CRC for Irrigation Futures: www.irrigationfutures.org.au



While plastic covers can be used to prevent evaporation from small dams, spray or pump-on monolayers are more appropriate for large dams like this one. (CRC for Irrigation Futures)

'With just 50 per cent adoption of the technology, we could save 292 000 megalitres of water a year from being lost through evaporation.'

'While plastic covers are suitable for dams up to 5 ha in size, larger dams from 5 ha to hundreds of hectares need another solution, such as monolayers.'

'Monolayers are an obvious solution for large storages because they are relatively easy to use and cost-effective. But they are not as stable as physical covers and require re-application every few days.'

'In this CRC project, we aim to get a better understanding of how monolayers work. We will look at the impact of wind and quantify the impact of environmental factors such as ultraviolet light and bacteria on decomposition of the monolayer.'

'Our aim is to improve performance and develop more stable products and

¹ Craig Green, A. Soltan, M. and Schmitt E. (2005). *Overcoming Evaporation Loss from Water Storage*. Queensland Department of Natural Resources and Mines National Centre for Engineering in Agriculture, University of Southern Queensland, Toowoomba. (CRC for Irrigation Futures No. 000899C)



Water Wise



Put a lid on dam evaporation

AN Australian company has patented a product which can reduce evaporation in water storages by more than 50 per cent.

And, with water resources in Australia currently at dangerously low levels, that's got to be great news.

The new product is Aquatain, and it has the potential to provide farmers with some long-needed relief.

Water lost to evaporation is extensive.

A typical one-hectare dam in central Victoria, for example, loses more than 15 million litres every year.

Losses are even higher in warmer locations.

Even a pond the size of a typical family river loses the equivalent of a bathtub of water every day.

Aquatain is a silicone-based liquid, which forms a very thin (one molecule thick) film on the surface of the water and significantly helps to stop vapor from escaping.

Not only is it extremely effective, it's also easy to apply as the silicone molecules repel each other giving almost instant coverage to the whole surface.

Aquatain is very cost effective and certainly costs significantly less than replacing the water lost to evaporation.

On average, for a one-hectare dam over a period of two months, the cost of Aquatain coverage is approximately \$160, instead



AQUATAIN BOYS: (from left) Glen McDonald, Peter Lusch and Graham Strachan believe Aquatain is the answer to dam evaporation.

of the replacement water cost. If indeed it can be bought, of approximately \$1000.

Glen McDonald, director of Ultimate Agri-Products who owns the patent, said Aquatain is safe to use on all types of water storages.

'Its components are approved for use in food

processing by the Australian Food Standards Authority," he said.

'Silicones eventually break down into mineral silicas, which is quite harmless as basically it becomes sand.'

The development of Aquatain is a huge breakthrough for those involved with water retention.

'Silicones are used in a wide variety of applications including water-repellent sealers, hair conditioners, and lipsticks and in the linking trade for non-stick sprays, but

their potential to be used as an evaporation film has not been recognised until now,' Mr McDonald said.

Aquatain is available from Lusch and Elders stores nationally, or directly from Ultimate Agri-Products, phone (03) 97030544.



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Spray-on protection reduces water loss

An Australian company has developed a new product which it claims can significantly reduce evaporation from water storages. The silicone-based liquid forms an almost invisible one-micron-thick film on the water surface, creating a barrier against evaporation.

Up to 40 per cent of the water in a shallow farm dam can be lost annually to evaporation. In Queensland, for example, this would translate into an estimated loss of up to 1000 000 megalitres a year from the state's total irrigation storage capacity of around 2 500 000 megalitres.

Graham Strachan, Director of Ultimate Agri Products, which developed the new anti-evaporation liquid called Aquatain, said, "It's easy to

apply, as the silicone molecules repel each other giving almost instant coverage to the whole surface."

"It is also very cost-effective. It certainly costs significantly less than replacing the water lost to evaporation. On average, for a 1-hectare dam over a period of two months, the cost of Aquatain coverage is approximately \$160," Mr Strachan explained.

"Aquatain is safe to use on all types of water storages. Its components are approved by the Australian Food Standards Authority for use in food processing — for example, in the non-stick spray-tined in bakeries."

The product is being evaluated by the CRC for Irrigation Futures as part of a broader



A shallow farm dam can lose up to 40 per cent of its water annually to evaporation. (Graham Strachan)

study to improve the performance of monolayers (see page 33), which currently are less effective than plastic dam covers. Plastic covers can be used on smaller dams, but are more expensive than pump-on solutions for very large dams — and according to Strachan,

water authorities have expressed interest in Aquatain for use in 'mega dams' that supply water to metropolitan areas.

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gardening australia expo

October 5-7, 2007

A Sunday Age advertising feature

September 30, 2007



They say necessity is the mother of invention. In this age of environmental awareness, it's no surprise that some of the best inventions are focused on combating global warming and other eco disasters.

At this year's Gardening Australia Expo, one of ABC TV's most popular shows, *The New Inventions* goes on the road, with a showcase featuring some of the year's best inventions and the people behind them.

"People spend half their lives worrying about the future," says *The New Inventions* host James O'Lughlin, of their audience's fascination with invention. "We're also interested in creativity and ingenuity."

The showcase was a hit at last month's expo in Sydney, and O'Lughlin believes its popularity will transfer to Melbourne visitors. "You're getting to see something that no one else has done before," he says, "things that are helping out tomorrow."

Take John Grimes' creation, The Perpetual Water system, which will be showcased in October. It's a fully automated urban grey-water treatment system that treats shower, bath and laundry water to the highest standard. The result? Safe water for long-term garden watering, toilet-flushing and

laundry water to the highest standard. The result? Safe water for long-term garden watering, toilet-flushing and clothes washing.

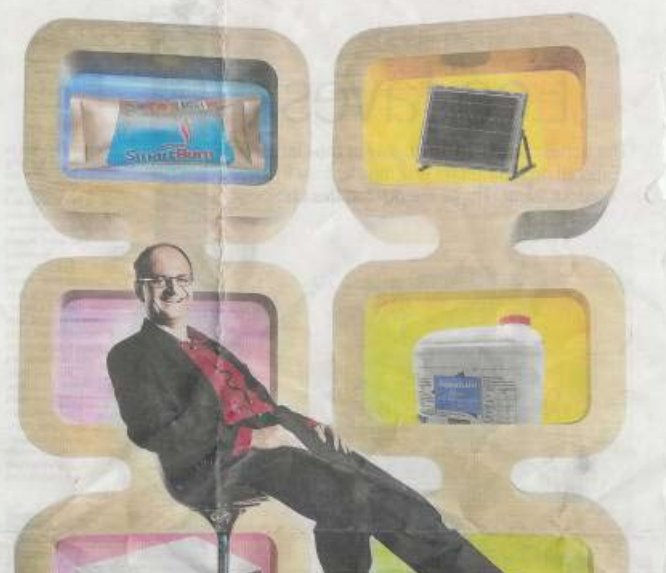
And if reducing particle emissions from your wood fire is of interest, then inventor Peter Haldiman might just have the solution. His product, SmartBurn, reduces emissions by up to 50 per cent, while simultaneously cleaning the chimney, he says. The secret lies in the mixture of natural ingredients encased in a steel, tube-like structure, which is simply placed in the fireplace and left to do its thing.

Self-cleaning is an important selling point of another invention, No Sweat Gutters. The man behind the manufacture and distribution of the innovative gutter-cleaning system are mechanical engineer Jim Knight, Liam Rosney (co-inventor along with architect/designer Jack Macneish) and consultant Peter Benson.

The idea was first invented by MacNeish, who designed a manual gutter flipping system for his own home 15 years ago. Rosney was responsible for the automated, solar-powered, electronic tipping mechanism, a system that was comprehensively tested throughout 2006 and 2007 before eventually making its way to *The New Inventions* show, then to the commercial marketplace in April, 2007.

"Since appearing on *The New Inventions* show we have had a big response," says Benson. "There has been interest from the US, Europe and Japan in the product as well. No Sweat Gutters was also invited to become a member of the Australian Technology Showcase, a government/private organisation that assists in the commercialisation of Australian technology."

"The fact that a person can clean a



Thinking smart

New inventions for today's eco age take to the road. By Claire Halliday.

gutter in five minutes and safely — no more climbing ladders — creates a lot of interest."

"Clients also are impressed with the fact that the system operates on solar power and so it does not cost anything to operate."

Another well-received invention was Graham Strachan's Aquatain, a liquid, based on silicones, which can be poured onto a body of water, such as a dam, where it will form a very thin layer across the top, thus retarding the ability of sun, wind and weather to evaporate the water.

"Even a small farm dam about the size of a tennis court loses more than 500 litres to evaporation every day in summer," Strachan, 39, says.

"I felt that there must be a cost-effective way to reduce evaporation and, after many dead ends, I focused on silicones. No one had thought of them for evaporation control."

With Aquatain, water losses, Strachan says, can be reduced by 30 per cent. Since appearing on *The New Inventions*, civil engineer Strachan, under his business name Ultimate Agri Products, has seen his invention gain market acceptance "in a very short time".

"We have had a huge amount of interest from water authorities, farmers, mining companies, golf courses and, indeed, any organisation where water is critical to their operations."

He is hoping his current research, into Aquatain with an additive such as mosquito-repelling eucalyptus oil, will eventually be just as successful.

"Malaria is a major problem in many countries — particularly in Africa, where one million children die every year. The self-spreading action of Aquatain could carry the eucalyptus oil across the surface and hopefully disrupt the mosquito lifecycle," he says.

The New Inventions host James O'Lughlin, with a showcase of inventions including (clockwise from top left) SmartBurn, No Sweat Gutters and Aquatain.