



Regulatory framework

Introduction

Recycling wastewater produced by the food industry, either in factories and facilities or externally for irrigating green spaces, relies on meeting a number of requirements. One of the most important of these is meeting regulatory requirements that protect human health and the environment.

This assessment specifies the regulatory requirements that need to be considered so that the wastewater produced within the food industry is recycled or used in irrigation in an effective and safe manner.

Despite the importance of meeting these requirements, the regulations for water recycling still lack clarity in some areas. For example, they use very general phrases such as 'fit for purpose' to describe the proper use of water. Greater clarity and specificity in the regulations are required to make them clearly defined and thus easier to interpret and implement. This ought to assist and promote the uptake and management of recycled water in the food industry.

Objectives

The regulatory sub-project's two main objectives were to:

- Assess the information in the national guidelines, standards and regulations pertaining to water recycling in the food industry; and
- Identify and investigate limitations or impediments to water recycling in the food industry.

This study evaluated the regulatory implications of internal and external recycling and reuse of water on human health and the environment. It is based on information from and the experiences of four industry participants in plant operations and irrigation. It identified sources and types of contaminations, likely impacts, exposure pathways, required treatment processes and the regulatory bodies responsible for internal and external water recycling and reuse at the case-study sites.

Methodology

Case studies were conducted with the following industry partners in the food and dairy sectors:

- Kellogg's
- Bega Cheese
- A dairy manufacturing case study site.

In addition, a desktop study reviewed the meat sector through the Australian Meat Processor Corporation and Meat and Livestock Australia.

The assessment compared the quality and source of the wastewater produced by the three participant sites with the national guidelines, standards and regulations appropriate for each industry site and the proposed end use of the recycled water product. The project also took into consideration whether wastewater recycling was to be used within the plant in non-food manufacturing areas (internal: e.g. scrubbers) or sent out of the

plant boundary (external: e.g. irrigation use). Issues from each of these impact categories and boundary conditions were then defined and recommendations made on how to proceed.

The key guidelines, standards and regulations incorporated in the assessment included:

- ANZFA Food Safety Australia Guidelines
- State and Territory Food Acts
- The Australian Guidelines for Water Recycling (which identify health and environmental implications of water recycling)
- The Australian Drinking Water Guidelines
- The Department of Environment and Conservation (NSW) Environmental Guidelines: Use of Effluent by Irrigation
- Australian standards for cooling towers.

Key observations

- **Minimal health risks from non-animal sources.** Wastewater from food products from non-animal sources poses minimal health risks, with the exception of assessing risks of regrowth potential of problem microorganisms.
- **Treatment necessary for non-food applications.** In-house non-potable reuse for non-food applications is possible, but treatment is necessary to prevent growth of spoilage/nuisance microbes and achieve a quality acceptable for application in equipment.
- **Minimal treatment for irrigation reuse.** Reuse of wastewater in irrigation by external partners is possible with minimal treatment as nutrients and salt levels were often found to be within acceptable limits according to environment guidelines in the Australian Guidelines for Water Recycling (AGWR). However, information on loading rates and impact on local conditions both require consideration to prevent environmental impacts.
- **Higher pathogen risk involved for animal products.** Water used in processing animal products needs higher scrutiny and a higher assessment of risk from pathogens. However, as most food-processing plants will comply with standard Hazard Analysis Critical Control Point (HACCP) procedures, it can be assumed that the wastewater from many food-processing plants will in fact be free from enteric microbes.
- **Suitable for food production if treated to required standards.** Recycled water may be used in food production processes within the plant as long as it is treated to potable standards and meets all standards and regulatory requirements. It is important to note that using recycled water in food production processes may not be acceptable for some export markets. For further information, refer to 'Export and DoA requirements' below.
- **Use for non-potable purposes possible but has limitations.** Recycled water may be used for non-potable purposes within the plant provided there is no risk of contact with food or food-processing equipment. However, treatment may still be necessary for operational reasons. It is also important to note that using recycled water in food-processing plants may still not be allowed for some export markets even though the recycled water has not come in contact with food products.
- **Use for external irrigation has limited risk.** Using wastewater from food-processing plants for external irrigation is allowed, though there are some health risks based on assessment using the AGWR. Environmental assessments through some of our case studies indicated that although salinity could be within acceptable limits, some nutrients may be considered too high (AGWR and Department of Environment and Conservation (NSW) Guidelines).
- **Guidelines and regulations may fall short.** A comparison of this assessment with Agricultural Production Systems sIMulator modelling undertaken in this case study showed that the guidelines and regulations may not provide all the required information. This is due to loading rates being difficult to assess in the guidelines and local soil and climatic conditions needing consideration.

However, the guideline requirements can be met through improved treatment or crop usage which would be assisted greatly by input from local regulators.

Export and Department of Agriculture requirements

Using recycled water in facilities that are registered and approved for the export of food products is regulated by the Australian Government Department of Agriculture (DoA) (previously the Australian Quarantine and Inspection Service - AQIS). In addition to providing certification for exported dairy products, the DoA assists with market access arrangements. The DoA requires that exported food products meet the specified requirements of the importing country. This is regulated via the implementation of Export Orders, which in turn correspond with the Australia New Zealand Food Standards Code. This code specifies that using recycled water is permitted provided it is potable and that the water has been considered an input under the HACCP program. Water recycling and reuse proposals are currently considered on a case by case basis.

Conclusions

The main conclusion of this assessment is that water recycling is possible in the food industry with careful consideration of the end use of the recycled water product and the potential for contact with food products. The wastewater produced in the processing and production facilities of the project partners have very little risk of being contaminated by human pathogens. The microbiological quality of the recycled water was acceptable according to the relevant guidelines, standards and regulations. This provided further evidence that appropriate treatment could aid recycling. However, further testing will be required to validate and conclusively determine the quality of the water produced and its suitability for different applications.

An in-depth assessment of the available guidelines, standards and regulations has revealed that there is limited mention of water recycling within the food industry in the Australian New Zealand Food Standards and other guidelines and regulations associated with food. The AGWR and the Environmental Guidelines: Use of Effluent by Irrigation provide limited information on industrial wastewater and focus predominantly on human effluent wastewater. However, it is indicated that the general approach of the guidelines can in fact also be applied to such wastewater sources.

As evidenced in the DoA requirements, care is needed with some export markets. The information from DoA requires that exported food products meet the specified requirements of the importing country.

A number of industry partners participated in the assessment, investigation and implementation of water recycling and reuse processes within their plants and processing facilities. This has provided a greater insight into the efficiency and effectiveness of the recycling process via various specified treatment and technology options.

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Recommendations

- **Engage with state health and environmental regulators.** Food industries that consider using recycled water within their processing and production plants should engage with the relevant state health and environmental regulators at a very early stage in order to outline intentions. This enables requirements or issues raised by the regulators concerning the production and use of recycled water to be identified and addressed during planning and design stages, and allow for appropriate water recycling risk management plans to be developed.
- **Test for pathogens prior to treatment.** Microbiological testing of the wastewater prior to a proposed treatment is essential to determine the presence or absence of various microbial pathogens and to verify that no faecal pathogens are present. Validation studies may be also required.

- **Demand greater clarity within the regulatory framework.** Food industries that consider using recycled water within their processing and production facilities need to be proactive in calling for greater clarity within the regulatory framework because the current regulations for water recycling are unclear and in some ways ambiguous. This may assist industry to reduce the apparent reluctance to initiate investigations into adopting water recycling and reuse processes.

References

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4. Australian/New Zealand Standard (2000). Air-handling and water systems of buildings— Microbial control. Part 3: Performance-based maintenance of cooling water systems
<http://www.specialpathogenslab.com/perch/resources/part-3-performance-based-maintenance-of-cooling-water-systems-1.pdf>
5. NSW State Food Regulation 2010 (2010). NSW Government
http://www.foodauthority.nsw.gov.au/documents/industry_pdf/food_regulation_2010.pdf
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7. Department of Environment and Conservation (2004). Environmental Guidelines: Use of Effluent by Irrigation. NSW Department of Environment and Conservation, Sydney.
<http://www.environment.nsw.gov.au/resources/water/effguide.pdf>
8. Australian Government Department of Agriculture. Australian Quarantine meat export information.
<http://www.agriculture.gov.au/export/food/meat>

Other useful sources of information

1. *Local Government Act 1993*
<http://www.legislation.nsw.gov.au/maintop/view/inforce/act+30+1993+cd+0+N>
2. *National Parks and Wildlife Act 1974*
<http://www.legislation.nsw.gov.au/viewtop/inforce/act+80+1974+FIRST+0+N>
3. *Threatened Species Conservation Act 1995*
<http://www.legislation.nsw.gov.au/maintop/view/inforce/act+101+1995+cd+0+N>
4. *NSW Water Industry Competition Act 2006*
<http://www.legislation.nsw.gov.au/viewtop/inforce/act+104+2006+FIRST+0+N/>
5. Water Industry Competition Amendment (Review) Bill 2014
<http://www.parliament.nsw.gov.au/prod/parlment/nswbills.nsf/0/F2156D365CA9E96ACA257CFB001CEBAF?Open&shownotes>