PIGS

May 2023

Edited by Amy Quinn

Welcome to the May edition of our monthly newsletter.

This month was a busy one for the Pig Development Department (PDD). Firstly we held the Teagasc Pig Open Day on May 9th in Teagasc, Moorepark, Fermoy, Co. Cork and on May 11th in Ballyhaise Agricultural College, Ballyhaise, Co. Cavan. Attendees were brought around different stations throughout the event showcasing our key research and the newest addition to the Teagasc Pig Research Facility, a finisher building tailored to conduct low emissions and high welfare research trials.

Both days were extremely well attended. We would like to thank all our stakeholders who attended and we sincerely thank you for your much valued feedback and contributions. The booklet from this event is available on our website (click here). This was our first time holding this event and our new format was well received, we look forward to holding this event again next year.

Secondly we have just launched the Teagasc National Pig Herd Performance Report for 2022 and its associated infographic. It is the detailed analysis of the performance of the pig farms that participated in the Teagasc Profit Monitor (PM) recording system in 2022. The report and infographic are currently available online and a copy of each will be posted out to all farmers in the coming days. The most recent Pig Edge podcast episode provides an insight and interpretation of the report and is well worth a listen.

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Teagasc
Agriculture and Food Development Authority

Improving liquid feeding system hygiene to improve the feed efficiency of liquid-fed grow-finisher pigs

James Cullen, Florence Viard, Gillian Gardiner & Peadar Lawlor

The feed efficiency of liquid-fed pigs can be up to 0.20 of an FCE unit poorer compared to dry feeding, which equates to an increase in feed cost of ~€5.10 per pig, based on the 5 year average finisher feed price. One reason for this is that microbial growth in the liquid mix can reduce the energy and amino acid content in the liquid feed. Microbes also grow on internal surfaces of mixing tanks and pipes and poor hygiene of the system likely contributes to the poorer feed efficiency. As part of the WetFeed2 project, we recently developed and trialled a sanitisation programme for liquid feeding systems to improve the hygiene of the feeding system. The cleaning of the system was performed between batches and included physical cleaning, and an alkali and acid wash. The new batch of pigs (~35 kg) were fed from the clean system for 10 weeks during which nightly (maintenance) acid rinses of the system were performed. We collected feed samples and swabs from the system before and after cleaning for microbiological analysis. The results showed that the hygiene of the mixing tank and feed pipe improved dramatically after cleaning (Figure 1).

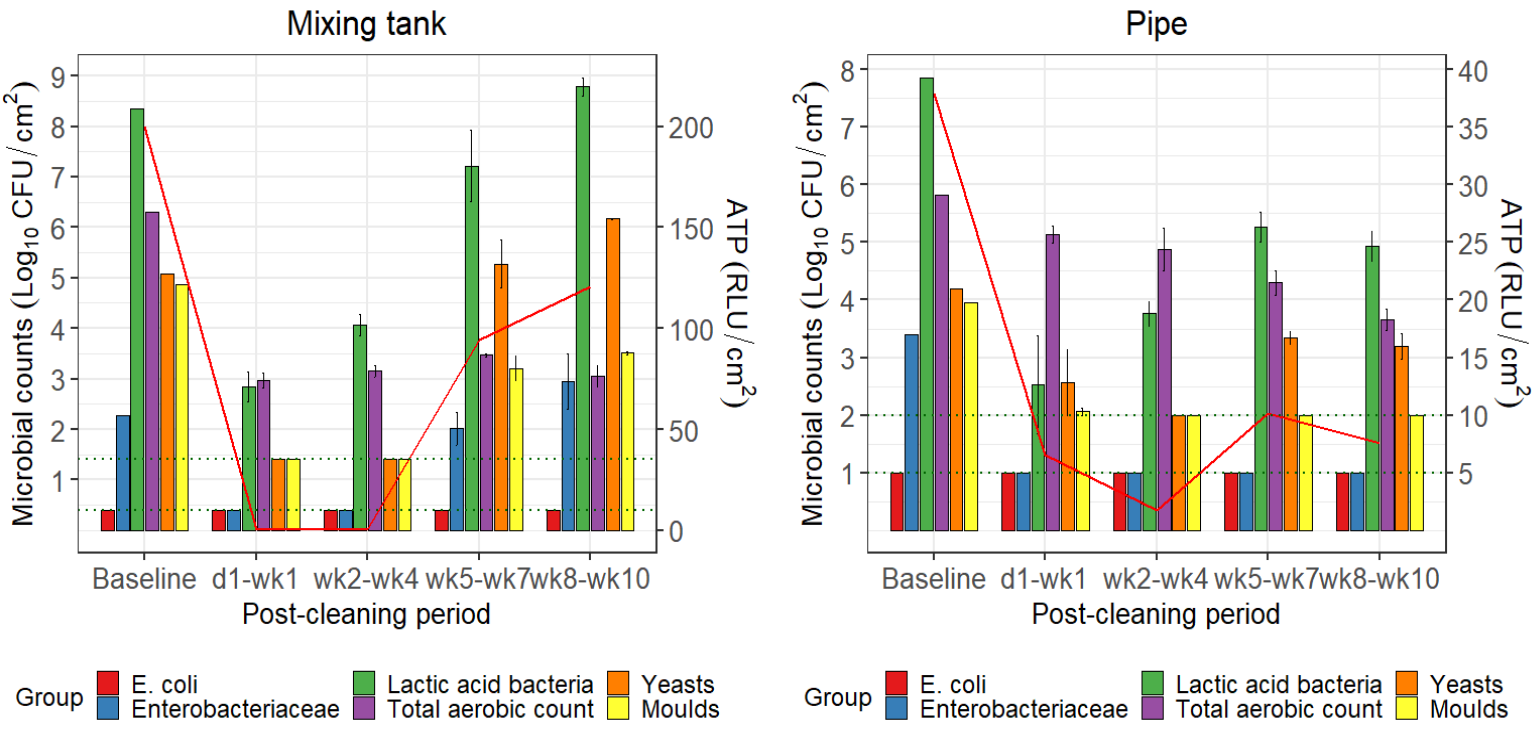

Figure 1. Hygiene of the feeding system before (Baseline) and after cleaning.

The red line on the graphs in Figure 1 show the ATP levels which measure surface hygiene. These readings were highest before cleaning and decreased immediately after cleaning. ATP levels remained low up to 10 weeks after cleaning in the feed pipe but started increasing after ~4 weeks in the mixing tank. Of particular note in the feed pipe, high levels of moulds were found before cleaning, but they were eliminated after cleaning for the duration of the trial.

We also saw this after using scanning electron microscopy (SEM) on sections of the feed pipe that we removed from the system (Figure 2). Moulds and bacteria were widespread in the pipe before cleaning but one day after cleaning, these moulds were damaged and were not found for the duration of the trial, which indicated that they were killed off completely. Despite the improved hygiene of the system, there was little impact on the microbiology of the liquid feed itself.

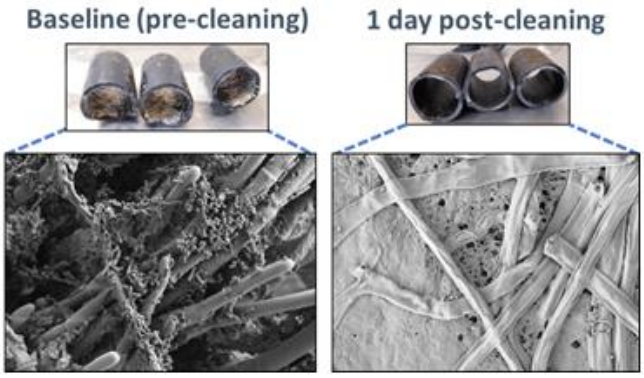

Figure 2. Scanning electron microscopy (SEM) images of the internal feed pipe surface before and after cleaning.

Based on the improved hygiene of the feeding system, we estimated a return from implementing our sanitisation protocol (Table 1). We assumed a very conservative improvement in FCE of 0.05 between 30 and 115 kg LW, based on 4 batches of pigs per year. Taking into account the costs associated with implementing the sanitisation programme, there is a potential financial return of up to €1.20 per pig, depending on the size of the unit.

Table 1. Estimated financial return from implementing the sanitisation programme.

	Batch size (no. pigs)		
	1,000	5,000	10,000
+ Feed saving/yr (€/yr)	5,390	26,948	53,896
- Total cost of cleaning (€/yr)	420	2,100	4,200
- ↑ Labour cost (€/yr)	401	401	401
- Repayments/yr (5yr loan;€)	1,077	1,077	1,077
Margin over ↑ cost (€/yr)	3,491	23,369	48,217
↑ Margin per pig (€/pig)	**0.87**	**1.16**	**1.2**

From this work we can conclude that implementing our sanitisation programme between batches improves the hygiene of the system. We believe that we can improve this protocol further by ensuring that the upper surfaces inside the mixing tank are thoroughly rinsed down with acid during nightly acid rinses. However, in order to improve the quality of the liquid feed itself, other strategies such as the use of dietary acidification should be combined with cleaning.

Acknowledgements: The WetFeed2 project is funded by Teagasc Core funding. Thanks to Interchem Ltd. (Colum Killeen and Lisa Hopkins), Irish Dairy Services (Gerard Kellett and David Mulhall), Annona (Hans Jensema), Big Dutchman (Dennis Engelking) for their invaluable input. Thanks to Antonio Lourenco and Laura Gómez-Mascaraque for performing the SEM work. James Cullen is funded by the Irish Research Council GOIPG Scholarship and WIT PhD Scholarship. Florence Viard is in receipt of a Teagasc Walsh Scholarship.

Water use on Irish pig farms, a good news story

Keelin O'Driscoll, Amy Quinn, John Upton & Shilpi Misra

The reformed Common Agricultural Policy (CAP; 2023-27) focuses on a sustainable food future and targets reduced pressure on global and local water resources while considering local needs, aligning with the aims of the European Green Deal to reduce the environmental footprint of EU food systems and increase sustainability from farm-to-fork. Livestock systems use about 40 percent of global arable land, one third of the cereals produced globally, and one third of freshwater withdrawals. The majority of freshwater use in livestock production is attributed to evapotranspiration from plants grown to produce feed, with a lesser, but yet significant role played by livestock drinking, cleaning and feed-mixing water. Among all the livestock production systems, pork production contributes 19% to the global water footprint (WFP).

The WFP of pork is calculated by considering the volume of freshwater used per unit of product produced (usually m3/ton). This total WFP is divided into green (i.e. rain water used in crop production), blue (e.g. irrigation and drinking water) and grey water (i.e. waste water). The environmental impact of freshwater use in pork production has not been thoroughly researched to date, and never before now in Ireland. Additionally, many previous studies only used data from secondary sources, such as databases, and not primary data collected on farm. Nor did most collect farm specific water use data for each production stage. The WATERWORKS project, which is drawing to a close, did just that. In this final aspect of the project we calculated the direct on-farm and off-farm green and blue water use of Irish pork production systems, to enable us to identify farm specific improvement options to reduce freshwater use, and importantly, compare the WFP of Irish pork production relative to other countries.

Experimental set-up

Twelve Irish commercial pig farms using dry feed, wet feed, and wet/dry feeders, with herd sizes ranging from about 300 – 900 sows took part in the study with the support of their Specialised Pig Advisor. We installed water meters on each farm for each production stage, in the cleaning lines, and where relevant if feed was mixed on the farm, and collected water and production data for one full year. We obtained diet specs for each stage and feed usage per stage so that we could quantify the freshwater use that was required for cultivation of crops for feed. Production data from each farm was obtained from the Teagasc Profit Monitor. The WFP of each farm was calculated by adding the total feed water use (L/year) to the metered on-farm blue water use (L/year) and dividing by the total amount of pork produced (kg) (i.e. carcass weight) on the farm during the year.

On farm water footprint

The on-farm WFP consisted of blue water only, and included drinking water (for each production stage), feed-mixing water and washing water. It ranged from 8.0 to 29.4 L/kg pork (average; 14.1 L/kg pork) and was 70% of the total blue WFP, with the remaining off-farm and used for the production of feed. Overall, the major

contribution towards on-farm BWFP was from drinking, followed by feed mixing and washing water. For dry feed farms, drinking water was the main contributor, and for wet, and wet and dry feed farms, feed mixing is the major part of on-farm blue water use. This difference is likely because in wet feeding systems pigs are consuming water via the wet feed.

Among all the production stages the finisher stage (65%) contributed most to drinking water use, followed by the weaner (19%), gestation (10%) and lactation (7%). This implies that to minimise the blue water use on the farm, the finishing stage can act as a crucial starting point, with a focus on strategies to reduce water wastage. In a separate experiment as part of the larger WATERWORKS project, we found that providing pigs with supplementary environmental enrichment in the finishing stage, with the aim of distracting pigs' attention away from the drinkers, significantly reduced water use (see May 2022 newsletter). Pigs with additional enrichment spent less time interacting with the drinker, wasted less water overall, and the proportion of water wasted relative to water used, was also less. Thus, management strategies as well as dietary options have a part to play in minimising usage.

Off farm water footprint

The off-farm WFP consisted of both green and blue water use for the production of pig feed. The average WFP for feed production was 2,523 ± 233 L/kg pork with a range of 2,006 to 2,894 L/kg pork. This included mainly green water, with only a small amount of blue water use. As well as feed origin and dietary composition, green water use is mainly affected by feed use efficiency, as pigs that are more efficient will use less feed, and hence water. In total, feed production (off-farm water use) had the largest contribution to the overall WFP (99.4%), with only a minor quantity (0.6%) due to on-farm water use.

Overall, off-farm water used for feed production (99.4%) was the major component of total WFP, and of this, green water was by far the most important contributor. Thus, factors such as feed efficiency, feed composition and ingredient origin have a major influence. Choosing sustainable feed ingredients such as inedible by-products or locally sourced feed to reduce pressure on the water resources of other countries is a decision which many pig farmers in Ireland could take, since about 43% of the Irish pig farmers are home millers (see article in the Nov 2022 pig newsletter). Thus detailed and high quality data collection on feed production, feed usage and feed imports is important, as these can influence the calculation of the overall WFP. Another aspect to be discussed in regard to feed WFP is food-feed competition, which considers whether we should use our diminishing freshwater resources for animals feed production or for food crops for humans.

Total water footprint & international comparison

The on and off farm WFP need to be considered together to get an overall view of freshwater use. We found that this was an average of 2,537 L/kg pork. Over all farms, the difference between the most efficient and least quartile of farms was 7% of the total WFP, indicating relatively uniform use of water across all farm types.

Our findings are in line with the majority of studies from other countries which found a WFP ranging from 2,800 to 4,500 L/kg pork, with green water

making up 80 to 99% of the total. Compared to these studies the total WFP of Irish pig farms was at the low end (2,537 L). This could be due to improved pig performance in the past 20 years. Some of the improvements in performance in Irish pork production systems between 2000-2020 include a 30% increase in piglets born alive per litter, an increase in carcass deadweight of 20.1 kg per pig, improved average daily gain from weaning to sale of 150 g per day and a decrease in the amount of feed required from 3.66 to 3.50 kg of feed to produce a kilogram of pork.

Conclusion

This study presents the first WFP assessment of Irish pig farms using farm specific data, and is a novel research as this level of detail for pig production did not exist before this study. Because the overall WFP of Irish pig farms was at the low end of previously published studies, Irish systems appear to perform well when it comes to minimising use of freshwater resources. This reflects well on current Irish pork production systems, relative to those elsewhere. Nevertheless, this study also indicates an opportunity to adjust management strategies, and source either by-products or feed ingredients from non-water stressed areas, to further reduce the burden on freshwater resources.

We would like to sincerely thank all the producers who took part in the study.

European Pig Producers (EPP) Congress 2023- The Spanish perspective

Emer McCrum

Attendees from 15 countries came together for the EPP International Congress entitled 'Resilience of the European Pig Industry' from May 17th-19th in Seville, Spain. Its technical programme focused around current challenges and future outlook. As host country, naturally there was an emphasis on Spanish production throughout the congress which was provided in part by Miguel Angel Higuera of ANPROGAPOR, the National Association of Pig Producers.

The Spanish industry is the largest in Europe, representing almost a quarter of total production, comprising a national herd of 2.6m breeding animals and 50,000 farms. Iberico sows nationally number 395,757 accounting for 15% of the breeding herd with the remaining sows and gilts in conventional systems. It is the second largest domestic agricultural enterprise after fruit and vegetable production and Spain is now the third largest exporter of pigmeat globally. The integrated model accounted for 74% of farms in 2021, up from 65% in 2015. The number of 'free farms' reduced in the same period as integration is perceived to be safer and the system allows producers access to services within the structure to further develop their businesses. All new units constructed in Spain since 2015 are integrated farms. 51% of the total production is located in the north east of the country, an area renowned for agricultural production. Spain also imports live animals from neighbouring countries. In 2022 a total of 3.5m live animals were imported including 2.5m piglets from countries such as the Netherlands, Denmark, Belgium and 1m finishers from Portugal and France. Live animal imports in

2022 was up 9.1% compared to 2021 levels, and 46.7% compared to the average of the previous four years.

Much like elsewhere, 2022 was a difficult year for producers in Spain. The following prices and costs provided at the congress are on a liveweight basis. Spanish production costs averaged 156c/kg and pig price 150c/kg for the full year representing an overall loss of 6c/kg. The average feed cost for the period was 112.9c/kg while remaining non-feed costs totalled 43.1c/kg. This included veterinary at 6.1c/kg, housing and management at 31.9c/kg and reproduction costs at 5.1c/kg. Fifty six million pigs were slaughtered in Spain last year, a reduction of 2.2% compared to 2021. Exports also reduced by 5.4% in 2022. While China remains the main destination for Spanish pigmeat exports at 23.9% of the total last year, exports to the country reduced by 44% on 2021 levels. Exports to China are expected to further reduce this year as the country shifts their attention to growing markets in other countries. Other key export destinations last year included France (9.9%), Italy (7.4%), the Philippines (7.1%) and Japan (7%).

Experts are of the opinion that 2021 represented peak production in Spain and this figure, as witnessed in 2022, will continue to reduce going forward. This is down to a number of factors including the trend in domestic consumption of pigmeat which has reduced in recent years and is expected to reduce further in the future. Changes to stocking densities in finisher housing will see capacity shrink by 4m animals and experts predict the slaughter numbers going forward will be in the region of 50m animals per year.

Miguel also outlined the main challenges facing the Spanish industry which, as reflected in discussions throughout the congress, are shared with other European countries. One of the most pressing issues for producers on the continent is the ASF threat with the programme content centering on improving biosecurity across the production chain. Sticking with health, the challenges around adapting to new legislation on the sale and prescription of antimicrobials, restrictions on the use of critically important antibiotics and the removal of ZnO was highlighted in addition to the impact of these changes at farm level. Environmental pressures was flagged as an area of concern across EU countries with discussions around emissions reduction and BAT, licencing of new and existing sites and calculating the carbon footprint of pigmeat. Impending changes to animal welfare legislation in the area of farrowing, stocking densities and tail docking was also discussed with transition times, the ability of the market to respond to increased production costs and new training requirements for farmers and staff all highlighted as concerns shared among attendees. The need for further research and discussion on the financial impact of any potential reduction in output at farm and national level, costs associated with converting existing buildings and/or the construction of new accommodation if required, in addition to the level of grant aid allocated to the sector was highlighted.

In spite of these challenges however the mood at the conference was positive. Producers highlighted the necessity for a sustained period of profitability to offset the lasting impact of the recent crisis, the continuing high levels of inflation and the impact of the ongoing war in Ukraine. Next year the EPP moves to France with the congress expected to take place in May 2022.

Goodbye Martyna

Martyna Lagoda is leaving the PDD to take up a postdoctoral position 6000km away with The University of Saskatoon, Saskatchewan, Canada. Martyna will work closely with the Prairie Swine Centre where she will be responsible for a number of government and industry funded projects related to pig behaviour and welfare. Martyna has been a member of the Teagasc pig department since starting work on the SowWeanWel project as a Walsh Scholar in 2018. She received her PhD from the Institute of Genetics and Animal Biotechnology of the Polish Academy of Sciences in February (see photo below pictured with supervisors Dr. Laura Boyle and Prof. Joanna Marchewka), and since October 2022 has worked with Dr. Keelin O'Driscoll as a research technologist for the ICT-Agri funded TailBiteAdvice project. We will be very sorry to see her go and wish her lots of luck.

Welcome Wendy

Wendy Izedonmwen has just commenced working with us as a Marie Skłodowska-Curie Early Stage Researcher. She will work alongside Peadar Lawlor and Paul Cormican both of Teagasc, Prof. Gillian Gardiner (SETU) and Dr. Ramon Muns (AFBI) on the MonoGutHealth project. Wendy recently finished her Masters at Wageningen University and Research, the Netherlands, where she specialised in Animal Nutrition and Metabolism. Her MSc. thesis was on 'Amino acid ileal digestibility of protein sources in growing pigs.' Wendy will be a great addition to the team and is very welcome to our group.

National Herd Performance 2022

The National Pig Herd Performance Report 2022, produced by the PDD, is the detailed analysis of the performance of the pig farms that participated in the Teagasc Profit Monitor (PM) recording system in 2022. The data available and included in this analysis is from a total of 76 herds representing over 56,500 sows or 43% of the total Irish sow herd. The average herd size included in this database is 744 sows and ranged from less than 100 sows to over 2,500 sows. The Teagasc PDD always welcome more herds to participate in benchmarking using the PM. Any new herds that wish to participate should contact their Specialised Pig Advisor.

On the latest episode of The Pig Edge, Host, Amy Quinn, is joined by Gerard McCutcheon, to discuss the report and interpret its results. To listen to this episode visit this link.

A copy of the report can be found at this link and a copy of the infograaphic can be found at this link.

TAMS 3

The TAMS 3 first tranche is set to close on June 16th for those that wish to apply. The full details on TAMS 3 and all its schemes can be found at this link for those that wish to apply under this tranche or subsequent ones. The Specific scheme details for the Pig and Poultry Investment (PPIS) scheme can be found here and for the Solar Capital Investment Scheme (SCIS) can be found here.

For more information:

Please visit our webpage at:
https://www.teagasc.ie/animals/pigs/

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