

## Byproduct Feeding Practices Important to California's Sustainability

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Nearly 41% of the California lactating cow ration is composed of byproducts. That number was calculated from responses to a 2022 survey of California dairy nutritionists. The data set represents approximately 936,700 lactating cows (26 returned surveys); 87.5% of those cows were housed in the San Joaquin Valley. Only 4% of lactating cows (38,100 cows) did not consume byproducts.

Our objectives were to quantify byproduct usage in dairy rations and to identify feeding trends and opportunities. Below are selected results from the study.

We asked a series of questions about byproduct inclusion rates of nutritionists' lowest and highest byproduct fed herds, as well as the average inclusion rate across all their herds. These values, as reported by nutritionists, are presented in **Table 1**. Average inclusion rate for the state was determined by weighting the nutritionists' "all herds" responses by number of lactating cows they fed. The result was a 41% average inclusion rate of byproducts in lactating rations.

**Table 1.** Byproduct inclusion rates (DM basis) in California lactating dairy rations (not weighted).

	Lowest Fed (%)	Highest Fed (%)	All Herds (%)
<i>Minimum</i>	0	5	10
<i>Maximum</i>	70	80	80
<i>Average</i>	25	48	40

The range in byproduct feeding amounts was large. Ninety-six percent (96%) of nutritionists reported replacing both forages and concentrates with byproducts. In lactating diets, the three byproducts most frequently used to replace forages were almond hulls, citrus, and soybean hulls. Citrus, whey, and millrun were most frequently reported as concentrate replacements. Every nutritionist selected value (worth the price) as a reason for including byproducts. Fewer chose price (they're cheap; 38%) and availability (65%). Nutritionists reported increased byproduct feeding rates in the last five years (68%); 80% thought feeding rates would increase in the next five years.

*Continues on page 2...*

### *Also In this Issue...*

Byproducts, continued.....	1
Welcome Jackie Atim.....	2
AMR in lagoons.....	3
NMC in Visalia.....	3

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Byproduct feeding is not a new practice. The wide range in feeding levels suggests it is possible to feed more byproducts on some dairies. Water regulation and reduced water availability will impact California's ability to produce forages. Summer 2022 saw rail disruptions prevent concentrates from entering the state. Byproduct feeding strategies may help mitigate feedstuff disruptions while contributing to the sustainability and resiliency of the California feeding program.

Thank you to the California dairy nutritionists who participated in the survey and to the California Dairy Research Foundation for funding this project. If you have any questions about this work, you can reach me at [jmheguy@ucdavis.edu](mailto:jmheguy@ucdavis.edu).

## Jackie Atim – New UC Cooperative Extension Specialist

Hi all, my name is Jackie Atim. I have recently joined the Cooperative Extension team of the University of California Agriculture and Natural Resources.

### Background

I am originally from Northern Uganda in East Africa, where sorghum is a staple and food security crop in the semi-arid area. I have a bachelor's degree from Kyambogo University in Vocational Studies in Agriculture and Education (2005, Uganda), which formed the foundation of my extension career. In 2010, I obtained my M.Sc. degree in Plant Biotechnology, specifically molecular plant breeding and pathology, from Wageningen University and Research in the Netherlands. In 2012, I joined the National Agriculture Research Organization in Uganda and worked with drought-tolerant crops, amongst others, until June 2022. In 2022, I earned my Ph.D in Agriculture, Health and Environment from the University of Greenwich, UK.

### Working with UC Cooperative Extension.

This past summer, I participated in screening different forage and grain sorghum varieties grown in three California locations. Results of this annual activity can be found on our website:

<https://ucanr.edu/sites/sorghum/Research>

As a Cooperative Extension Specialist with statewide responsibilities, I plan to work closely with advisors, growers, consultants, dairy operators, and industry personnel to develop an applied sorghum-based research and outreach program. The program will study growing sorghum, a drought tolerant crop, for feed, food, bioenergy, and bio-products. The intent of this program will be to mitigate the challenges of water quality and quantity in California's crop production.

*Are you growing sorghum, or did you face some challenges at one point while growing it? Please feel free to schedule an appointment to discuss these challenges and see how to best solve them.*

*Are you interested in growing sorghum but are not sure where to start, or do you want to learn more about this drought tolerant crop? If yes, feel free to contact us to discuss your concerns.*

*Do you have land that you want to put under fallow because of insufficient water? Have you thought of growing a summer grain/forage that uses less water and fertilizer as compared to corn? If yes, please feel free to contact me, and we can discuss growing sorghum.*

Extension is not complete until we know your challenges and deliver the solutions back to you. Feel free to contact me at Kearney REC offices at 559-646-6506 or email me at [jatim@ucanr.edu](mailto:jatim@ucanr.edu).



# Recycled Lagoon Water – Does it Harbor Antimicrobial Residues and Resistance?

Emmanuel Okello – UC Davis & UC ANR & Essam Abdelfattah – UC Davis

In California, recycled lagoon water is commonly used to flush lactating cow pens. However, lagoon water may contain antimicrobial residues and harbor bacteria with resistance to antimicrobials. At UC Davis, we analyzed lagoon water from 9 dairies located in North, Central and Southern California for residues of antimicrobial drugs and the presence of indicator bacteria (*E. coli* and *Enterococcus*) with antimicrobial resistance. A total of 8 samples were collected from each dairy over a period of 8 months.



We detected residues of antimicrobial drugs, and indicator bacteria with antimicrobial resistance in the tested samples. Residues for four antimicrobial drugs were detected but in low concentrations (Tetracycline, Penicillin, Florfenicol and Tilmicosin). Antimicrobial resistance was detected in:

- *E. coli*: Florfenicol (86.1%), Sulfadimethoxine (21%) and Tetracycline (17%). Resistance to all other tested antibiotics were below 12%.
- *Enterococcus*: Tilmicosin (96%), Tildipirosin (96%), Tiamulin (93%), Florfenicol (84%), Tetracycline (37%), Gamithromycin (32%), Tulathromycin (30%), Tylosin (19%), Penicillin (5%) and Ampicillin (2%).

The observed high resistance of the *E. coli* to Florfenicol and Tetracycline antibiotics correlated with the presence of the same drug residues in the lagoon water samples. Adult cow treatment records from the study dairies did not identify treatments using florfenicol and tilmicosin. However, these two drugs are commonly used in youngstock which may explain their residues in recycled flush water given the shared lagoon. The finding of a high level of resistance to Tiamulin in samples from these dairy farms point to the complex situation for understanding antimicrobial resistance in bacteria from environmental samples because this drug is used almost exclusively for treatment of poultry and swine. In addition, environmental degradation of florfenicol is slow and may persist longer in the environment compared to fast degrading drugs like cephalosporins, which were not detected.

## Future studies

Further research is needed to confirm the source and impact of drug residues in recycled lagoon water. Additional studies should evaluate the implications of management practices (i.e., composting manure solids before using for bedding) or new technologies on the presence of antimicrobial resistant pathogens in lagoon water.

## What can you do?

Flush your pens when cows are away in the milking parlor. Avoid flushing when cows are coming from the milking parlor with the teat ends still open.

Research team: Emmanuel Okello, Essam Abdelfattah, Pramod Pandey, Pius Ekong, Terry Lehenbauer, Sharif Aly

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## 2023 National Mastitis Council Regional Meeting

**Who should attend?** Dairy producers, veterinarians, dairy processors, milking equipment specialists, pharmaceutical reps and consultants who help producers harvest quality milk.

**Where?** Visalia, California **When?** May 2-4, 2023

**Why?** This NMC meeting provides a forum for networking and sharing information about udder health, animal health and welfare, milk quality and milk safety.

Visit the website for more information: [www.nmconline.org](http://www.nmconline.org)