

**Thank You and Happy Holidays!**

Thank you for your continued support of our University of California Cooperative Extension Dairy programs. As always, if you have comments, questions, or suggestions for our research and extension programs, do not hesitate to reach out. I look forward to working with you in the year ahead and wish you and your families a wonderful holiday season and joyous new year.

–Jennifer Heguy, Dairy Advisor in Merced, Stanislaus & San Joaquin Counties

**Byproduct Usage in California Dairy Rations**

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California produces over 400 commodities, many of which generate byproducts destined for dairy cattle diets. Little research has been done to quantify the extent of byproduct use in California dairy farms. Given increased water use regulation, byproducts may play an even more critical role in feeding dairy cattle in the coming years. In this article we identify commonly used byproducts, estimate the proportion of dairy rations made up of byproducts, and assess trends in byproduct usage as reported by California dairy nutritionists.

**Survey Respondents.** In March 2022, an electronic survey was sent to 61 nutritionists across the state, with 26 returned surveys (46% response rate). Those nutritionists provided services to 498 dairy farms, representing approximately 936,700 milking cows. These farms accounted for 44.5% of all California dairies, providing a comprehensive assessment of byproduct usage in dairy rations. Most herds were in the San Joaquin Valley (87.6%), with fewer in Northern California (5.5%) and Southern California (6.9%).

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**Commonly Used Byproducts.** A total of 58 byproducts were reported as being used in dairy rations; the most commonly utilized are included below.

Byproduct	Number of Nutritionists Utilizing (n = 26)
Almond Hulls	25
Whole Cottonseed	25
Canola Pellets	24
Soybean Meal	24
Dry Distiller's Grains	23
Wheat Straw	22
Wheat Midds/Millrun	21
Corn Gluten Feed	20
Molasses	20



The most reported byproduct fed by California dairy nutritionists was almond hulls. Photo: J.M. Heguy

Almond hulls were the most frequently cited byproduct used as a forage replacement in lactating cow rations, reported by 88.5% of responding nutritionists. Citrus byproducts (30.8%) were the most frequently used concentrate replacement. As California produces nearly 80% of the world's almonds, an abundant supply of almond hulls is available for dairy rations. Their moderate neutral detergent fiber (NDF) content and highly fermentable carbohydrates make them suitable as replacements for both forages and concentrates. Similarly, California accounts for 79% of total U.S. citrus production, ensuring a steady supply of citrus byproducts. Rich in pectin and sugars, citrus byproducts serve as substitute for traditional high-energy concentrates.

**Byproduct Inclusion Rates in Dairy Rations.** In this study, the weighted, average byproduct inclusion rate in California lactating cow rations was estimated at 40.9% on a dry matter (DM) basis. This estimate was calculated by weighting nutritionists' reported average DM byproduct inclusion rates with the number of lactating cows they served. For comparison, 2021 work estimated a national average of 32% inclusion for lactating dairy diets. California's higher rate likely reflects the state's abundant supply of ag byproducts.

The inclusion rate of byproducts in dairy rations varied widely as follows:

- Lactating cows: 10-80% (average: 39.8%, not weighted by cow numbers)
- Dry cows: 5-80% (average: 35.4%)
- Heifers: 5-80% (average: 36.0%)

**Trends in Byproduct Usage.** Over the previous five years, most nutritionists (68%) reported an increase in byproduct usage. A smaller proportion reported decreased (12%) or unchanged (20%) usage. Looking ahead, 80% of nutritionists anticipate further increases in byproduct use, while 12% predict a decrease and 8% foresee no change.

**Implications for Dairy Industry.** The extensive use of byproducts in California dairy rations provides numerous benefits:

- Cost-effective: Byproducts offer an economical alternative to traditional feed ingredients.
- Flexibility in diet formulation: Nutritionists can adjust rations based on the availability and price of byproducts.
- Sustainable practice: Feeding byproducts reduces landfill waste and water consumption.

- Demonstrating sustainability to consumers and legislators: As environmental concerns and regulatory pressures increase, it is essential for the dairy industry to highlight its sustainable feeding practices. By incorporating byproducts, dairies contribute to a circular economy, repurposing agricultural residues into valuable feed sources. Effectively communicating these efforts to consumers and policymakers can strengthen support for the industry.

## Conclusions

The results of this survey confirm that byproducts are a key component of California dairy rations, with an average inclusion rate of 40.9%. The large range of byproduct feeding rates for lactating rations (0-80% DM) may indicate an opportunity to increase byproduct inclusion rates in California dairy rations on some farms. Consumption of byproducts benefits not only the dairy industry, but those industries that produce byproducts.

## Acknowledgments

Funding for this study was provided by the California Dairy Research Foundation. Thank you to the participating dairy nutritionists for their contributions.

If you have any questions about the work, or would like the references included in this article, please feel free to reach out. The full study was published in California Agriculture and can be accessed by scanning the QR code or clicking here: <https://doi.org/10.3733/001c.147223>



## Golden State Dairy Management @ the World Ag Expo

*Join us for University of California Research Updates  
at the Farm Show in Tulare!*

**CEUs Requested:**  
ARPAS, CCA & CDFA-INMP

**Tuesday, February 10<sup>th</sup> & Wednesday, February 11<sup>th</sup>**

**Seminar Trailer 2**

**10am – 12pm**

**University of California**  
**Agriculture and Natural Resources**

