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The Prevalence of Competing and Complementary Claims on U.S. Food Product Packaging: A Case Study of Claims on Milk and Yogurt

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Abstract

Food products sold at retail stores may carry a variety of claims on packaging, including claims about human health (low fat), environmental stewardship (USDA Organic), and the types of inputs used in making the food (non-genetically modified organism or non-GMO). This study examines which claims appeared most frequently on fluid milk and yogurt product packaging, the number of claims that appeared on products, which ones were complementary (appearing together), and which ones competed for consumers' attention (appearing on separate products). Emphasis is placed on claims related to farm production methods. Label Insight and Circana (formerly IRI) data for 2022 were used to conduct the study. Claims that a product is USDA Organic certified were found on 10.9 percent of fluid milk products and 8.9 percent of yogurt products. Organic products were also more likely to contain animal welfare and non-GMO claims than conventional fluid milk and yogurt products. Natural food claims were more common than organic claims and commonly appeared with hormone-free claims. Complementary claims fell into two groups: Verified claims that required farmers, suppliers, or retailers to incur some expenses appeared together, and claims that required little or no new activities or costs appeared together. The two groups rarely overlapped.

Keywords: food product label claims, scanner data, dairy products, fluid milk, yogurt

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The Prevalence of Competing and Complementary Claims on U.S. Food Product Packaging: A Case Study of Claims on Milk and Yogurt

Introduction

Packaging of foods sold at retail includes a wide range of label claims. Claims about human health and safety might say low fat or good source of calcium. Retailers and producers might claim USDA Organic to highlight commitments to environmental stewardship and animal welfare that meet the USDA National Organic Program standards. Some products highlight their mix of production inputs, claiming non-genetically modified organism (GMO) or no hormones. A kosher claim means the product meets standards set by a rabbinical certifier.

Currently, there is little quantitative information about the volume of label claims consumers might see on product packaging and almost no information about ways that food suppliers are combining claims. There is little in peer-reviewed literature quantifying the use of label claims and combinations of claims. Here, we partially fill this knowledge gap, providing a quantitative baseline of food label use. We focus on fluid milk and yogurt products, including the frequency and distribution of different types of claims on product packaging, as well as correlations that show which claims tend to appear together and which are competitive and rarely appear together. We highlight labels that spotlight farm production practices because these production practices are the focus of several U.S. Department of Agriculture (USDA) programs.

Dairy was chosen for examining label use because the range of claims appearing on dairy products is wide, including claims about human health and safety, environmental stewardship, input use, and religious claims. Some research suggests label claims appear frequently on dairy products. Kuchler et al. (2023) tallied use of the natural claim on foods and found its use on dairy products was highest among major food groups.

U.S Department of Agriculture's Role in Food Labeling

Labels on food product packaging can be an important source of information for consumers. They list the attributes of available products so consumers can choose products that best suit their needs and wants. For producers, label claims are an opportunity to attract consumers' attention, highlighting attributes the producers believe consumers want. The claims also help consumers select products that adhere to guidance in the 2020–25 Dietary Guidelines for Americans. Several programs supported by USDA help consumers and producers by verifying claims about farm production practices. These programs include:

- A variety of product claims are authenticated by the USDA, Agricultural Marketing Service (AMS) through the USDA Process Verified Program (PVP). The program is a fee-for-service verifica-

tion service offering applicants a way to market their products using self-described process points. Currently, USDA, AMS is auditing claims for 73 companies. Most companies have contracted for multiple claims. For example, chicken producers are using the program to support claims that antibiotics were not used at all or used responsibly, diet claims, animal welfare claims, geographic claims, as well as many others. Applicants with an approved PVP may develop promotional materials associated with their process-verified points. Applicants may also use the PVP shield in accordance with program requirements and market themselves as USDA Process Verified. Unlike regulatory programs, there are no limits on the claims that PVP might support.

- The USDA, National Organic Program (NOP) is responsible for organic claims made on all products. This Federal regulatory program sets standards for use of the USDA Organic label, developing and enforcing consistent national standards for organically produced agricultural products sold in the United States (USDA, AMS, 2025a). The program also accredits third-party organizations to certify that farms and businesses meet the national organic standards. These certifiers and USDA work together to enforce the standards.

USDA's NOP and PVP programs allow suppliers to highlight their investments in farm production methods, including the use of production practices that are significantly more expensive than conventional practices. For example, the first firm to claim its chicken was raised without antibiotics incurred a higher cost of production than those systems that used antibiotics for growth promotion and disease prevention. The firm had to investigate how to reduce antibiotic use in poultry operations, develop new technologies and vaccination protocols, and finance a controlled trial to look at the effect of removing antibiotic use for growth promotion (Bowman et al., 2016). Other firms were motivated to subsequently adopt these production practices only if they believed doing so would be profitable; the financial incentive to produce the new and differentiated product would vanish if firms were not compensated through higher prices for production losses from higher infection rates and other risks of forgoing the use of antibiotics.

Farmers, food suppliers, and retailers must receive a price premium that meets or exceeds their extra costs for producing foods with attributes that are not present in conventional and commodity foods. The supply of these differentiated products will exist only so long as all the participants in the supply chain profit. USDA programs fill an information gap that could otherwise make it more difficult for firms to collect a premium: Consumers usually cannot independently verify attributes like organic, raised without antibiotics, or non-GMO. Foods with these attributes may taste, smell, and feel the same as foods without them. For example, without the raised without antibiotics claim on retail packaging, consumers may have no way to distinguish conventional chicken from chicken raised without antibiotics.[1] If consumers cannot verify a claim, they may be reluctant to pay a higher price in case the claim is not true (Ferreira et al., 2021; Raszap Skorbiansky et al., 2021). Even if consumers' willingness to pay for farm production attributes exceeds the cost of production, exchanges may not occur if consumers worry that products are not what is claimed.[2]

USDA supports markets for agricultural and food products, including markets for organic products. Other U.S. Government agencies, such as the Food and Drug Administration (FDA) and the Federal Trade Commission (FTC), also regulate aspects of food labeling. The FDA is responsible for the safety and labeling of most foods, including dairy products. FDA oversees a front-of-package claim about bone health, such as

[1] Darby and Karni (1973) named these types of unobservable qualities "credence" attributes.

[2] For example, as recently as 2019, approximately half of the Mānuka honey on the market was reportedly not genuine (Taylor, 2019). However, quantitative evidence about the extent of food fraud is sparse. The most detailed information comes from NOP. NOP has an active enforcement function. It receives and may investigate complaints and inquires. In 2022, NOP closed 382 such cases. Investigators concluded that a fraudulent certificate had been posted in 3 percent of those cases (USDA, AMS, 2023).

"Adequate calcium and vitamin D, as part of a well-balanced diet, along with physical activity, may reduce the risk of osteoporosis." The FTC focuses on fraud,[3] and its actions are likely to be reactions to findings of misleading claims.

The food-label environment also includes numerous private sector intermediaries that set standards and enforce claims. Multiple rabbinical certifiers set and enforce kosher standards (Lytton, 2013). A nonprofit organization sets standards and enforces claims that foods do not contain genetically engineered materials (Non-GMO Project, 2022). Other organizations judge the credibility of claims for consumers (Consumer Reports, 2024).

While USDA and other entities bring credibility to covered label claims, research shows that consumers do not fully understand food package labels related to farm production methods, and sometimes multiple claims lead to greater confusion. Using a discrete choice experiment with a sample of 1,010 consumers, Lim et al. (2021) found evidence of a halo effect: respondents credited grass-fed beef with unsupported health benefits.[4] Wilson and Lusk (2020) conducted a nationwide survey of 1,122 adults and found that 40–58 percent of respondents were willing to pay a price premium for foods carrying what the researchers named "redundant labels:" non-GMO salt, gluten-free orange juice, and no-hormone-added chicken. In a separate study, the Organic Trade Association collaborated with Euromonitor International to survey 1,201 U.S. consumers about their knowledge, preferences, and attitudes toward foods that were advertised as organic, produced sustainably, and improving human health or animal welfare, among other issues (Organic Trade Association, 2024). The survey found that many consumers were unaware of the range of environmental stewardship, health, and animal welfare benefits derived from organic food purchases. Some consumers attributed health benefits from chemical avoidance to non-GMO production. Some consumers valued claim attributes like raised without antibiotics more than organic, even though NOP standards prohibit marketers from selling, labeling, or representing as organic any products derived from any animal treated with antibiotics (Organic Livestock and Poultry Standards, 2023), again suggesting consumers were generally not well-informed about any of the claims.

There is currently little formal analysis in peer reviewed literature about the use of farm-production related claims in the marketplace, including the position of these claims compared to other types of activities. The Organic Trade Association (2024) study suggested consumer confusion affects program efficacy. A baseline is needed, however, for any analysis. In this study, we provide that baseline for two dairy products: fluid milk and yogurt.

A Taxonomy of Claims

Our focus is on the frequency of various label claims on milk and yogurt products. To that end, we constructed a taxonomy of label claims covering health, environmental stewardship, and animal welfare that link claims with Universal Product Codes (UPCs).

Circana (formerly IRI) retail scanner data and Label Insight (acquired later by NielsenIQ) data identify numerous claims on each UPC. Both datasets listed some UPCs with label claims that the other dataset did not.

[3] The Federal Trade Commission' mission statement is "Protecting the public from deceptive or unfair business practices and from unfair methods of competition through law enforcement, advocacy, research, and education" (FTC, 2025).

[4] Halo effects occur when positive feelings about a single product attribute drive a consumer to judge unrelated product attributes in a more positive light. In the case of food labels, for example, a consumer might assume products that are low in calories are also high in nutrients or low in fat.

We counted a product (UPC) as carrying a claim if either dataset identified the products as carrying the claim. The data we used cover products purchased in 2022, which were the most recent data available when we undertook the analysis.[5]

The taxonomy helps to organize the label claims data on dairy products. Our taxonomy includes the claims that concern FDA—health claims, structure/function claims, and nutrient content claims. We also included labels related to farm production methods. These include environmental stewardship claims like organic, no hormones, non-GMO, and animal welfare claims like pasture raised.

Note that Circana and Label Insight both track how claims are worded. Aside from the health claims that are approved by the FDA, wording of claims is determined by individual retailers and suppliers. The wording of claims varied so much that when we used wording to identify and distinguish among claims, the frequencies of most claims were small, and the relative magnitudes of the claim use was uninformative. Therefore, we grouped claims by the information that the claims impart.

The level of Government involvement differs among claims, as detailed below. However, all the claims we categorized were added to labels voluntarily, without any legal requirement to do so. We organized the data into a taxonomy of 11 claims, as described in the following section.

(1) Fat claims

We identified dairy product UPCs that carry a fat claim suggesting the product contributes no or very little to dietary fat intake. These claims include those identifying grams of fat (0 fat grams, 1–3 fat grams, and 4–12 fat grams), making low-fat or relatively low-fat (less fat, low fat, no fat) claims and making no transfat claims.[6]

(2) Sugar and sweetener claims

Consistent with advice in the 2020–25 Dietary Guidelines for Americans to limit added sugars, we identified dairy products that carry a sugar or sweetener claim. We included claims saying no added sweetener, sweetener free, unsweetened, and other sweetener. Claims about sugar include less sugar, no sugar, no sugar added.

(3) Digestive benefits claims

These claims include references to the product having prebiotic or probiotic properties, and those claims that point to additions of the bacteria *Lactobacillus acidophilus* for its probiotic properties. Also included are claims that lactose is lower than in comparable products.

[5] Claims first used after 2022 are not part of our dataset. Also, claims that were not used on any dairy product, like being caffeine-free, are not part of the taxonomy.

[6] In the 1980s and 1990s, doctors, Federal health experts, the food industry, and the news media were reporting a low-fat diet could benefit everyone (La Berge, 2008). More recently, doctors and health experts refined their earlier message (Egan, 2023). The 2015–20 Dietary Guidelines for Americans report stresses the importance of managing calorie intake and saturated fat intake. However, the label claim data only point to fat reductions.

(4) Claims that high levels of attributes promote health

Claims about calcium and protein point to dairy products being a good source of calcium and protein, or that dairy products are relatively high in calcium and protein. These claims were included in this variable. Also included were claims that highlighted the addition of omega-3 fatty acids.

(5) Claims that low levels of attributes promote health

These include claims pointing to low or relatively low levels of calories and cholesterol. These are claims consistent with the Dietary Guidelines for Americans report.

(6) No-hormone claims

In the United States, several active ingredients of drugs approved by the FDA for use in food animal production are hormones or have hormone-like actions. Only one compound, bovine somatotropin (rBST) is approved as a method for increasing milk production in dairy cattle (Nachman & Smith, 2015). It is a genetically engineered protein that is identical to a naturally synthesized pituitary product and is marketed to dairy farmers to increase milk production and efficiency of milk synthesis in cows. Claims suggesting hormones were not used are worded in many ways. These claims include no hormones, no hormone added, not treated with hormones, and hormone free. All these claims were used to construct our variable for hormone claims.

(7) Natural claims

FDA has not established a regulatory definition or standards to use the natural claim. However, the agency has operated under the longstanding policy that natural means nothing artificial or synthetic has been added to a food product (FDA, 2018). Our variable for natural claims includes natural as well as 100-percent natural, no artificial ingredients, no added preservatives, no artificial preservatives, and no preservatives.

(8) USDA Organic

USDA Organic regulations for dairy production cover the operation of dairy farms and most of the life of dairy cows (USDA, AMS, 2025a; Organic Livestock and Poultry Standards, 2023). Only certified dairy operations may use the USDA Organic label on their products. Feed must be organically produced, including pasture and forage. Producers must promote animal health without the use of antibiotics and hormones. The regulations speak directly to animal welfare. Among these provisions, dairy producers must provide conditions that allow for exercise, freedom of movement, and reduction of stress. Continuous total confinement of livestock is prohibited, and producers must allow access to pasture throughout the grazing season, totaling at least 120 days of the year.

The USDA Organic label indicates a food has been produced according to USDA Organic standards. Products with 70 percent organic ingredients or more may not qualify to use the label but can use language highlighting those ingredients (USDA, AMS, 2025a). Language contained in our data includes organic, made with organic ingredients, and certified organic.

(9) Animal welfare claims

There are various ways retail product packaging identifies production practices about the treatment of dairy cows. Language in our data includes claims of pasture raised, grass fed, and humane certified.

(10) Non-GMO claims

Food suppliers can claim their products do not contain genetically engineered ingredients (GMOs); no regulations preclude such truthful claims. However, most non-GMO claims are certified by a nonprofit organization, the Non-GMO Project, and certified products can carry their blue butterfly label (Non-GMO Project, 2022). For the case of dairy products, milk carrying this label must be from cows provided non-GMO feed (Non-GMO Project, 2020). We included products with claims stating non-GMO certified and no GMO.

(11) Kosher

Kosher food certification is conducted by competing private sector certification agencies (Lytton, 2013). While the certification agencies likely do not all agree on standards to which they certify food products, we treated all kosher claims as alike in constructing our variable indicating the presence of a kosher claim.

Six of the claims focus attention on human health and well-being. Five of the 11 claims spotlight farm production methods. These include no-hormone claims, natural claims, USDA Organic claims, non-GMO claims, and animal welfare claims.

Methods and Results

To characterize the claims consumers face, we constructed a dataset with 1 binary variable for each of the 11 types of claims discussed above. The value of these variables is 1 or 0 for each milk and yogurt product (UPC). That is, each such variable was constructed by coding each UPC as bearing the claim (coded 1) or not (coded 0). Having constructed the dataset, we first used the set to examine how many UPCs carried each claim, as well as the total number of claims different UPCs carried. Next, we examined correlations among claims, showing which claims often appear together (complementary claims) and which ones tend to appear on separate products within the same product category (competitive claims).

Frequency and distribution of claims

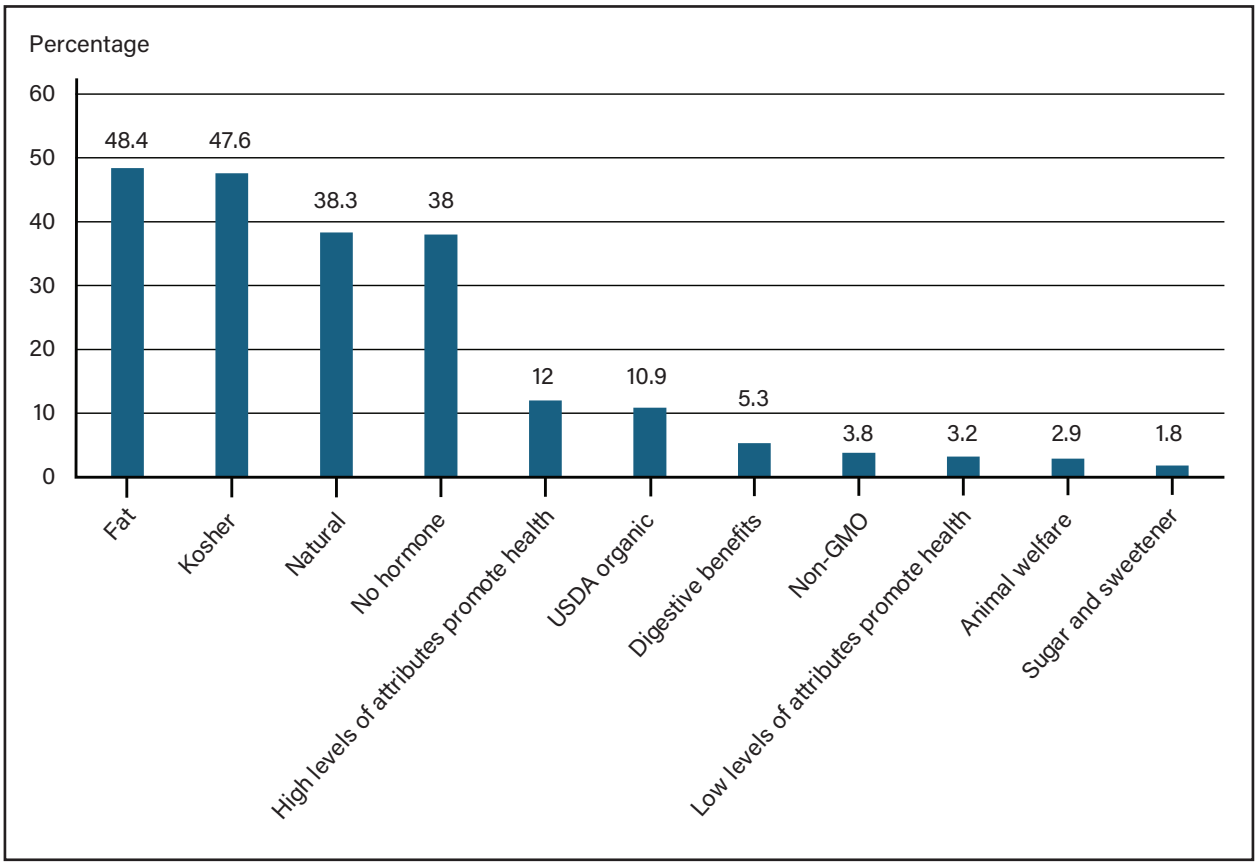
Because each binary variable equals 1 if a particular type of claim appears and 0 otherwise, the mean of the variable gives the proportion of all products making the claim. Separate results are presented for our 4,811 milk products (UPCs) and our 3,084 yogurt UPCs (figures 1 and 2).

The most common claims were related to a product's fat content and if a product was certified kosher. A kosher claim was carried by about 47.6 percent of all milk and 55.3 percent of all yogurt UPCs, and a fat claim was carried by 48.4 percent of milk and 55.1 percent of yogurt UPCs. Claims that a product was natural were also common on milk and yogurt products. These claims appeared on 38.3 percent of fluid milk products and 50.6 percent of yogurt products.

The five claims that spotlight farm production methods represented 44.3 percent of all claim types we identified on milk and 30.4 percent of all claim types we identified on yogurt products. Claims that a product was USDA Organic certified were less common than statements about a product being natural, but organic claims appeared on 10.9 percent of fluid milk products and 8.9 percent of yogurt products. These findings are consistent with previous research. In 2021, organic products represented about 15 percent of total dollar U.S. fluid milk sales (Carlson & Raszap Skorbiansky, 2023).

Some notable differences were found between milk and yogurt products. No-hormone claims were common on fluid milk but not on yogurt products. Conversely, yogurt products were more likely to contain claims that the product contains high levels of attributes to promote health.

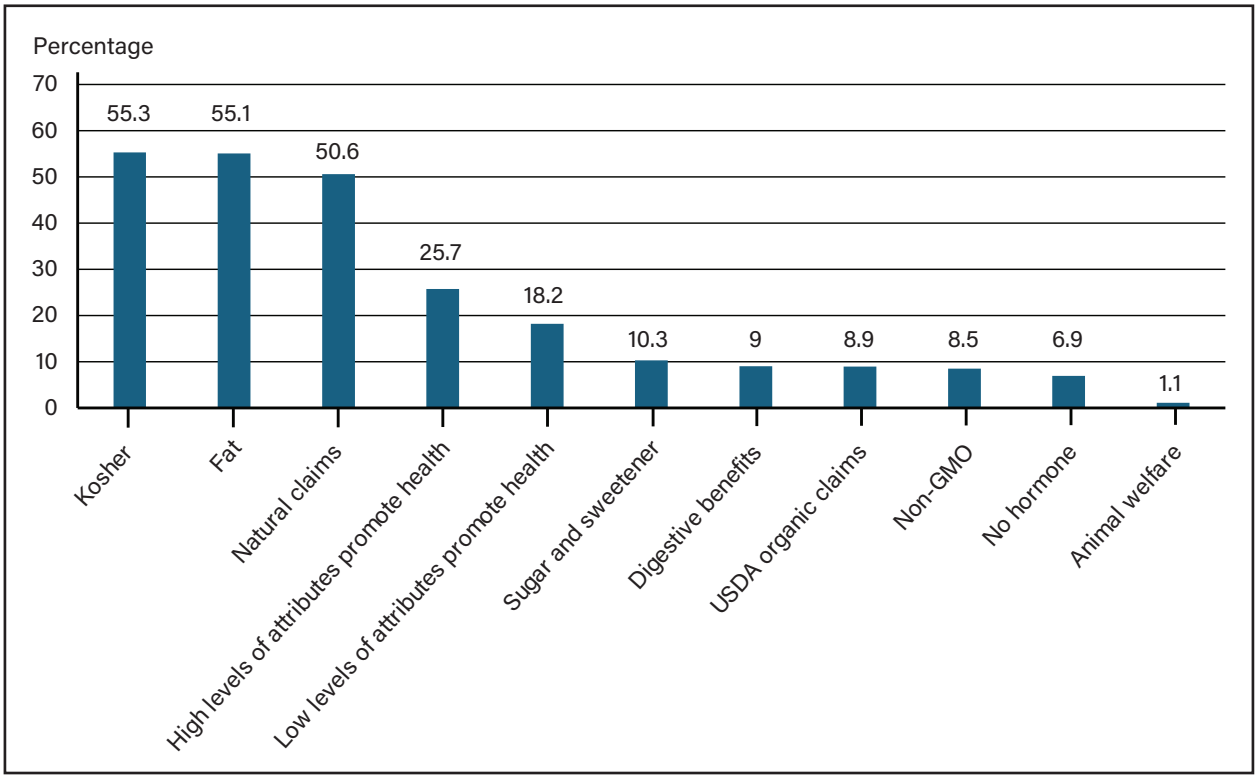
Figure 1
Percentage of fluid milk UPCs bearing product claims, 2022



UPC = Universal Product Code.

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Figure 2
Percentage of yogurt UPCs bearing product claims, 2022



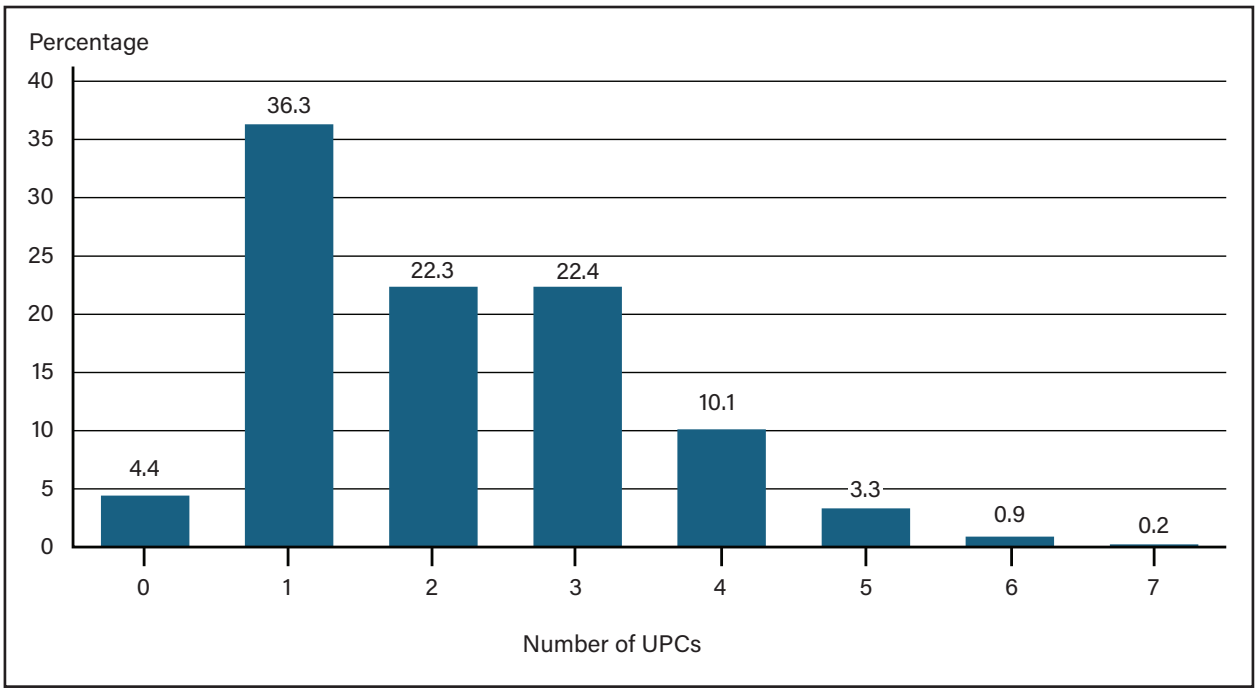
UPC = Universal Product Code.

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Examining how often different claims appear on packaging is one way to characterize the overall message being sent to consumers through label claims. Another is to examine the number of claims that appear on packaging. Packaging for most foods is usually large enough to support multiple claims and multiple claims occur on most dairy products.

For milk UPCs, 95.6 percent carried at least one claim (4.4 percent had no claims) (figure 3). Most had more than one claim. Two claims appeared on 22.3 percent of milk UPCs. Three claims appeared on 22.4 percent of milk UPCs (entirely different products). In total, multiple claims appeared on 59.3 percent of milk UPCs. No product carried more than seven claims.

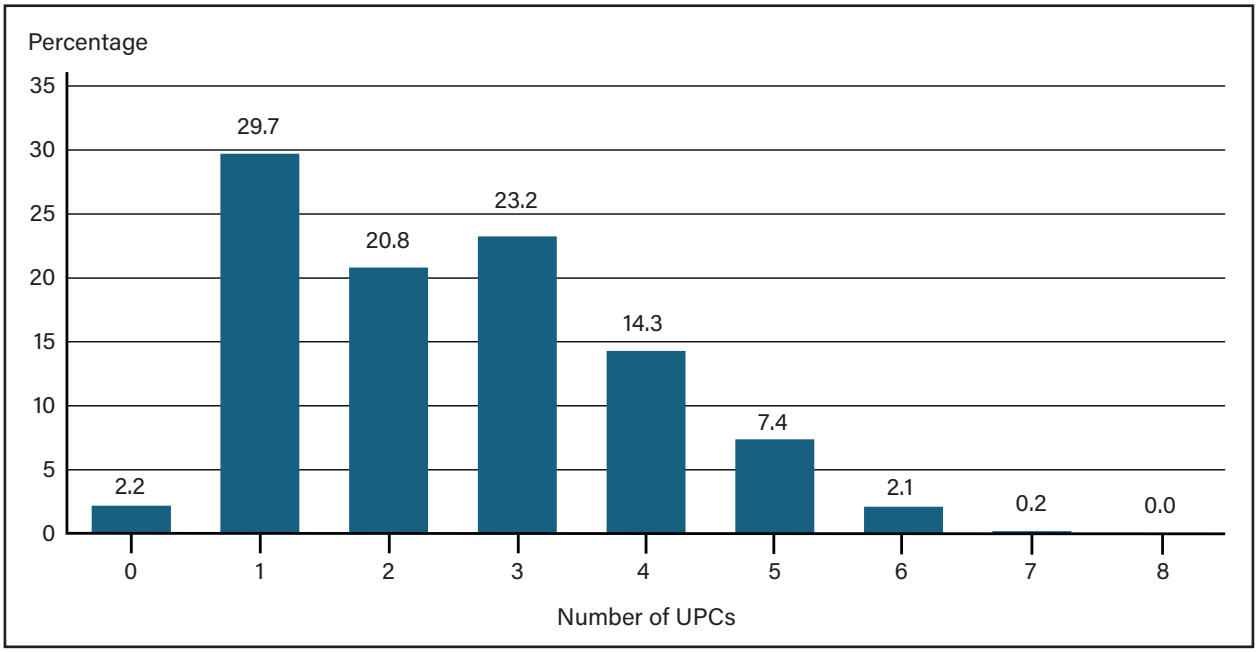
Figure 3
Percentage of milk UPCs by the number of label claims



UPC = Universal Product Code.

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Figure 4
Percentage of yogurt UPCs by the number of label claims



UPC = Universal Product Code.

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Label claims appeared more often on yogurt than on milk (figure 4). At least one label claim appeared on 97.8 percent of yogurt UPCs (2.2 percent had no claims). The modal number of claims was one claim, with 29.7 percent of yogurt products making one (and only one) claim. However, 68.1 percent of yogurt UPCs had multiple claims. The maximum number of claims on a yogurt product was eight (only one product had eight claims).

Multiple claims were more common than a single claim and much more common than no claims (figures 3, 4). However, the number appears to be limited, topping out at seven for milk and eight for yogurt.

Which claims tend to appear together and separately?

For the second part of our empirical analysis, we asked whether one type of claim was commonly observed on the same package as another type of claim. Calculating the correlation coefficient between our binary variable for whether a product bears an organic claim and our binary variable for whether the product bears a natural claim, for example, revealed whether these two types of claims commonly appeared together or separately. Estimates of our coefficient ranged between 1 and -1. Values near 1 indicate a strong positive association (i.e., two claims often appear together on the same products). Values near -1 indicate a strong negative association (i.e., the use of one claim tends to exclude use of the other). Values near zero indicate that no relationship exists between the two claims. The correlation coefficient between each of our 11 binary variables and all other 10 binary variables was estimated (55 correlations in total). Methods developed specifically analyzing binary data were used (see box, "Tetrachoric correlation"). Results showed that examining relations among pairs of claims was sufficient to reveal the most important aspects of relations among multiple claims.

Many significant associations, both positive and negative, were observed (tables 1 and 2). Kosher claims were negatively correlated with many other types of claims whereas fat claims were positively associated with the use of some other claims. Organic claims and natural claims did not typically appear on the same products. Estimated correlation coefficients between these two types of claims were -0.126 for fluid milk and -0.374 for yogurt. Both were statistically significant at the 5-percent level. The strongest positive associations were found between USDA Organic, non-GMO, and animal welfare claims, as well as between natural and no-hormone claims.

Table 1

Correlations among claims on milk packaging

Label class	Fat claims	Sugar and sweetener claims	Digestive benefits claims	Claims that high levels of attributes promote health	Claims that low levels of attributes promote health	No-hormone claims	Natural claims	USDA Organic claims	Animal welfare claims	Non-GMO claims	Kosher claims
Fat claims	1										
Sugar and sweetener claims	0.168	1									
Digestive benefits claims	0.290	0.486	1								
Claims that high levels of attributes promote health	0.277	0.392	0.539	1							
Claims that low levels of attributes promote health	0.354	0.401	0.272	0.312	1						
No-hormone claims	0.427	0.177	-0.06	0.131	0.282	1					
Natural claims	0.409	0.233	-0.042	0.163	0.307	0.982	1				
USDA Organic claims	0.088	-0.094	-0.050	0.201	0.170	-0.150	-0.126	1			
Animal welfare claims	0.105	-0.140	0.047	0.251	-0.072	0.013	0.115	0.692	1		
Non-GMO claims	0.016	-0.085	0.068	0.252	0.258	-0.288	-0.045	0.845	0.725	1	
Kosher claims	-0.538	-0.192	-0.400	-0.317	-0.200	-0.588	-0.588	-0.317	-0.425	-0.296	1

GMO= Genetically Modified Organism.

Note: Grey cells indicate statistical significance at the 0.05 level.

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Table 2
Correlations among claims on yogurt packaging

Label class	Fat claims	Sugar and sweetener claims	Digestive benefits claims	Claims that high levels of attributes promote health	Claims that low levels of attributes promote health	No-hormone claims	Natural claims	USDA Organic claims	Animal welfare claims	Non-GMO claims	Kosher claims
Fat claims	1										
Sugar and sweetener claims	0.288	1									
Digestive benefits claims	-0.018	0.288	1								
Claims that high levels of attributes promote health	0.445	0.264	0.182	1							
Claims that low levels of attributes promote health	0.550	0.197	–-0.118	0.389	1						
No- hormone claims	0.203	-0.123	0.186	-0.138	-0.009	1					
Natural claims	0.626	0.271	0.316	0.362	0.426	0.639	1				
USDA Organic claims	-0.186	0.041	-0.020	-0.055	-0.398	-0.048	-0.374	1			
Animal welfare claims	-0.208	NA	0.121	–0.096	NA	0.026	-0.167	0.640	1		
Non-GMO claims	-0.020	0.173	-0.006	0.145	0.027	-0.107	-0.142	0.603	0.581	1	
Kosher claims	-0.411	-0.108	-0.195	-0.130	-0.125	0.232	-0.398	-0.158	-0.372	-0.033	1

NA = insufficient observations. GMO = Genetically Modified Organism.

Note: Grey cells indicate statistical significance at the 0.05 level.

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Tetrachoric correlation

Correlation coefficients are numerical measures of the associations between two variables. Methods for calculating these measures depend on the type of data being analyzed. The method of tetrachoric correlation was developed specifically to measure the association between pairs of binary variables. El-Hashash and El-Absy (2018) examined the statistic, discussed its use and interpretation, and presented a simple method for calculating it based on a 2 x 2 crosstabulation table.[1] Below, we summarize this method using our binary variables for whether a fluid milk product bears an organic claim and whether the product bears a natural claim.

Table 1
USDA Organic and natural product claims, fluid milk

		USDA Organic claim		
		No	Yes	Total
Natural claim	No	2,605	364	2,969
	Yes	1,684	158	1,842
	Total	4,289	522	4,811

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Values in the table's diagonal boxes (including (0,0) and (1,1), respectively) indicate the number of products that carried neither claim and the number of products that carried both claims. Our two binary variables had the same value for these products—both 0 or both 1. The variables are said to "agree." Values in the table's off-diagonal boxes conversely indicate disagreement between our two binary variables, including (0,1) and (1,0), which are the number of products that contains one claim but not the other. The formula for tetrachoric correlation (ρ) is:

$$\rho = \cos\left(\frac{\pi}{1+\sqrt{\frac{N(0,0)\ x\ N(1,1)}{N(1,0)\ x\ N(0,1)}}}\right)$$

where $N(0,0)$, $N(1,0)$, $N(1,1)$, and $N(0,1)$ indicate the number of products in each of the contingency table's four boxes. The value of the statistic ultimately rests heavily on the number of products for which the binary variables agree relative to the number for which they disagree, as the formula shows. The tetrachoric correlation between our USDA Organic and natural claims variables was -0.126 for fluid milk, and it was statistically significant at the 5-percent level, showing a modest negative association (box table 1). The claims did appear together on some products but more typically appeared apart on separate, competing products.

[1] Different formulas for calculating tetrachoric correlation have been developed over time. El-Hashash and El-Absy (2018) identify seven existing methods. However, after investigating each formula's performance, they conclude that all seven approaches lead to substantially the same result.

Discussion

Below, we focus on our findings related to claims about farm production methods, such as organic, non-GMO, animal welfare, natural, and no hormones. Additionally, we present 2 x 2 crosstabulation tables for a more nuanced understanding of some of the pairwise correlations in tables 1 and 2 associated with our binary variables for these claims.

Products labeled USDA Organic are required to be non-GMO. So, if consumers were aware of the meaning of the two claims, the non-GMO claim would be redundant. Nevertheless, the correlation between carrying the USDA Organic claim and carrying a non-GMO claim was +0.845 for fluid milk and +0.603 for yogurt products (tables 1 and 2). Crosstabulation further reveals that, among the 522 fluid milk products claiming to be organic, 155 (29.7 percent) also carried a non-GMO claim (table 3). This finding is consistent with the findings of previous consumer studies (e.g., Organic Trade Association, 2024) that documented consumer confusion over the attributes confirmed by a USDA Organic label. Also, Kuchler et al. (2017) noted the redundancy of USDA Organic labels and non-GMO claims. They showed that in the 2010–14 period in which the number of products carrying the USDA Organic label and the non-GMO Project Verified label were both growing rapidly, each month, about half of the non-GMO labeled products also carried the USDA Organic label. Correlations reported here suggest the redundant use of these labels has increased.

Animal welfare is also a component of USDA Organic certification. Correlations between USDA Organic and animal welfare claims were similarly high and positive (+0.692 for fluid milk and +0.640 for yogurt products) (tables 1 and 2). Crosstabulation further reveals that, among the 522 fluid milk products claiming to be organic, 93 (17.8 percent) also carried an animal welfare claim (table 4).[7]

Both non-GMO and animal welfare claims were relatively less common than most other claim types considered in this study, appearing on just 3.8 percent and 2.9 percent of all 4,811 fluid milk products, respectively (figure 1). However, when the claims do appear, it was often on USDA Organic labeled products (tables 3, 4). Among all 185 fluid milk products carrying a non-GMO claim, 155 (83.8 percent) were on an organic product (table 3). Among all 138 fluid milk products carrying an animal welfare claim, 93 (67.4 percent) were on an organic product (table 4).

Table 3
USDA Organic and non-GMO claims, fluid milk

		Non-GMO claim		
		No	Yes	Total
USDA Organic claim	No	4,259	30	4,289
	Yes	367	155	522
	Total	4,626	185	4,811

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Table 4
USDA Organic and animal welfare claims, fluid milk

		Animal welfare claim		
		No	Yes	Total
USDA Organic claim	No	4,244	45	4,289
	Yes	429	93	522
	Total	4,673	138	4,811

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

[7] To ensure animal welfare standards were consistently applied, USDA issued Federal regulations in 2023 (Organic Livestock and Poultry Standards, 2023). The Organic Livestock and Poultry Standards final rule (effective January 2, 2024) amends and clarifies the USDA organic regulations related to the production of livestock, including poultry, marketed as organic. The rule adds detailed regulations related to animal health care, indoor and outdoor space standards, manure management, temporary confinement of livestock, access to the outdoors, transportation conditions, and humane euthanasia and slaughter.

Natural food product claims tended to appear on nonorganic products, as already discussed above, but were more likely to be paired with many other types of claims. These claims included a no-hormone claim (correlation coefficient equaled +0.982 for fluid milk and +0.639 for yogurt products). Among the 1,830 fluid milk products that carried a no hormone claim, 1,695 (92.6 percent) were on a product with a natural claim (table 5).[8] Two notable exceptions included non-GMO and animal welfare claims. These claims were instead closely aligned with USDA Organic claims, as discussed above. All correlation coefficients between natural product claims and these two claim types were negative or zero (tables 1 and 2).

Table 5
Natural and no-hormone claims, fluid milk

		No-hormone claim		
		No	Yes	Total
Natural claim	No	2,834	135	2,969
	Yes	147	1,695	1,842
	Total	2,981	1,830	4,811

Source: USDA, Economic Research Service analysis of 2022 Circana and Label Insight data.

Conclusion

This report provides a quantitative baseline analysis of the messages consumers are receiving through food package labels focusing on fluid milk and yogurt products, two food groups placing numerous claims on labels. We quantify the presence of claims on food product labels and describe relationships among label claims. This report is not an assessment of label policies or the effects of label claims, but these findings can inform future discussion surrounding proposed label policies. Results showed manufacturers placed at least one claim on 95.6 percent of milk UPCs and 97.8 percent of yogurt UPCs. Multiple claims (more than 1) appeared on 59.3 percent of milk UPCs and 68.1 percent of yogurt UPCs. Kosher claims and fat content claims were the most common claim types, appearing on about half of milk and yogurt UPCs. Natural claims also appeared on about half of yogurt UPCs but slightly less frequently on milk. Claims that a product was USDA Organic certified were less common than statements about a product being natural, but the claims still appeared on 10.9 percent of fluid milk products and 8.9 percent of yogurt products.

Positive correlations occurred between USDA Organic and non-GMO and between USDA Organic and animal welfare. However, non-GMO and animal welfare are components of the USDA Organic program. If consumers knew USDA Organic required food to be non-GMO and took steps to provide for animal welfare, the paired claims would be unnecessary to inform consumers; the non-GMO and animal welfare claims would be redundant, given the USDA Organic label. Placing these labels together on product packaging may serve to inform consumers who do not understand the organic program and serve as a reminder for those that do.

Putting a USDA Organic label on dairy products with or without a non-GMO or animal welfare claim is costly. Organic dairy farms incur higher total feed and total operating costs than do similar-sized conventional dairy farms (Gillespie et al., 2024). Fluid milk processors and dairy product manufacturers wanting to instead make a natural claim along with a no-hormone claim would incur relatively little or no additional cost. They would need to exclude milk from farms that continue to use rBST. However, they would not have

[8] Surveys of dairy farms showed that in 2000 and 2005, 17 percent of dairy farms were using rBST. By 2021, use had declined to 1 percent of farms (Gillespie et al., 2024).

to additionally check to what extent cows received a special diet, exercise, freedom of movement, or stress reduction, among other things.

Natural claims are more common on fluid milk and yogurt products than the USDA Organic label. A negative correlation was also identified between the presence of these two types of claims. USDA Organic and natural claims tended to appear on separate products. Of course, separate products within the same product category may compete for consumers' attention and food dollar. Claims with less stringent requirements appear to be an alternative to making claims that require suppliers to incur additional costs or take on additional activities.

This study examines the information that suppliers provide to consumers about food products at retail stores via label claims. Emphasis was placed on labels related to farm production methods. However, we did not examine how exposure to labels can affect consumer demand for products nor did we investigate strategies for reducing consumer confusion. Future research might examine how the presence of a label by itself and in combination with other labels affects a household's willingness to buy a product, as well as the price it is willing to pay. Researchers might also seek to identify practical and effective strategies for reducing consumer confusion. Previous research shows that efforts to educate consumers may not work as planned. Most of the participants in Wilson and Lusk's (2020) study who had been willing to pay a price premium for foods carrying a redundant label did not respond as the researchers expected when told the claims were redundant. Less than half were successfully convinced otherwise, and more than 30 percent counter-intuitively increased their premiums. A related question is how a consumer education program would be funded and who would administer the program. Since 1966, Congress has authorized industry-funded research and promotion boards so that suppliers could pool their resources to conduct research and promotion activities (USDA, AMS, 2025b). In 2015, the Organic Trade Association (OTA) formally petitioned USDA to implement a research and promotion check-off program for the organic industry (OTA, 2015). However, differences within the industry eventually ended the regulatory process. Future research could examine why past efforts have faltered and identify possible strategies to overcome challenges.

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