



True colors.

Consumer preference for natural colors and what it means for dairy.

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The natural color revolution

Across the world, consumers are sending a powerful message to manufacturers that they want the colors in their food and drink products to be natural.

According to Nielsen's August 2016 report on ingredient trends, 61% of consumers internationally say they try to avoid artificial colors, rising to 65% in the Asia-Pacific region. In Europe, the number of new products with natural colorants grew by 5.6% in 2015, compared to a decline of 5.2% for artificial colors.

The trend is expected to continue well into the future, with more and more manufacturers keeping pace with customer preference by swapping artificial colors for natural alternatives.

Lycored are international leaders in the development of natural, beta-carotene derived products for the dietary supplement and functional food industries. In particular we provide safe and natural coloring agents in a range of hues for use in food and beverages.

We set out to explore the strength of consumer demand for natural colors within the specific context of the dairy industry, and with particular focus on strawberry flavored milks. Over the course of both quantitative and qualitative research, the responses of mothers to the visual appearance of flavored milks colored red naturally versus artificially were explored.

A powerful preference for natural over artificial colors was discovered. Even more importantly, the research found that consumers are willing to pay significantly more for flavored milks colored naturally. In the following pages we explore the findings in more detail.

Lycored – offering natural, resilient, colors to dairy manufacturers

- Many dairy products, such as milk drinks, are recognized by consumers as both natural and healthy. It is important not only that they contain natural ingredients, but also – given that color sends powerful visual cues about nutritional value – that they look natural.
- However, manufacturers of dairy products face particular technical challenges. Natural colors are often less stable under neutral pH conditions and tend to oxidize when exposed to UV light and extreme temperatures, which demands innovative solutions.
- Recognizing this challenge, Lycored has drawn on 20 years of research to develop natural color solutions that are both appealing to consumers and resilient to the rigors of dairy manufacture processes. Lycored natural Lycopene based colorants, derived from non-GM and lycopene-rich tomatoes grown on farms in Israel and California, offer a more robust alternative to sensitive natural reds such as beetroot and anthocyanins.
- Lycored natural red color shades are kosher and halal-friendly and – unlike colorings such as carmine – suitable for vegetarians and vegans. They can simply be declared as “lycopene from red tomatoes” on the label, allowing dairy manufacturers to develop milk beverages with a “natural” or “free-from” sell.
- In a recent trial, Lycored super stable natural colors not only remained stable when exposed to a range of tough dairy manufacturing and storage conditions – including UHT processing, temperature extremes, and extreme shelf-life tests – but significantly outperformed artificial alternatives.

Testing the visual appeal of Lycored's natural reds

Having established the capability of our Lycored natural red colors to withstand the severe processing conditions necessary for dairy applications, Lycored set out to explore how consumers rated their appearance versus artificial alternatives.

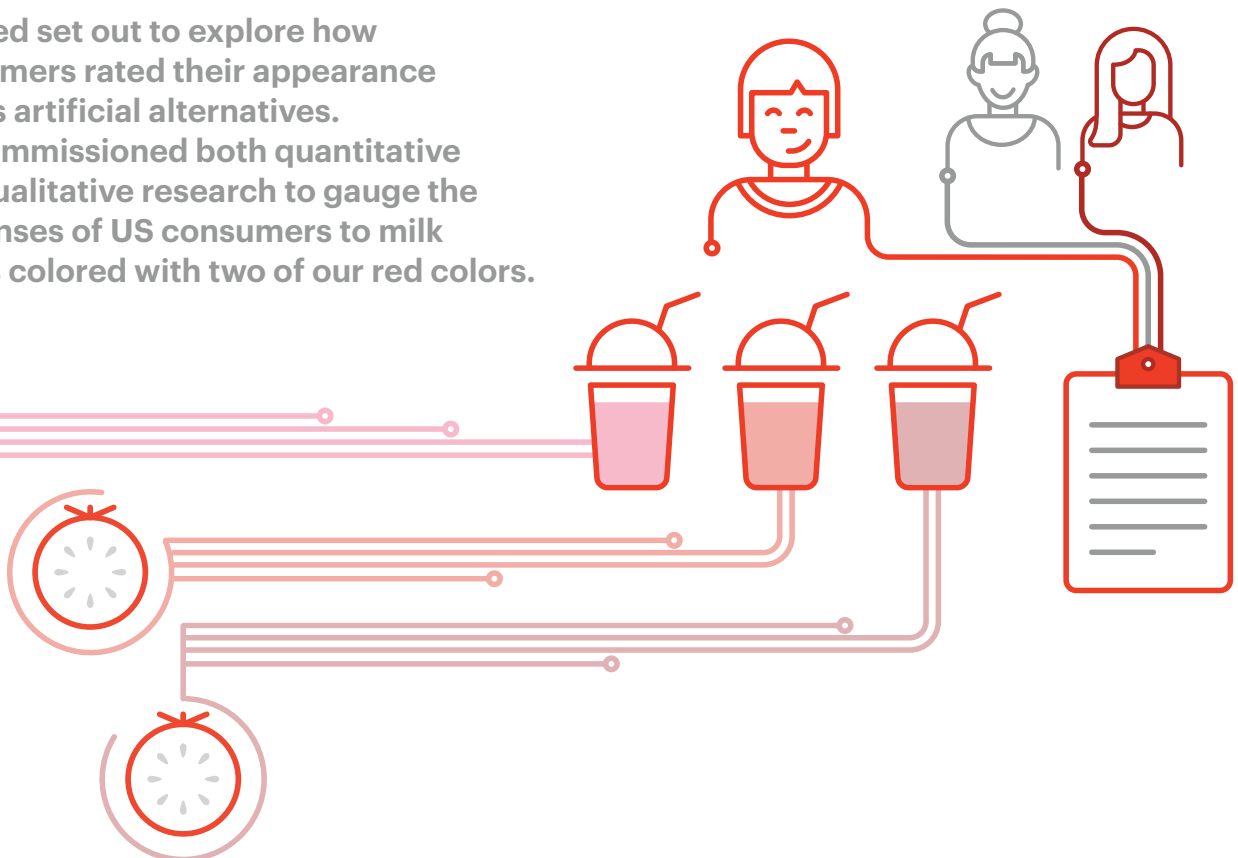
We commissioned both quantitative and qualitative research to gauge the responses of US consumers to milk drinks colored with two of our red colors: ConstantCrimson A (which can be used in a wide range of foods and beverages) and ResoluteRuby A (which is specially developed for products containing oil and fat). Both deliver a naturally strawberry-like color.

First, a 20-minute online poll of 506 US consumers was carried out. All were health-conscious mothers who had bought flavored milk drinks for their school-age (4-14 years old) children within the past three months. Most (72%) were aged between 18-40, and 73% were on a high or very high income.

Without being informed which was which they were shown three samples of flavored milk: one colored with ResoluteRuby A, one colored with ConstantCrimson A and one colored with Red 3, an artificial colorant. The survey gauged their perceptions of appearance (including naturalness), taste impression, and flavor association. The researchers also carried out a word association exercise to identify an emotional profile for each sample and asked pricing questions to assess willingness to pay more for a naturally colored product.

To gain even more detailed insight Lycored also commissioned qualitative research which explored reactions to the same three colored milk options among opinion-leading, on-trend consumers.

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Natural reds score high on appearance

When consumers were asked to rate the naturalness of the appearance of the three samples, both the Lycored red color shades outscored the artificial sample. ConstantCrimson A achieved the highest rating for naturalness (7.5 out of 10) and was seen as significantly more natural than the artificial red.

ResoluteRuby A scored highest of the three (7.6 out of 10) on “looks like real strawberry” and the two Lycored samples also performed well on overall appearance, both scoring 7.7 out of 10. ResoluteRuby A scored highest when it came to suitability of appearance for a kids flavored milk drink, with 77% of consumers rating it either quite or very suitable.

Figure 1: Both Lycored natural red colors outscored the artificial sample on naturalness



In the emotional profiling exercise, the key equities most associated with each sample were ordered from top to bottom. No significant differences emerged between the three emotional profiles, with qualities such as happy, friendly and youthful associated with all three. However, the Lycored natural red products scored directionally higher on positive key equities: ConstantCrimson A was perceived as distinctive and trustworthy, and ResoluteRuby A emerged as playful, fun and simple.

Consumers will pay more for natural

When asked directly “Would you be willing to pay more for a product with natural flavorings and colors?” almost nine in ten survey respondents (88%) said they would. They were then told that the average flavored milk beverage costs US\$1.50 and asked how much they would be willing to spend on a product if it was made with natural colors and flavors. On average they said they would pay up to \$2.20 – 47% more.

Figure 2: Consumers are willing to pay significantly more for a product with natural flavors and colors



Significantly more mums aged 18-40 (90%) are likely to pay more, compared to mums aged 41-65 (84%)

We told consumers that the average milkshake product costs \$1,50. Those willing to pay more were prepared to pay, on average

\$2.20 for a product with natural flavorings / colors

Qualitative research – A powerful preference for natural

For the qualitative research, three opinion-leading American mothers were asked to host focus groups of friends and to measure responses to the same three flavored milk samples. Overall, the views of a total of ten consumers, all mothers in the US and Canada, were captured.

When asked for overall preference, there was a resounding win for the two Lycored options, which were chosen by nine of the ten (90%) consumers. Six preferred ConstantCrimson A; with three opting for ResoluteRuby A. Only 10% preferred the artificial sample.

The mothers were then asked which sample looked the most like a natural strawberry color and flavor. Again, the Lycored options were chosen by 90% of the consumers, with ConstantCrimson A seen as looking the most natural (60%) and ResoluteRuby A chosen by 30%.

Comments on ConstantCrimson A included: “Looks the most natural to a blended strawberry, therefore potentially most healthy for my children”; “Reminds me of a drink from my childhood... and more likely to appear in nature;” and “more attractive to the mom in me. I believe it looks like it has less artificial ingredients in it.”

The focus groups suggested a “feel-good factor” from buying their children a product that looked like something they would make in their home, with both the naturally colored samples associated with smoothies or

other home-made items. Comments on ResoluteRuby A included “Looks like a smoothie so this one looks like something I would purchase for my kids”, “and ConstantCrimson A was reminiscent of “mashing fresh strawberries and cream”.

Other feedback indicated that consumers are turning away from non-natural colors that are too vibrant. Comments on the artificially colored sample included: “Brighter or more neon-looking colors seem unnatural in appearance, and tells me as a mother that they also probably have unnatural and unhealthy ingredients as well.” It was also described as looking “neon”, “fluorescent”, or like “Pepto-Bismol”.

Participants were finally asked if they would consider changing from their current brand of strawberry-milk to one colored with their preference from the three samples. All three opinion-formers said they would consider switching because of the more natural appearance of ConstantCrimson A. The fact that it looked more like a smoothie was frequently mentioned and respondents commented that the more artificial food coloring looks, the less likely they are to buy the product. One of the mothers said: “If the color looks chemically engineered, I won’t bring it home for my kids to put in their growing bodies. If the color seems natural, I would investigate the ingredients on the label to confirm. If everything was free of synthetic ingredients, I would definitely make the switch.”

Figure 3: Nine out of ten consumers in focus groups preferred the appearance of the natural options



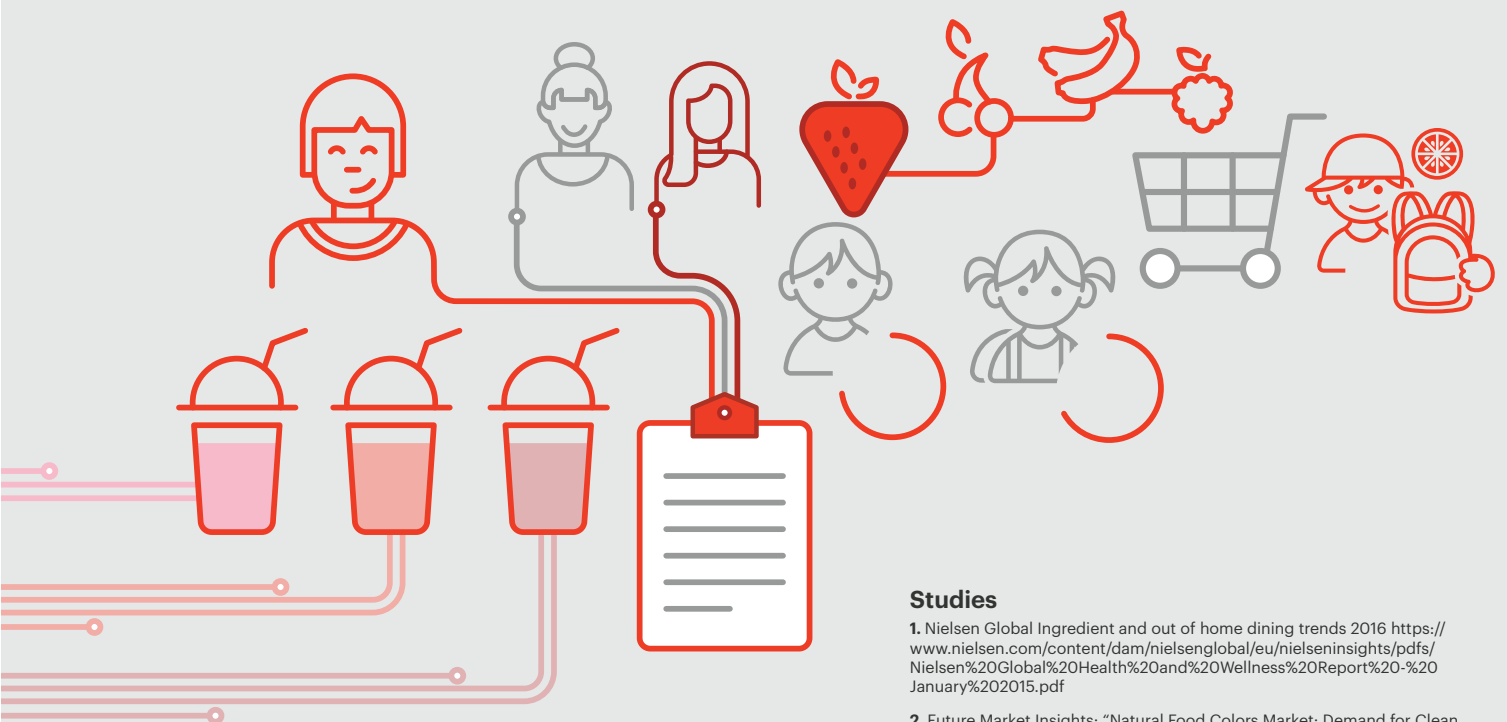
Conclusion

Lycored's research offers two very clear conclusions for dairy product manufacturers.

First: consumers find natural colors more visually appealing.

Second: their preference for naturally colored products is so powerful that they will pay significantly more for them.

Given that artificial colors can easily be replaced with natural options without sacrificing the resilience necessary in dairy manufacture, the opportunities for producers of flavored milks and other dairy products are clear. A switch to natural will resonate with shoppers, give products a fresher and more positive brand positioning, and enable higher pricing.



Studies

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