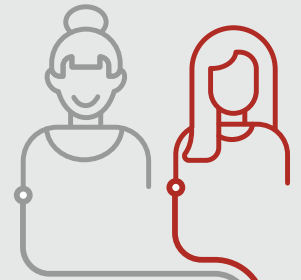




**Real colors,
real moms,
real insights.**

**Real moms react to
all natural colorings,
ResoluteRuby A from
Lycored.**

In 2016 we surveyed 506 consumers in the US with kids between 4 and 14. We showed them 3 samples of flavored milk and gauged their perception of naturalness of color, visual appeal, taste impression and purchase intention. Their answers offer valuable insights into the visual appeal of natural colorants.



When asked directly, 88% of consumers are willing to pay more for a product with natural flavoring and colors.



On average willing to pay up to 47% more for it.

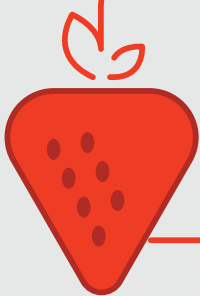


88% of the consumers agreed with the statement they consciously limit the amount of products containing artificial flavors or colors that their children consume.

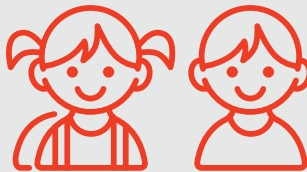


ResoluteRuby™ A

**Most intense Strawberry
flavor perception.**



**PLAYFUL
& FUN**



77% of consumers rate ResoluteRuby A as highly suitable for a childrens flavored milk drink (vs 72% for artificial color).



**“This looks like a smoothie,
so it looks like something I
would purchase for my
kids.”**

Alyson (45), director of finance from Niwot, California



96% of consumers would buy a flavored milk colored with ResoluteRuby A.



But that's not all...

We also subjected our natural colors to 4 types of ultra high temperature treatment, as well as homogenisation (upstream & downstream) in a typical application of strawberry flavored milk, followed by accelerated shelf life tests under different storage conditions.

Our enduring reds survived all treatments without any visible difference to the naked eye compared to the artificial sample which visibly faded over time. Our natural colors proved to be more robust, have longer shelf life and offer more packaging, display and storage flexibility than artificial equivalents. The visuals & graphs shown highlight accelerated shelf life test results after the harshest UHT treatment of direct steam injection, with downstream homogenisation.

Accelerated shelf life tests

Lycored's scientists also evaluated the performance of the colors in accelerated shelf life tests. These simulated the harshest possible conditions during transportation and storage and whilst on sale in store.

The drinks were exposed for extended periods to 24/7 light (6000 lux) to test their light stability. After 36 days, the Red 3 drink displayed a significant color variation (DeltaE score of 17), whereas there was no discernible change in the brightness of the Lycored colored drinks, confirming their suitability for the chiller aisle.

In a final test, the drinks were kept in an incubator in the dark at a temperature of 40°C, to establish their ability to remain stable during warehousing and transportation. The Lycored samples were able to withstand 40°C heat in incubation conditions over 30 days without any discernible impact on color, but the color of the Red 3 sample underwent a considerable variation. This shows that drinks colored with Lycored can be transported via ambient rather than cold chain distribution - particularly beneficial in hotter climates.

Benefits of using Lycored versus artificial colors

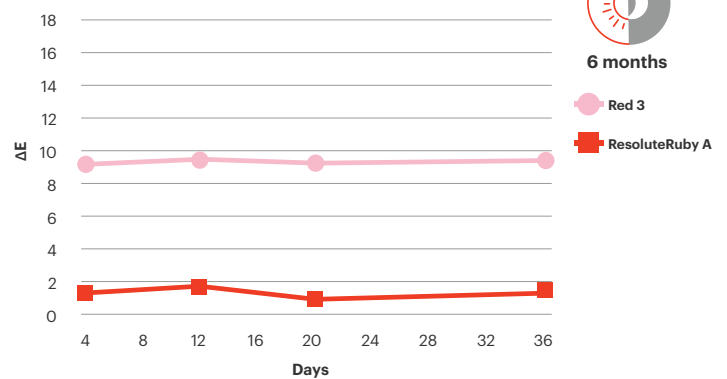
- Can withstand even the most demanding processing and storage conditions
- Longer shelf life and more packaging, display and storage flexibility than artificial colors
- Clean label status, can be declared as 'lycopene from red tomatoes'
- Enhances the natural positioning of products



Artificial color Red 3

ResoluteRuby A

Table 1: Ambient conditions after UHT Injection Downstream

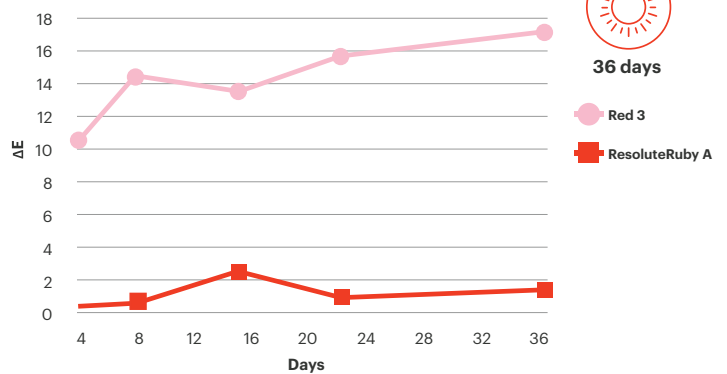


6 months

Red 3

ResoluteRuby A

Table 2: Light Stability after UHT Injection Downstream

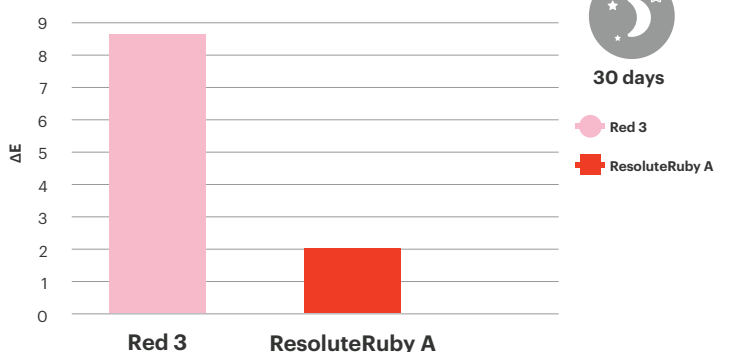


36 days

Red 3

ResoluteRuby A

Table 3: 30 Day Incubator Stability after UHT Injection Downstream



30 days

Red 3

ResoluteRuby A