



The production of flour has shaped economies and cultures around the world for thousands of years. Image Source: Pexels user kaboompics.com

At a time when we are walking around with powerful computers in our pockets and standing at the cusp of self-driving cars, it can be hard to appreciate the technological discoveries of the past, the ones that have become so deeply integrated in our culture and economy that we now take them for granted. One of the most striking examples can be found in virtually every kitchen in the United States: flour.

Even before the wheel was invented, a revolutionary technology had been discovered: the production of flour. The realization that ingestible seeds could be ground into nourishing dust steered the history and fate of man in a new direction. Without the grinding stone there would be no bread or buns, no pasta or pizza, no cakes or couscous. Probably there would be fewer people on our planet. Certainly there would be no civilization as we know it. And the wheel, originally an aid to agriculture, would presumably never have been invented.<sup>1</sup>

Today, modern mills “produce hundreds of different types of flour for every conceivable application, and in incredible quantities,” using over 320 million tons of wheat flour each year. “Wheat milling has become a global industry that bears a great responsibility,” notes the FlourWorld Museum. “For the plant that was cultivated by the pioneers of agriculture over 10,000 years ago is now the stable food of a third of the world’s population – a bulwark between us and hunger.”

As overall demand for flour continues to grow globally, so too do quality standards for an ever-expanding array of flour types. This is where another revolutionary technology comes in: the spectrophotometer. By measuring the color of flour, spectrophotometers provide invaluable insight into flour quality and [an objective method of assessing process variables](#).

The Color of Flour and Why It Matters

The color of flour is influenced by a broad range of variables, from wheat variety to aging, and from milling practices to bleaching and maturing agents, creating a spectrum of colors ranging from brownish grey to creamy yellow to the whitest white. These color differences take on both practical and psychological meaning; color [reflects the chemical composition and processing history](#) of each batch of flour while simultaneously influencing function and our perception of nutritional value and safety. As such, the color of flour has been a significant area of research since the advent of industrial flour production.<sup>2</sup>

First and foremost, flour color is an important indicator of suitable application; as noted by Kelli Foster for The Kitchn, “Foods made with bleached flour tend to have a softer texture, more volume, and a brighter color than those made with unbleached flour.”<sup>3</sup> Meanwhile, unbleached flour “provides more structure in baked goods, which makes it an ideal base for things like yeast breads, cream puffs, eclairs, and pastries.” In addition to differences in product behavior, bleached and unbleached flours also produce subtle flavor differences that impact appeal to some customers.

However, bleaching itself is a contentious issue due to potential health hazards; bleaching and maturing agents have been banned in a number of countries. and in the U.S. an increasing number of consumers are now expressing concern about the impact of bleached flours, shifting demand to unbleached products. Simultaneously, whole wheat flours, which produce darker colors and more intense flavors, are becoming more appealing to an increasingly health-conscious public. Specialty and artisanal flours are also growing in popularity due to both specificity of application and real and perceived quality differences. In this changing landscape, the color of flour is taking on more significance than ever before for both individual consumers and [commercial scale buyers](#).



Spectrophotometric measurement of flour color allows for rapid, economical quality assessment and ensures that each batch meets consumer expectations.

Image Source: Pexels user [www.lifeofpix.com](http://www.lifeofpix.com)

## Integrating Spectrophotometric Color Measurement

While public perception of and market demand for different flour varieties may be evolving, objective color assessment is an integral part of quality control for all types of flour. Each flour variety must consistently meet buyers' expectations to optimize marketability and produce desirable end product hues. Spectrophotometers allow producers to measure the color of flour through sophisticated spectral technology, facilitating [the development of color standards](#) and ensuring that all product falls within established tolerances. Today's modern spectrophotometers are ideally suited to analyze the color of everything from heavily textured, nonuniform samples to fine powders, giving you the accurate and precise data you need to perform in-depth quality assessments.

Spectrophotometers may be integrated at various key locations within the production chain to monitor color throughout the manufacturing process, from raw materials to finished product. By doing so, you are able to exercise the utmost quality control protocols at each stage of manufacturing and catch unwanted variations as early as possible, improving efficacy and minimizing economic losses as the result of faulty product. Spectrophotometric technologies may also be used to evaluate novel bleaching and maturing agents, flour improvement methods, and [the aesthetic impact of fortification products](#).

### HunterLab Quality

[HunterLab](#) has been a pioneer in spectrophotometric technology for over 60 years. In that time, we have led the way in developing highly precise, flexible instruments designed with the user in mind. Today, we offer a comprehensive range of [portable, benchtop, and online spectrophotometers](#), giving our customers the tools they need to meet their unique color measurement challenges in the food industry. When combined with our [sophisticated software packages](#), HunterLab provides unprecedented insight into color behavior and control over product quality. Contact us to learn more about our innovative instruments and world-class customer support services and let us help you find the perfect spectrophotometer for your needs.

1. "The History of Flour: From the Mortar to the Industrial Mill", <http://www.art-and-flour.de/english/history.html>
2. "The Color of Wheat Flour", July 15, 1929, <http://pubs.acs.org/doi/abs/10.1021/ac50067a018>
3. "What's the Difference Between Bleached and Unbleached Flour?", September 21, 2015, <http://www.thekitchn.com/whats-the-difference-between-bleached-and-unbleached-flour-223858>