

## Ash: AACCI Method 08-01.01

Weigh 3 grams of flour or wheat into crucibles and place crucibles into cold ash oven

Place crucibles into cold ash oven and set temperature to 350°C

After 1 hour increase to 450°C and after 1 more hour increase to 590°C



Weigh back and calculate percent ash based on 14% moisture content

Burn for approx. 16 hours then remove crucibles from oven and cool in dessicator

- Ash is the mineral content in flour. The ash content of flour is affected by the wheat from which it was milled and its milling extraction. Ash can also be determined by NIR.

## Starch Damage: AACCI Method 76-31.01

Flour is digested with  $\alpha$ -amylase for 10 minutes

The reaction is stopped with acid

Amyloglucosidase is added to break the digested starch into glucose



The color formed is read on spectrophotometer to determine the level of starch damage

Glucose oxidase/peroxidase reacts with the glucose

- Starch damage results from the shear on the starch granules during roller milling. This loss of crystals allows the granule to take up more water. Hard wheat flour contains a higher level of damaged starch than soft wheat.

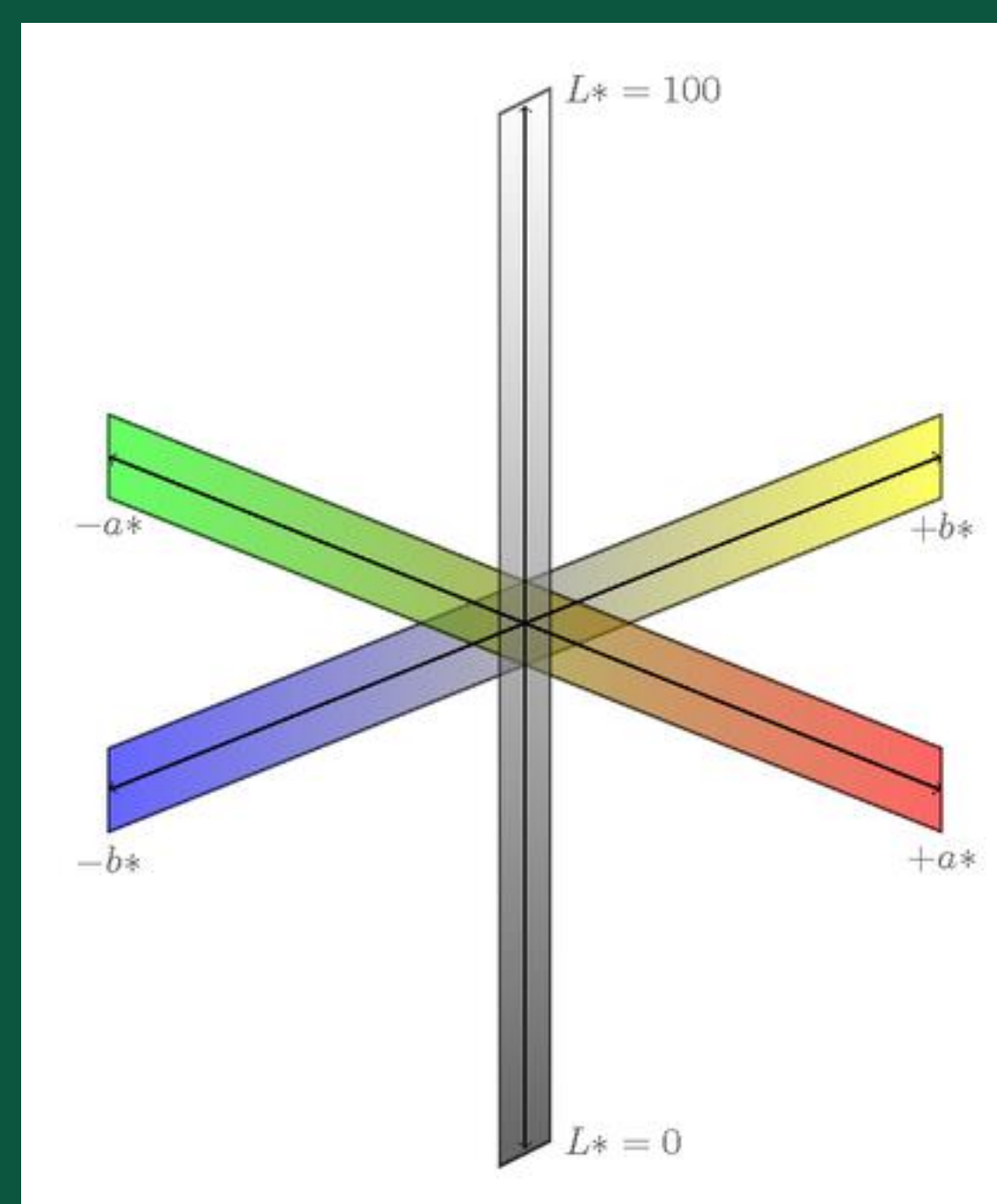
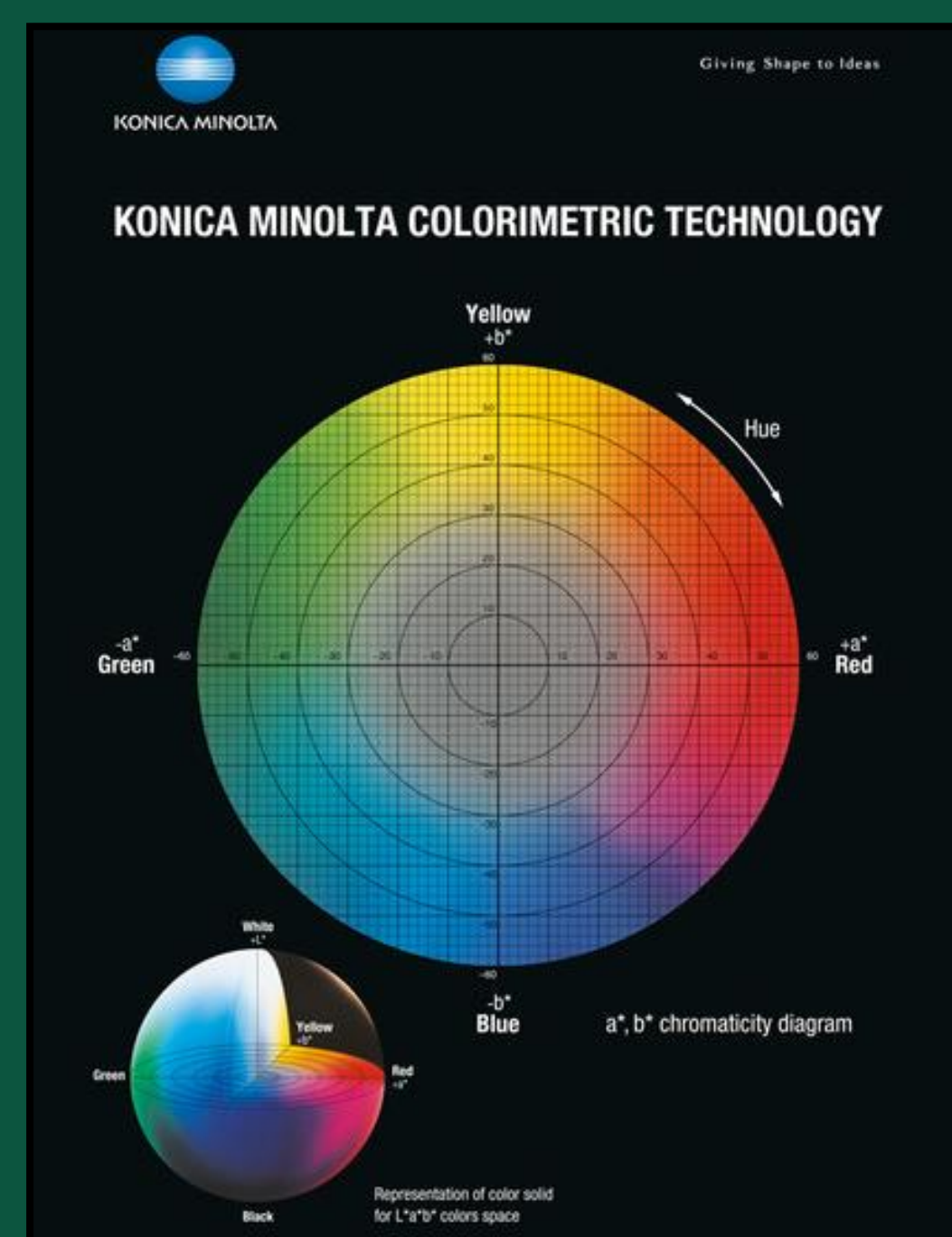
## Color: AACCI Method 14-22.01

### Flour Samples



$L^* = 90.03$   
 $a^* = -0.48$   
 $b^* = 7.69$

$L^* = 89.09$   
 $a^* = -1.97$   
 $b^* = 16.80$



<https://www.konicaminolta.eu/>  
<http://www.texample.net/fikz/examples/cielab/>

- Flour color is influenced by the wheat's endosperm color, particle size and ash content. Color is a numerical system to measure a sample's lightness ( $L^*$ ) on a scale of 0 to 100 and hue on two scales each running from -60 to +60 for green-red ( $a^*$ ) and blue-yellow ( $b^*$ ).

## Protein: AACCI Methods 76-31.01 and 39-11.01

Leco 628  
AACCI Method 76-31.01  
Combustion method of predicting total protein by determining nitrogen percent of the sample. Considered a standard method of predicting protein %.

Near Infrared (NIR)  
AACCI Method 39-11.01  
Rapidly predicts protein by near-infrared spectroscopy based on standard method curves previously determined.



- Flour protein content is an important parameter for bread flour. There is usually, but not always, a good correlation between protein content and bakery performance of flour. Flour and wheat protein can also be determined by NIR.