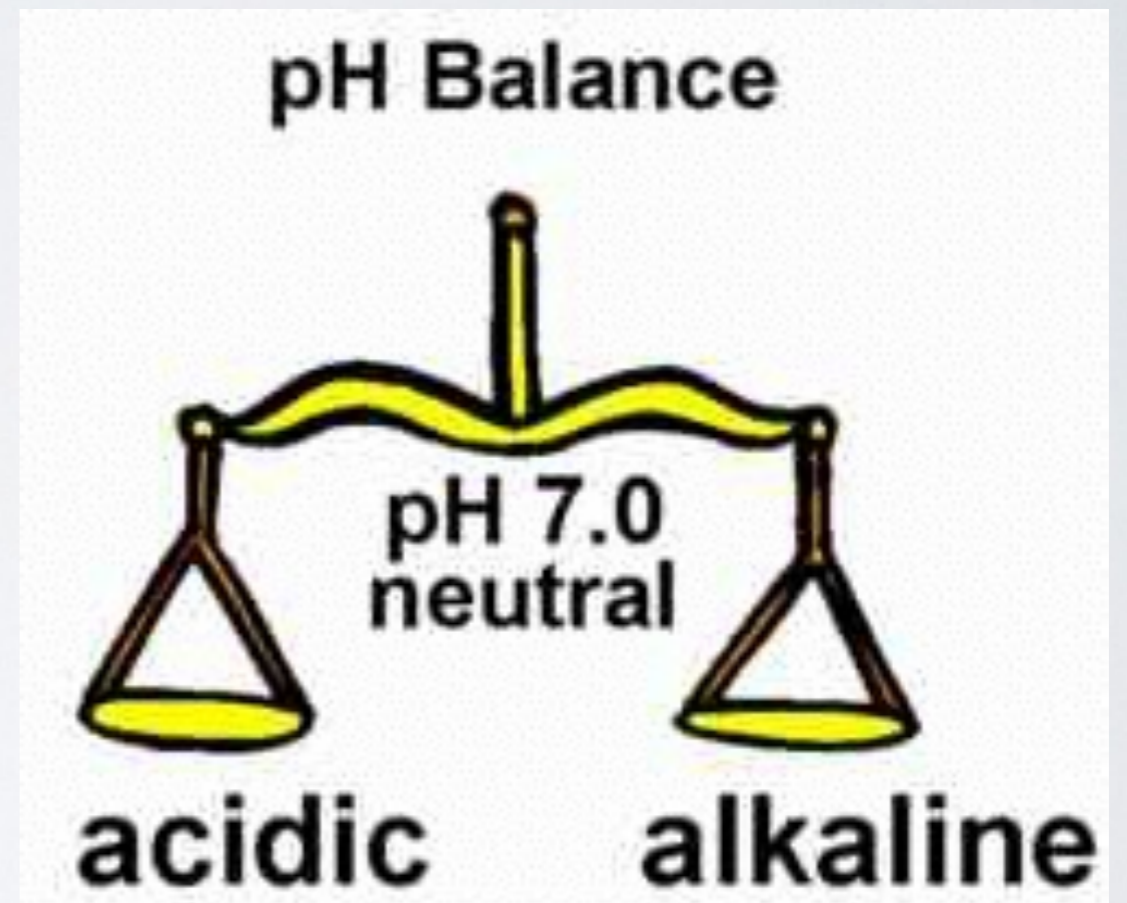


BREWING WATER AND MASH PH



AGENDA

- What is pH
- Alkalinity
- Balancing PH
- Water Treatment
- Testing Mash PH



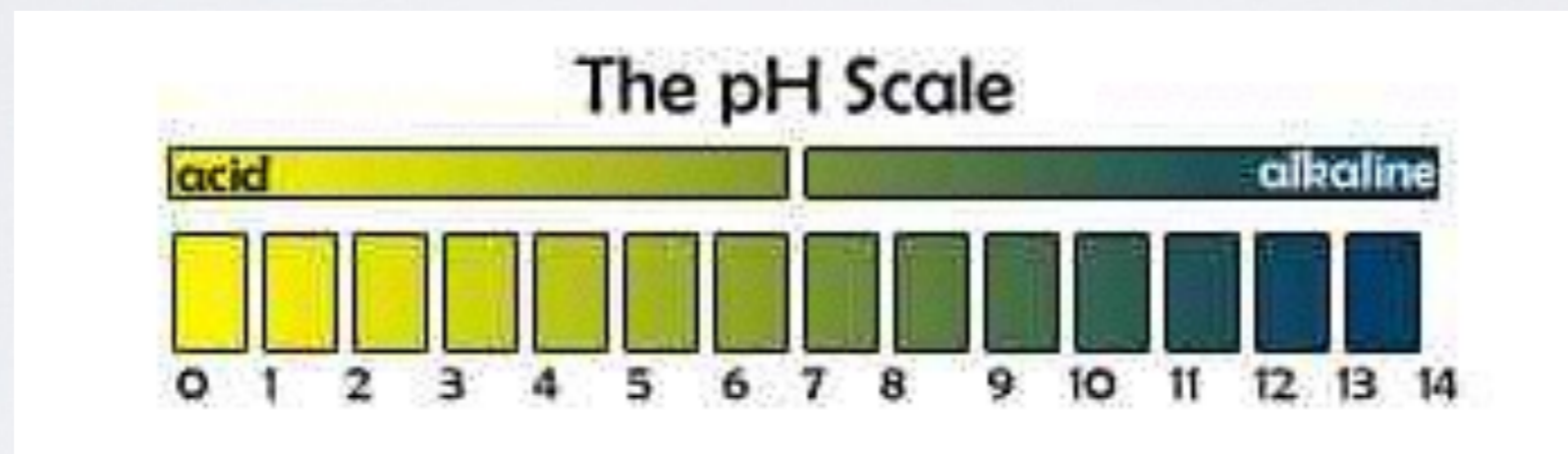


WHAT IS PH

pH: Measure of acidity

Less than 7 = Acidic

Greater than 7 = Alkaline



Pure H₂O pH = 7
Lemon pH = 2.2





ALKALINITY

- **ALKALINITY:**
 - Quantitative capacity of an aqueous solution to neutralize an acid.
 - Measuring alkalinity is important in determining water's ability to neutralize acidic pollution from rainfall or wastewater.
 - For beer it's important because it helps us balance the pH of the mash.

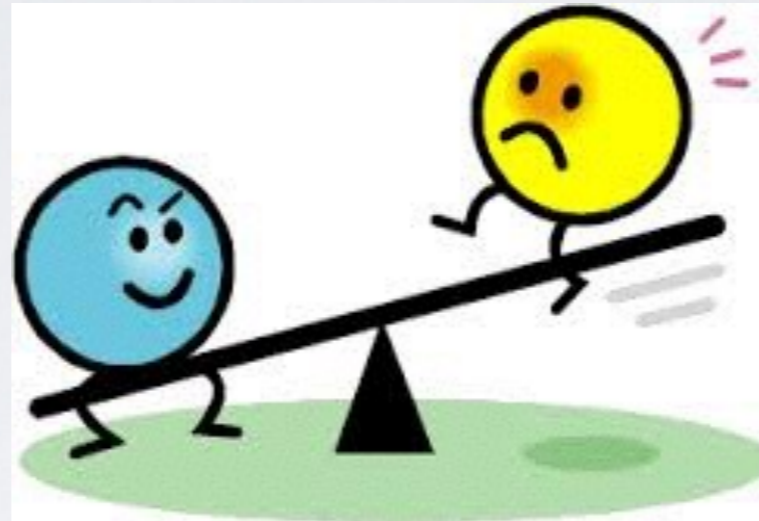


BALANCING PH

ACIDITY

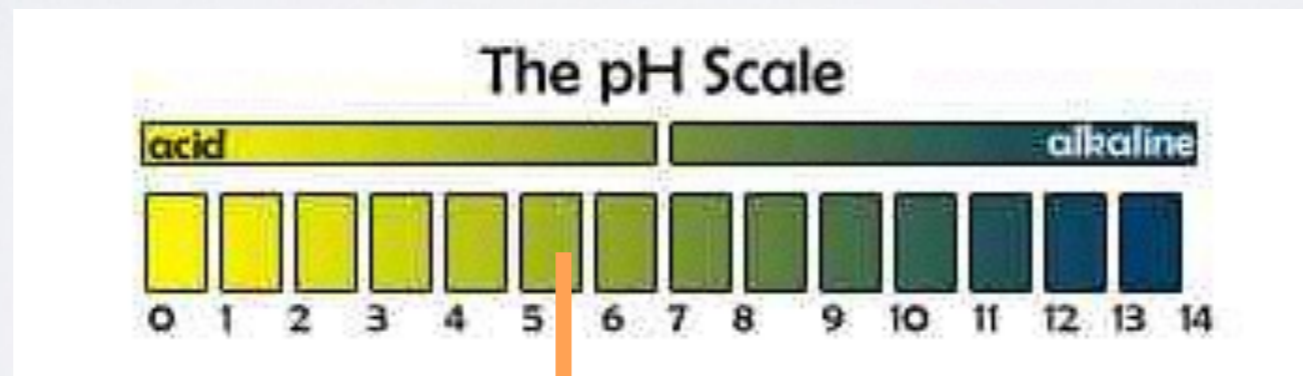
Malt pH Range: 5.6 - 6.0

Darker malts are more acidic.



ALKALINITY

Alkaline is a
neutralizes acid



Conversion of malt starch to sugar works best around 5.1 - 5.5 pH when measured at mash temperatures.



WATER TREATMENT

Now What?

- **Baseline your water source**
- **Adjust Residual Alkalinity**
- **Adjust Flavor Ions**





BREWING WATER

- **BASELINE**
 - Research your water's chemistry
 - Contact the water department. or use _____
 - Look for parts per million of calcium, sulfate, sodium, (bi)carbonate, chloride, and magnesium
 - **MASH PH:** and Magnesium neutralize alkalinity to help balance pH.
 - **FLAVOR:**





BREWING WATER

- **ADJUST RESIDUAL ALKALINITY:**
 - **MASH PH:** Calcium, (bi)Carbonate, and Magnesium (**neutralizes alkalinity**)
 - Calculate target residual alkalinity(RA) with John Palmer's RA Spreadsheet
 - Residual alkalinity: The amount of alkalinity not neutralized by biCarbonates
- **ADJUST FLAVOR IONS:** Based on beer style
 - **FLAVOR:** Sulfate, Sodium, Chloride
 - Sulfate - Hoppy 175 ppm, moderately hoppy 75 ppm, low hopped less than 50 ppm.
 - Chloride – Hoppy less than 50 ppm, moderately hoppy 75 ppm, low hopped 100 ppm.
 - Sodium – Hoppy beers less than 30 ppm, moderate hop/malt 50 ppm, very sweet/malty 75 ppm.
- **FILTER:** Use carbon filter to eliminate chlorine

TESTING MASH PH

pH Strips



pH Stabilizer



Promises to lock in mash pH at 5.2 no matter what the starting pH of the water with 1 TBLS per 5 gallons of water.

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