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A refractometer is sometimes used as a quick way to estimate the amount of dissolve solids in a solution. It is however a method which is far from accurate and specific. It is imperative to know how the meter works and what the data in reality shows.

Observation 1

When light hits a mirror the angle between the mirror and the light coming in is the same as between the mirror and the reflected light. That is school knowledge - even if you have forgotten by now. You can say that the mirror passively reflects the light, without any influence on the light.

Observation 2

Go to any body of water. A lake. A swimming pool. Even a glass of water. Take a straight stick and put it in the water. You will observe that the stick seem to be sharply bent where it enters the water. You can repeat this experiment with different liquds and you will find that the stick seems to bend at different angles at each liquid.

Condense the essence of these observations, and you will conclude that whenever 1. there is a boundary layer between two substances, 2. light passes through the boundary and 3. The angle of “bending the stick” is different (also known as the refractive index) light will be bent. That is the background for the so-called refractometer used in many laboratories.

In a refractometer you can measure the angle of bending of light = refractive index of many liquids. If you do that you will find that literally all have distinctive properties, which makes it possible to use the refractometer to measure properties in seconds which otherwise will take hours or days. Remember: *all you measure is an angle. No more. No less.*

How to get from refractive index to degree Brix = /Bx, used as unit for dissolved solids.
The following is valid at 25/C

1. Place a drop of pure water in the refractometer . Determine the position of the light. That is per definition 0 Bx.
2. Dissolve 1 g sugar (sucrose) and add water till you have 100 gram of solution. Determine the position of the reflected light. That is per definition 1 Bx.
3. Dissolve 10 g sugar (sucrose) and add water till you have 100 gram of solution. Determine the position of the reflected light. That is per definition 10 Bx.

And so on.

Remember: all you measure is an angle.

You can now measure Bx on a variety of products. When you do, it will become evident, that if you compare Bx with a correct determination of the dissolved solids, then Bx is never equal to the true dissolved solids - with the exception of a solution of pure succrose. Examples

- Bx * 0,86 = true solids in cheese whey
- Bx * 0,80 = true solids in spent sulphite liquor

Every product needs it own correction factor. Be aware, that addition of substance with a high refractive index can significantly distort the result, e.g. addition of citric acid. You should also be aware that e.g. cheese whey varies over time. Therefore, although Bx is a true and correct number and the measured Bx may be constant, then the conversion to true solids is an approximation.

There are meters calibrated in Bx or % sugar and you may believe that they actually gives you the amount of dissolved solids. They do not!. Better wording may be

English refractometer-solids Deutsch refraktometer trockenmasse
Danish refraktometertørstof