Application Note

Measurement of Brix in Fruit Juice Using a Refractometer

Industry	:	Food & beverage
Instrument	:	Refractometer
Measurement method	:	Detection of critical angle of optical refraction
Standards	:	

1. Scope

Brix is defined as the mass percent concentration (%) of an aqueous sucrose solution. There is a correlation between Brix and the refractive index, so the refractive index at 20 °C can be converted to Brix using a conversion table built into the device. When the refractive index of an aqueous sucrose solution with a known concentration is measured and then converted to the Brix value, it matches the sucrose concentration. This does not mean however that the Brix for actual samples indicates their sucrose concentration. This is because samples contain acids such as citric acid and sugars such as glucose as soluble solids other than sucrose. The Brix obtained from this measurement is generally used as an indicator of the sugar content of fruit juices for example. This Application Note describes an example of the measurement of Brix for fruit juices using a KEM refractometer. Note that orange, grape, and apple juice were used as the measurement samples.

2. Precautions

After measurement is finished, use a paper wipe to remove the sample. Then clean the prism with pure water, and dry it with a paper wipe. Clean it three times with pure water. Then proceed to the next measurement.

3. Apparatus

Refractometer

4. Reagents

Cleaning solution : Pure water

5. Procedure

-Sample preparation-

1) The juice is obtained by squeezing it out of the fruits.
2) If there is any skin, fiber, or other solids from the fruit in the juice, filter them out before using the fruit juice as the sample.

-Prepare to measurement-

1) Set the measurement temperature to 20 °C.
2) Calibrate with air and pure water.
(Calibrate each measurement day.)

- Measurement -

1) Drop the sample using a dropper to ensure ample coverage of the refractometer prism.
2) Measurement.

6. Example of measurement

-Parameter-

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Set Temp	: 20.00 ℃
Stability	: 0
Wait Time	: 0s
Limit Time	: 600s

The settings above are just one example. They may vary depending on the model, different parameters may be added or different items may be added.

— Measurement results —

Table1 Results of Brix measurement of fruit juice
(measurement temperature: 20℃)

Sample		Refractive index (nD)	Brix (%)	Time (s)
Orange juice	1	1.34778	9.97	35
	2	1.34778	9.97	33
	3	1.34778	9.97	36
Apple juice	1	1.35455	14.29	35
	2	1.35455	14.29	34
	3	1.35455	14.29	33
Grape juice	1	1.35817	16.55	35
	2	1.35816	16.54	34
	3	1.35817	16.55	34

9. Summary

Good repeatability was obtained in the measurement results for each sample. The Brix value for fruit juices can be measured stably using a KEM's refractometer.