

Application Note

Flow curve of commercial dressing

Industry	:	Food & beverage
Instrument	:	Viscometer
Measurement method	:	Electro Magnetically Spinning Method
Standards	:	

1. Scope

Xanthan gum is generally added as a dispersant and a thickener to most of commercial dressings.

Since xanthan gum is viscous when mixed with water, it is used in foods as a thickener and thickening stabilizer for dressing, various sauces, retort pouch foods and frozen foods etc. for a wide range of applications.

An example of measuring Change in viscosity of the solution, containing xanthan gum, using an EMS viscometer that can be measured by sealing, sterilization and non-contact will be shown below.

2. Precautions

None.

3. Post-measurement procedure

The sample container and the sample are discarded appropriately.

4. Apparatus

- EMS Viscometer
- Control Laptop PC

5. Reagents

- Sample : Green perilla dressing(Commercially available),
Italian dressing(Commercially available)

6. Procedure

- 1) Enter the following conditions in measurement condition of the sequence mode of control software.

✧ Measurement mode	:Sequence mode
✧ Measurement temperature	:25°C
✧ Motor rotation speed	:I ; Rise(200→400→600→800→1,000rpm) II; Descent (800→600→400→200rpm)
✧ Measurement time	:I (1 second)~III(10 seconds)
✧ Repeat count	:3 times
✧ Measurement interval	:1 second
✧ Waiting time for temperature stability	:0 minute
- 2) Place an aluminum spherical probe of ϕ 2 mm and a sample of 300 μ L in a container, cover with a cap and packing, set the sample container in the EMS Viscometer, and click the measurement button.
- 3) Measure another samples on the same condition when the measurement of the first sample is completed.

7. Example

The flow curve of the commercial dressing was shown in Figure 1, and the measurement result was shown in Table 1.

Both of the samples were able to measure with a variation coefficient of 5% or less under any motor rotational speed condition.

In the Italian dressing, the coefficient of variation (CV%) of viscosity measurement at each motor revolution speed slightly increased.

It was speculated that the shredded vegetables (solid matter) included in the Italian dressing might have been influenced by colliding with the spherical probe.

For reference, by using sequence measurement, it was possible to measure (to create a flow curve) in about 3 and half minutes in these samples.

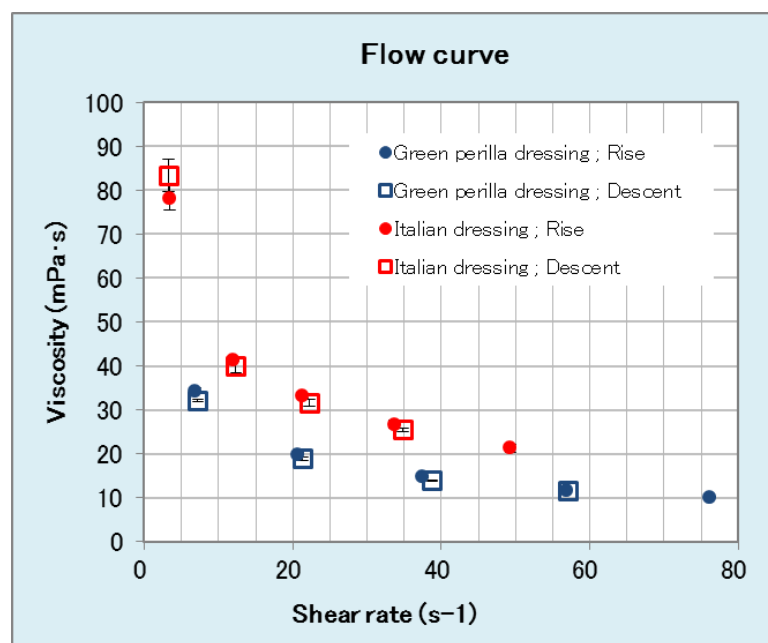


Figure 1. Flow curves of commercially dressings

Table1. Measurement results of commercially dressings

No.	Motor rotation speed rpm	Green perilla dressing(Commercially available)						Italian dressing(Commercially available)					
		Viscosity(mPa·s)			Shear rate (s ⁻¹)			Viscosity(mPa·s)			Shear rate (s ⁻¹)		
		Ave (n=3)	SD (n=3)	CV (n=3)	Ave (n=3)	SD (n=3)	CV (n=3)	Ave (n=3)	SD (n=3)	CV (n=3)	Ave (n=3)	SD (n=3)	CV (n=3)
1	200	34.33	0.551	1.6%	6.86	0.087	1.3%	78.20	2.762	3.5%	3.45	0.110	3.2%
2	400	19.70	0.458	2.3%	20.73	0.314	1.5%	41.37	0.351	0.8%	11.94	0.096	0.8%
3	600	14.70	0.265	1.8%	37.44	0.505	1.3%	33.20	0.529	1.6%	21.36	0.272	1.3%
4	800	11.67	0.058	0.5%	56.92	0.091	0.2%	26.63	0.907	3.4%	33.67	0.791	2.3%
5	1000	10.13	0.058	0.6%	76.13	0.091	0.1%	21.23	0.950	4.5%	49.32	1.414	2.9%
6	800	11.63	0.058	0.5%	56.97	0.091	0.2%	25.43	0.462	1.8%	34.82	0.453	1.3%
7	600	13.83	0.058	0.4%	38.75	0.091	0.2%	31.60	0.781	2.5%	22.20	0.363	1.6%
8	400	18.83	0.321	1.7%	21.31	0.240	1.1%	39.90	1.556	3.9%	12.32	0.378	3.1%
9	200	32.17	0.231	0.7%	7.22	0.045	0.6%	83.43	3.691	4.4%	3.26	0.126	3.9%

8. Summary

The flow curve of the commercially available dressing using the sequence mode, could be created in about 3 and half minutes.

In the measurement by the sequence mode, it was confirmed that flow curve could be created without breaking the higher-order structure of sample molecule, because the shear rate increased and the descending viscosity were almost the same.

9. References

None.