

Supporting information

Self-assembled chitosan-PEG nanocarriers for *Cordyceps militaris* extract: process optimization and enhanced biological activities

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SZ-100

5-5.nsz

Measurement Results

Date : Monday, June 27, 2022 10:17:33
 Measurement Type : Particle Size
 Sample Name : 5:5
 Scattering Angle : 90
 Temperature of the Holder : 24.8 °C
 Dispersion Medium Viscosity : 0.898 mPa·s
 Transmission Intensity before Meas. : 31387
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 4919 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	149.5 nm	98.8 nm	142.5 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	149.5 nm	98.8 nm	142.5 nm

Cumulant Operations

Z-Average : 927.9 nm
 PI : 0.547

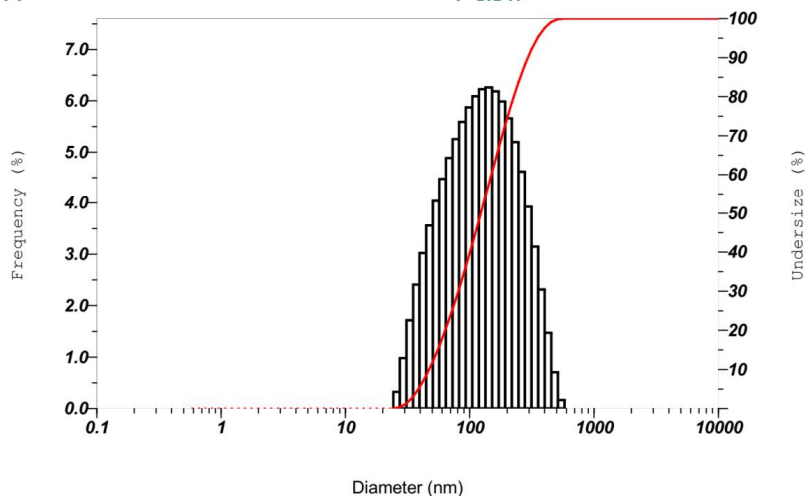


Figure S1. Size distribution of at Cts:PEG 5:5.

SZ-100

7-3.nsz

Measurement Results

Date : Monday, June 27, 2022 10:35:44
 Measurement Type : Particle Size
 Sample Name : 7:3
 Scattering Angle : 90
 Temperature of the Holder : 24.9 °C
 Dispersion Medium Viscosity : 0.897 mPa·s
 Transmission Intensity before Meas. : 33269
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 3705 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	20.1 nm	14.1 nm	12.4 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	20.1 nm	14.1 nm	12.4 nm

Cumulant Operations

Z-Average : 14.1 nm
 PI : 0.366

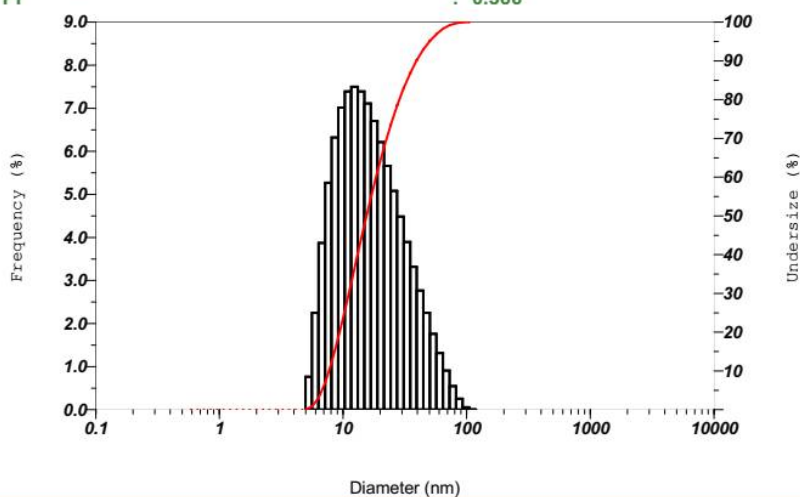


Figure S2. Size distribution at Cts:PEG 7:3.

SZ-100

9-1.nsz

Measurement Results

Date : Monday, June 27, 2022 10:42:57
 Measurement Type : Particle Size
 Sample Name : 9:1
 Scattering Angle : 90
 Temperature of the Holder : 24.9 °C
 Dispersion Medium Viscosity : 0.897 mPa·s
 Transmission Intensity before Meas. : 31112
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 1472 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	271.2 nm	133.2 nm	205.9 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	271.2 nm	133.2 nm	205.9 nm

Cumulant Operations

Z-Average : 384.1 nm
 PI : 0.449

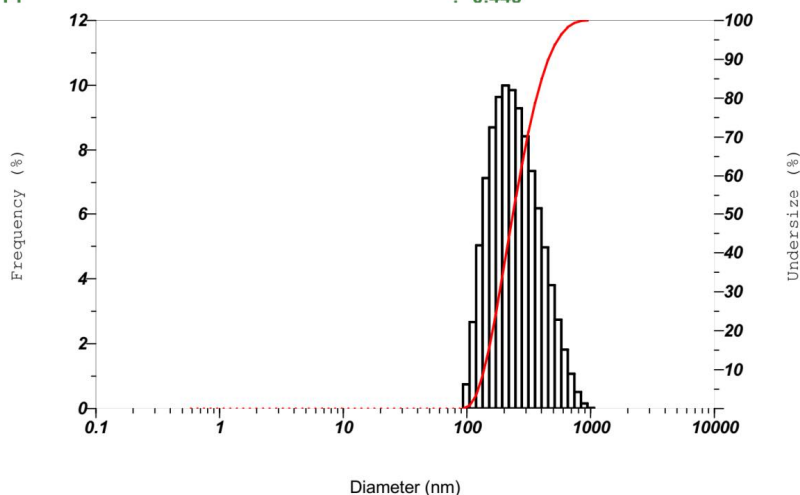


Figure S3. Size distribution of at Cts:PEG 9:1.

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SZ-100

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1%.nsz

Measurement Results

Date : Friday, July 1, 2022 14:59:38 PM
 Measurement Type : Particle Size
 Sample Name : 1%
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.896 mPa·s
 Transmission Intensity before Meas. : 31158
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 2210 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	0.17	1.1 nm	0.1 nm	1.1 nm
2	0.83	57.9 nm	8.3 nm	55.0 nm
3	---	--- nm	--- nm	--- nm
Total	1.00	48.2 nm	22.6 nm	55.0 nm

Cumulant Operations

Z-Average : 6748.9 nm
 PI : 2.024

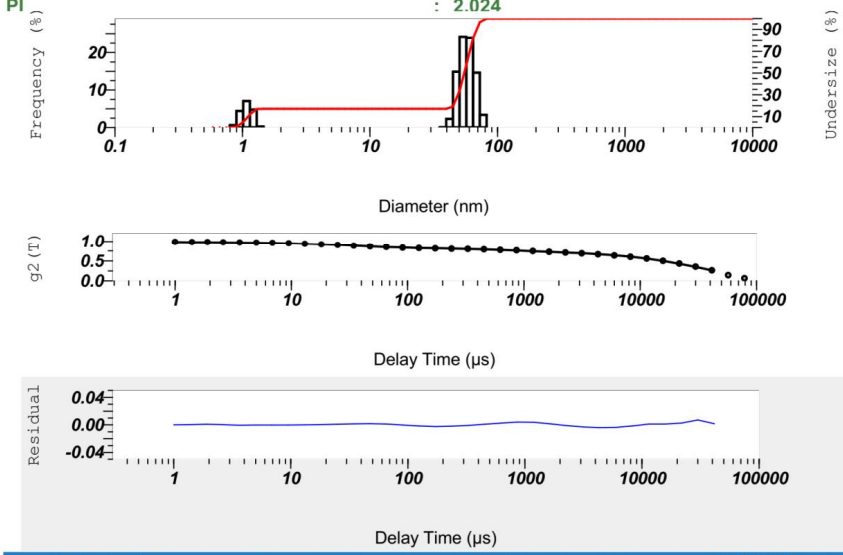


Figure S4. Size distribution of at 1.0% Tween 80.

SZ-100

7-3.nsz

Measurement Results

Date : Monday, June 27, 2022 10:35:44
 Measurement Type : Particle Size
 Sample Name : 7:3
 Scattering Angle : 90
 Temperature of the Holder : 24.9 °C
 Dispersion Medium Viscosity : 0.897 mPa·s
 Transmission Intensity before Meas. : 33269
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 3705 KCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	20.1 nm	14.1 nm	12.4 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	20.1 nm	14.1 nm	12.4 nm

Cumulant Operations

Z-Average : 14.1 nm
 PI : 0.366

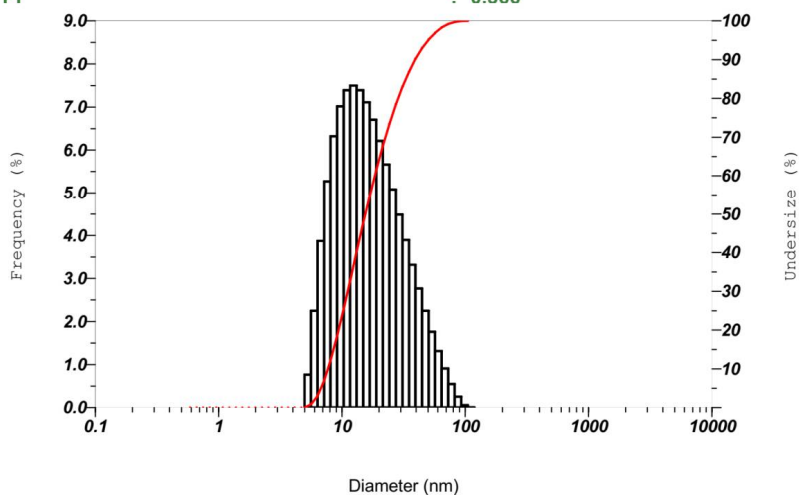


Figure S5. Size distribution of at 3.0% Tween 80.

SZ-100

5%.nsz

Measurement Results

Date : Friday, July 1, 2022 15:09:11 PM
 Measurement Type : Particle Size
 Sample Name : 5%
 Scattering Angle : 90
 Temperature of the Holder : 24.9 °C
 Dispersion Medium Viscosity : 0.897 mPa·s
 Transmission Intensity before Meas. : 31377
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 1253 KCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	17.9 nm	10.7 nm	12.4 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	17.9 nm	10.7 nm	12.4 nm

Cumulant Operations

Z-Average : 14.0 nm
 PI : 0.308

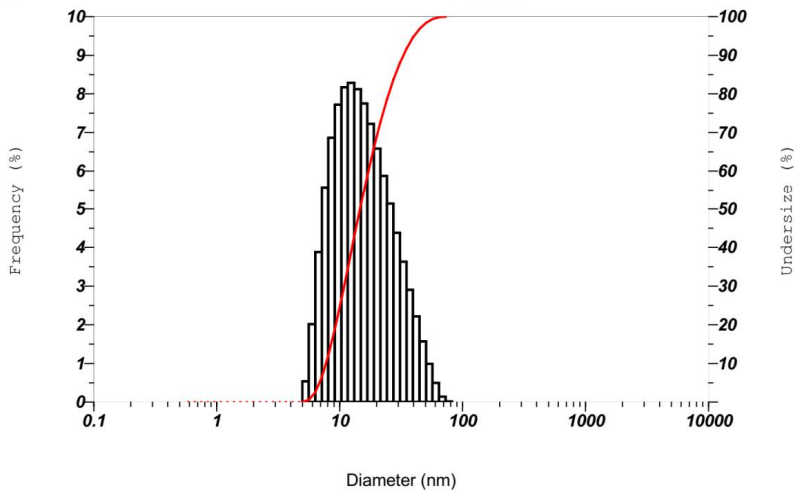


Figure S6. Size distribution of at 5.0% Tween 80.

SZ-100

7%.nsz

Measurement Results

Date : Friday, July 1, 2022 14:55:14 PM
 Measurement Type : Particle Size
 Sample Name : 7%
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.895 mPa·s
 Transmission Intensity before Meas. : 30703
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 3267 KCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	9.9 nm	4.9 nm	7.6 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	9.9 nm	4.9 nm	7.6 nm

Cumulant Operations

Z-Average : 9.0 nm
 PI : 0.045

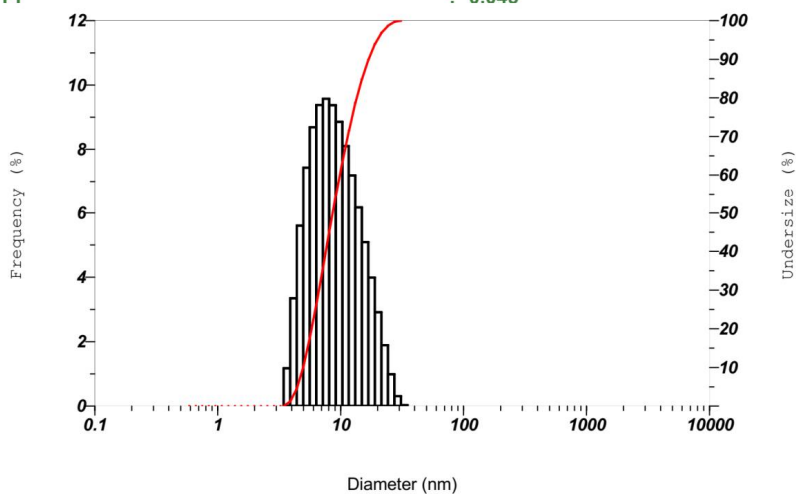


Figure S7. Size distribution of at 7.0% Tween 80.

SZ-100

20p.nsz

Measurement Results

Date : Monday, July 4, 2022 15:43:53 PM
 Measurement Type : Particle Size
 Sample Name : 20p
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.896 mPa·s
 Transmission Intensity before Meas. : 30915
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 1235 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	11.8 nm	5.1 nm	9.7 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	11.8 nm	5.1 nm	9.7 nm

Cumulant Operations

Z-Average : 100.9 nm
 PI : 0.540

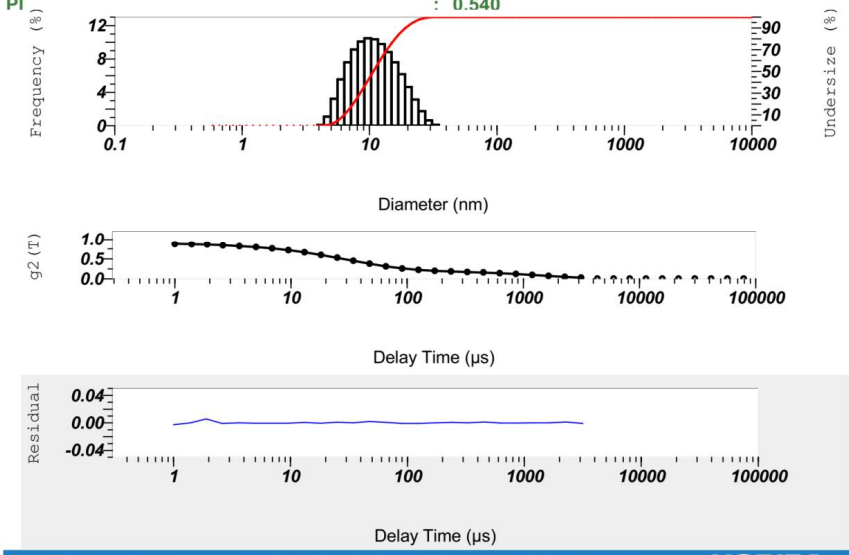


Figure S8. Size distribution of NCCs at of 20 min of stirring.

SZ-100

B.nsz

Measurement Results

Date : Monday, July 25, 2022 17:14:46
 Measurement Type : Particle Size
 Sample Name : B
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.896 mPa·s
 Transmission Intensity before Meas. : 33411
 Distribution Form : Standard
 Distribution Form(Dispersity) : Polydisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 1206 KCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	14.4 nm	6.3 nm	12.4 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	14.4 nm	6.3 nm	12.4 nm

Cumulant Operations

Z-Average : 12.2 nm
 PI : 0.267

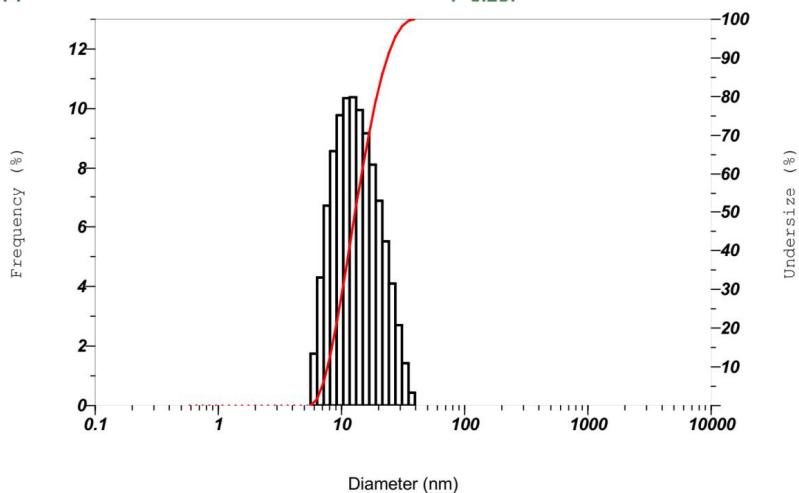


Figure S9. Size distribution of NCCs at of 30 min of stirring.

SZ-100

40p.nsz

Measurement Results

Date : Monday, July 4, 2022 15:35:58 PM
 Measurement Type : Particle Size
 Sample Name : 40p
 Scattering Angle : 90
 Temperature of the Holder : 24.9 °C
 Dispersion Medium Viscosity : 0.897 mPa·s
 Transmission Intensity before Meas. : 29988
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 1257 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	17.6 nm	10.7 nm	12.4 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	17.6 nm	10.7 nm	12.4 nm

Cumulant Operations

Z-Average : 13.1 nm
 PI : 0.500

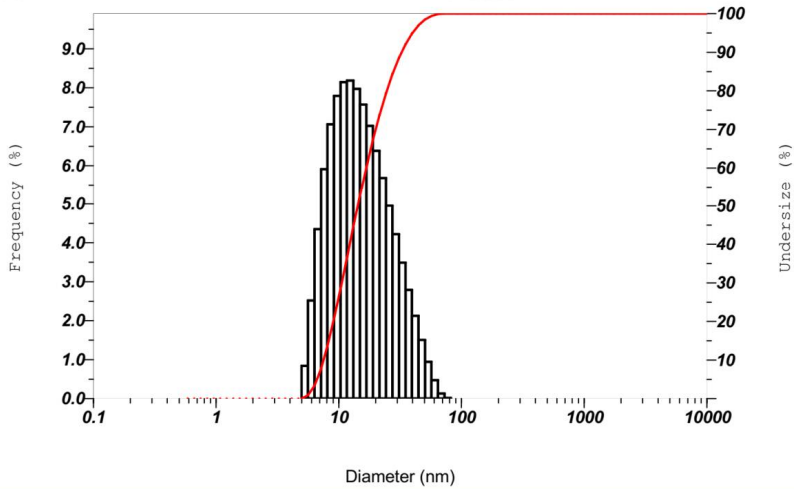


Figure S10. Size distribution of NCCs at of 40 min of stirring.

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600V.nsz

Measurement Results

Date : Tuesday, July 5, 2022 16:56:27 PM
 Measurement Type : Particle Size
 Sample Name : 600V
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.896 mPa·s
 Transmission Intensity before Meas. : 31442
 Distribution Form : Broad
 Distribution Form(Dispersity) : Polydisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 1943 kCPS

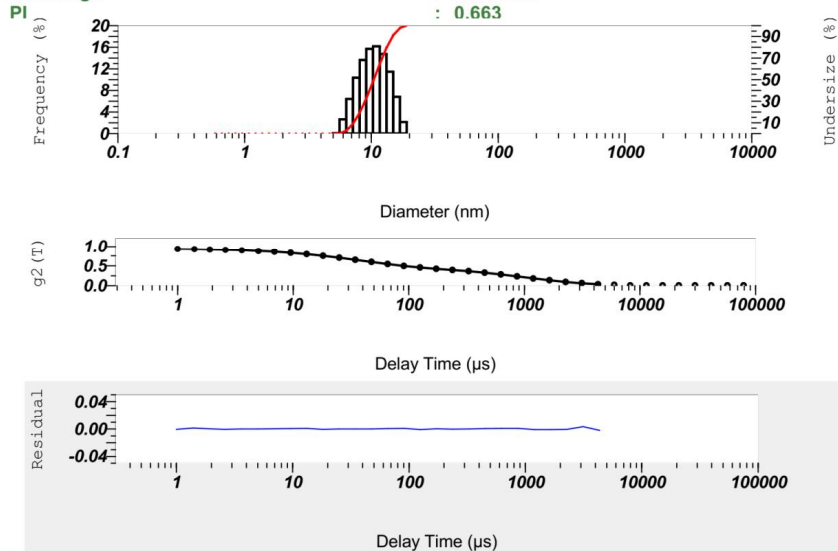
Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	10.7 nm	2.8 nm	10.9 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	10.7 nm	2.8 nm	10.9 nm

Cumulant Operations

Z-Average : 222.2 nm

PI : 0.663



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Figure S11. Size distribution of NCCs at 600 rpm.



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15%.nsz

Measurement Results

Date : Tuesday, July 12, 2022 15:25:21 PM
 Measurement Type : Particle Size
 Sample Name : 15%
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.895 mPa·s
 Transmission Intensity before Meas. : 32232
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 3809 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	15.4 nm	8.1 nm	11.0 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	15.4 nm	8.1 nm	11.0 nm

Cumulant Operations

Z-Average : 12.4 nm
 PI : 0.277

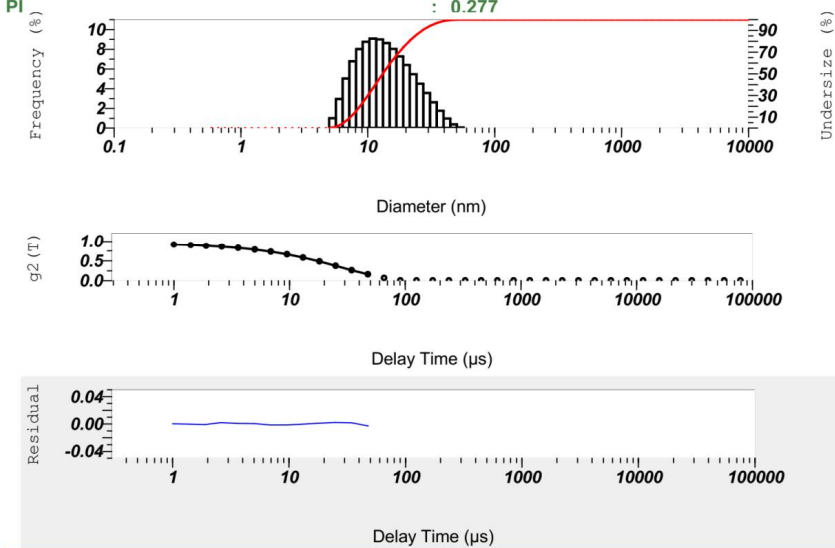


Figure S12. Size distribution of NCCs at 900 rpm.

2022.07.05 17:02:41

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SZ-100

1200V.nsz

Measurement Results

Date : Tuesday, July 5, 2022 16:45:15 PM
 Measurement Type : Particle Size
 Sample Name : 1200V
 Scattering Angle : 90
 Temperature of the Holder : 24.8 °C
 Dispersion Medium Viscosity : 0.898 mPa·s
 Transmission Intensity before Meas. : 32562
 Distribution Form : Broad
 Distribution Form(Dispersity) : Polydisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 1367 kCPS

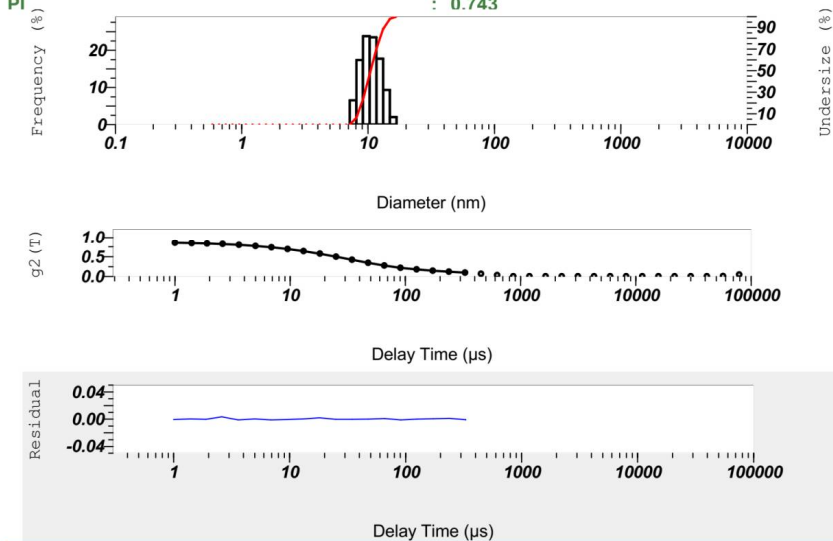
Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	10.7 nm	1.9 nm	9.9 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	10.7 nm	1.9 nm	9.9 nm

Cumulant Operations

Z-Average : 20.8 nm

PI : 0.743



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Figure S13. Size distribution of NCCs at 1200 rpm.

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60oC.nsz

Measurement Results

Date : Wednesday, July 6, 2022 15:25:24 PM
 Measurement Type : Particle Size
 Sample Name : 60oC
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.896 mPa·s
 Transmission Intensity before Meas. : 29870
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 2906 KCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	0.88	472.6 nm	246.0 nm	336.1 nm
2	0.12	5587.4 nm	2086.4 nm	8518.3 nm
3	---	--- nm	--- nm	--- nm
Total	1.00	1103.9 nm	1849.5 nm	336.1 nm

Cumulant Operations

Z-Average : 346.2 nm
 PI : 0.617

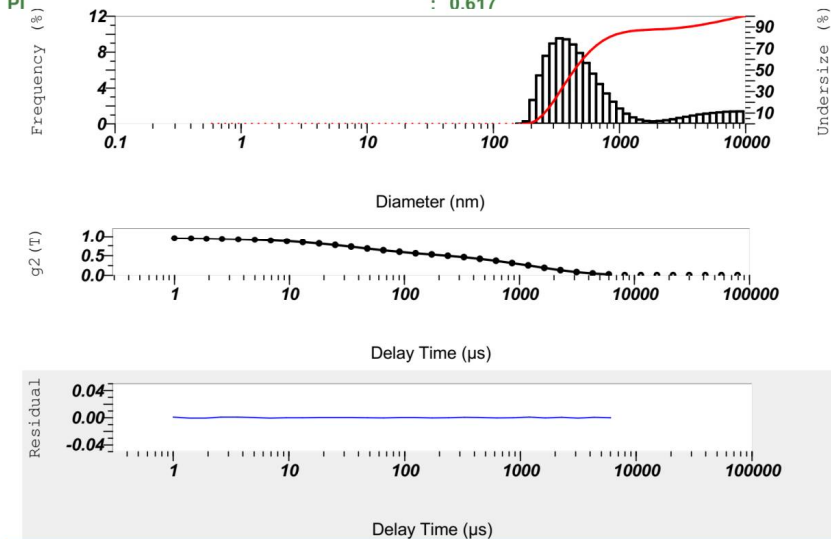


Figure S14. Size distribution of NCCs at 60°C of PIT.

SZ-100

A.nsz

Measurement Results

Date : Monday, July 25, 2022 17:20:46
 Measurement Type : Particle Size
 Sample Name : A
 Scattering Angle : 90
 Temperature of the Holder : 25.0 °C
 Dispersion Medium Viscosity : 0.896 mPa·s
 Transmission Intensity before Meas. : 32546
 Distribution Form : Standard
 Distribution Form(Dispersity) : Polydisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 3459 KCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	11.2 nm	1.6 nm	11.0 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	11.2 nm	1.6 nm	11.0 nm

Cumulant Operations

Z-Average : 11.0 nm
 PI : 0.275

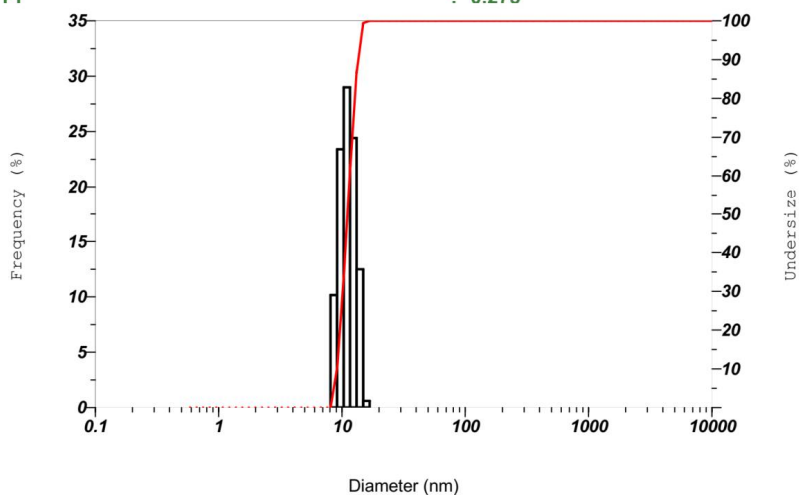


Figure S15. Size distribution of NCCs at 70°C of PIT.



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SZ-100

80oC.nsz

Measurement Results

Date : Wednesday, July 6, 2022 15:21:20 PM
 Measurement Type : Particle Size
 Sample Name : 80oC
 Scattering Angle : 90
 Temperature of the Holder : 24.9 °C
 Dispersion Medium Viscosity : 0.897 mPa·s
 Transmission Intensity before Meas. : 29251
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 2366 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	450.5 nm	201.5 nm	336.4 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	450.5 nm	201.5 nm	336.4 nm

Cumulant Operations

Z-Average : 376.9 nm
 PI : 0.669

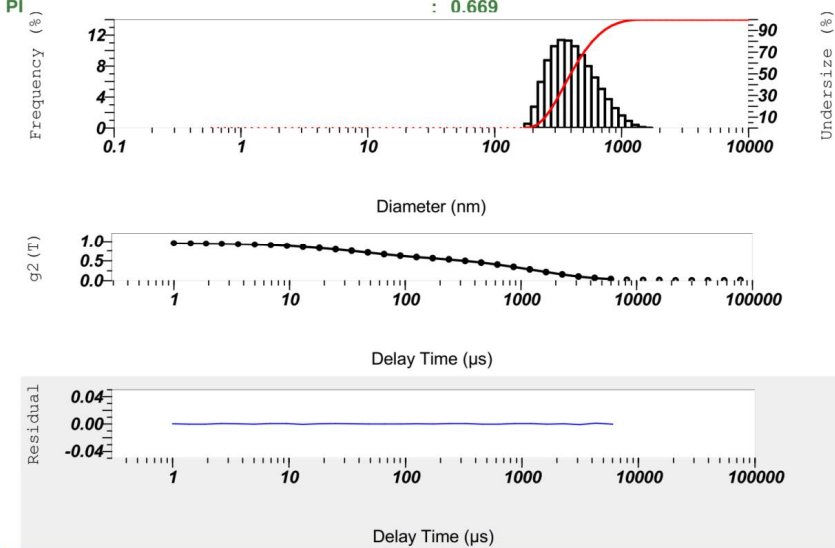


Figure S16. Size distribution of NCCs at 80°C of PIT.

SZ-100

7-3.nsz

Measurement Results

Date : Monday, June 27, 2022 10:35:44
 Measurement Type : Particle Size
 Sample Name : 7:3
 Scattering Angle : 90
 Temperature of the Holder : 24.9 °C
 Dispersion Medium Viscosity : 0.897 mPa·s
 Transmission Intensity before Meas. : 33269
 Distribution Form : Standard
 Distribution Form(Dispersity) : Monodisperse
 Representation of Result : Scattering Light Intensity
 Count Rate : 3705 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	1.00	20.1 nm	14.1 nm	12.4 nm
2	---	--- nm	--- nm	--- nm
3	---	--- nm	--- nm	--- nm
Total	1.00	20.1 nm	14.1 nm	12.4 nm

Cumulant Operations

Z-Average : 14.1 nm
 PI : 0.366

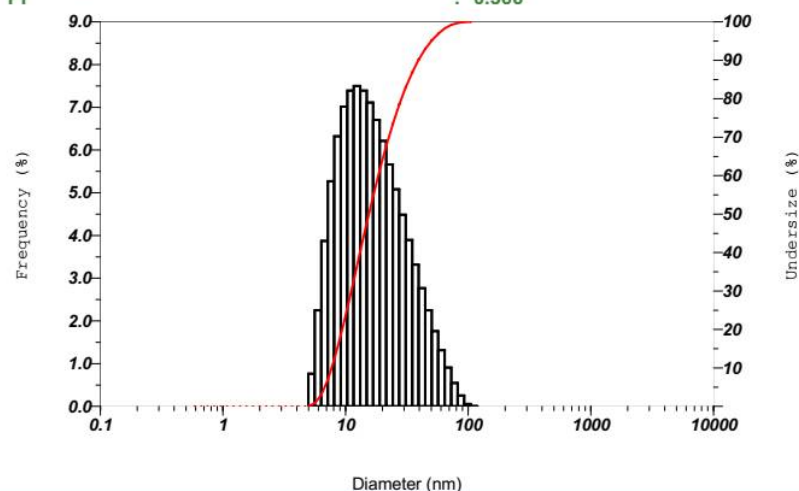


Figure S17. Size distribution of NCCs at optimized condition (first measurement).