# Investigation Process robustness homogenisation square term

Date: 2023-09-22. User: Anna Karin Morén

## Introduction and background

### Factors

| Name | Abbreviation | Units | Type | Settings |
|---|---|---|---|---|
| **Temperature** | Temp | C | Quantitative | 60 to 75 |
| **Homogenisation speed** | Hom | rpm | Quantitative | 5000 to 1,2e+04 |
| **Polymer concentration** | Pol | % (m/m) | Quantitative | 0,63 to 0,77 |

### Responses

| Name | Abbreviation | Units | Condition | Objective | Min | Target | Max | Predicted min | Predicted max | Response range |
|---|---|---|---|---|---|---|---|---|---|---|
| **Viscosity** | Vis | mPas | Observed | Predicted | | | | -- | -- | |
| **Droplet size** | Dro | µm | Observed | Predicted | | | | -- | -- | |
| **Physical stability** | Phy | | Observed | Predicted | | | | -- | -- | |
| **Whiteness** | Whi | | Observed | Predicted | | | | -- | -- | |
| **Viscosity Zero shear** | Vis_0 | Pas | Observed | Predicted | | | | -- | -- | |
| **Viscosity high shear** | Vis_H | Pas | Observed | Predicted | | | | -- | -- | |
| **Flow stress** | Flo | | Observed | Predicted | | | | -- | -- | |
| **Firmness** | Fir | g | Observed | Predicted | | | | -- | -- | |
| **Consistency** | Con | gs | Observed | Predicted | | | | -- | -- | |
| **Cohesiveness** | Coh | g | Observed | Predicted | | | | -- | -- | |
| **Adhesiveness** | Adh | gs | Observed | Predicted | | | | -- | -- | |

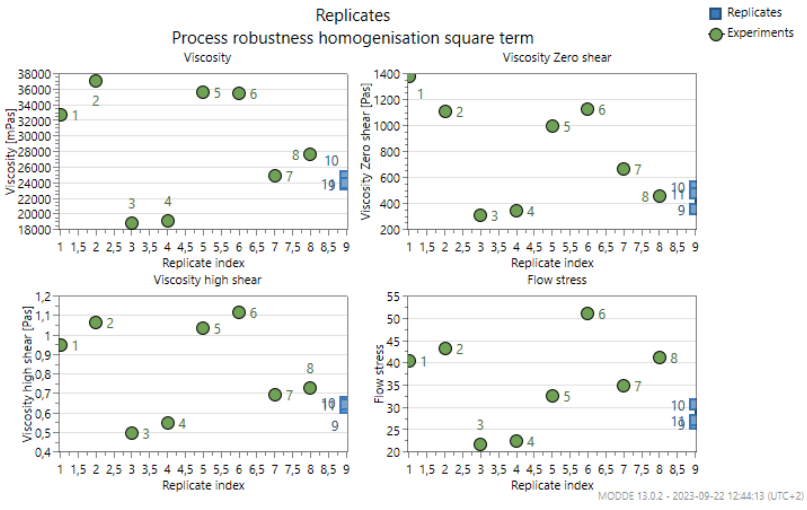
### Objective, model and design

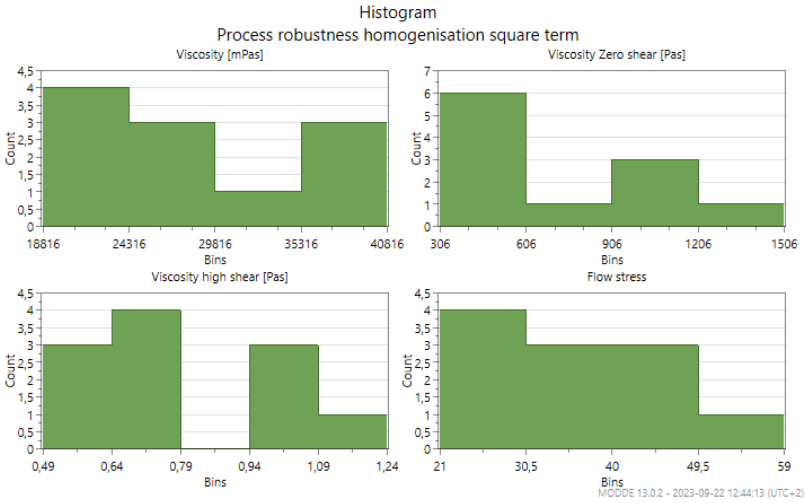
| **Objective** | **Screening** |
|---|---|
| Process model | Interaction |
| Mixture model | -- |
| | |
| **Design** | **Full Fac (2 levels)** |
| Runs in design | 8 |
| Center points | 3 |
| Replicated runs | 0 |
| Replicates | 0 |
| N = actual runs | 11 |
| Maximum runs | 12000 |
| Constraints | No |

### Worksheet

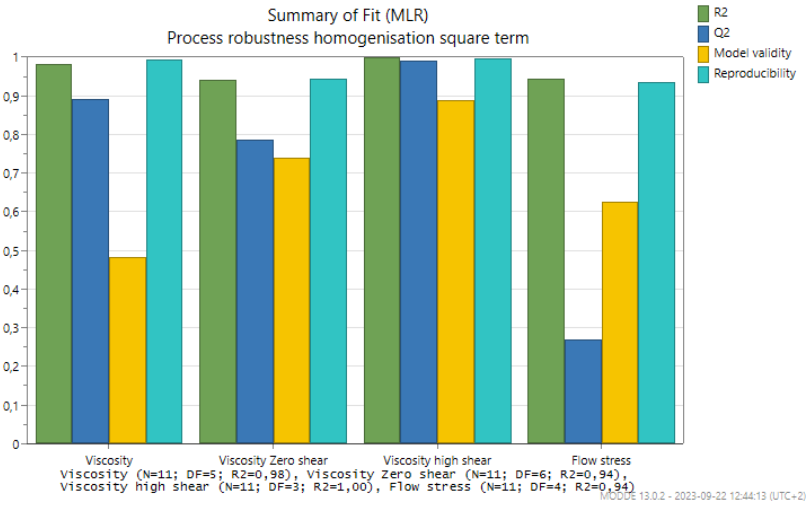
| Exp No | Exp Name | Run Order | Incl/Excl | Temperature | Homogenisation speed | Polymer concentration | Viscosity | Droplet size | Physical stability | Whiteness | Viscosity Zero shear | Viscosity high shear | Flow stress | Firmness | Consistency | Cohesiveness | Adhesiveness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N1 | 10 | Incl | 60 | 5000 | 0,63 | 32782 | | | | 1381 | 0,946 | 40,4 | 5,512 | 17,206 | -2,534 | -14,816 |
| 2 | N2 | 9 | Incl | 75 | 5000 | 0,63 | 37032 | | | | 1106 | 1,066 | 43,2 | 5,2 | 16,253 | -2,519 | -17,315 |
| 3 | N3 | 1 | Incl | 60 | 12000 | 0,63 | 18816 | | | | 306,4 | 0,4957 | 21,8 | 2,419 | 10,247 | -1,291 | -8,237 |
| 4 | N4 | 6 | Incl | 75 | 12000 | 0,63 | 19050 | | | | 345,2 | 0,5512 | 22,4 | 2,478 | 10,033 | -1,402 | -8,705 |
| 5 | N5 | 11 | Incl | 60 | 5000 | 0,77 | 35650 | | | | 993,9 | 1,036 | 32,6 | 4,886 | 15,276 | -2,394 | -16,188 |
| 6 | N6 | 3 | Incl | 75 | 5000 | 0,77 | 35502 | | | | 1126 | 1,116 | 51,1 | 4,693 | 14,807 | -2,382 | -18,422 |
| 7 | N7 | 2 | Incl | 60 | 12000 | 0,77 | 24966 | | | | 663,1 | 0,693 | 34,9 | 2,78 | 11,037 | -1,664 | -11,102 |
| 8 | N8 | 5 | Incl | 75 | 12000 | 0,77 | 27684 | | | | 459,5 | 0,7306 | 41,2 | 3,003 | 11,613 | -1,751 | -11,26 |
| 9 | N9 | 7 | Incl | 67,5 | 8500 | 0,7 | 23750 | | | | 350 | 0,6254 | 26,3 | 2,589 | 10,251 | -1,57 | -10,686 |
| 10 | N10 | 4 | Incl | 67,5 | 8500 | 0,7 | 24768 | | | | 527,2 | 0,6541 | 30,7 | 2,767 | 10,721 | -1,582 | -10,767 |
| 11 | N11 | 8 | Incl | 67,5 | 8500 | 0,7 | 23868 | | | | 472,9 | 0,6412 | 27 | 2,706 | 10,608 | -1,578 | -10,113 |

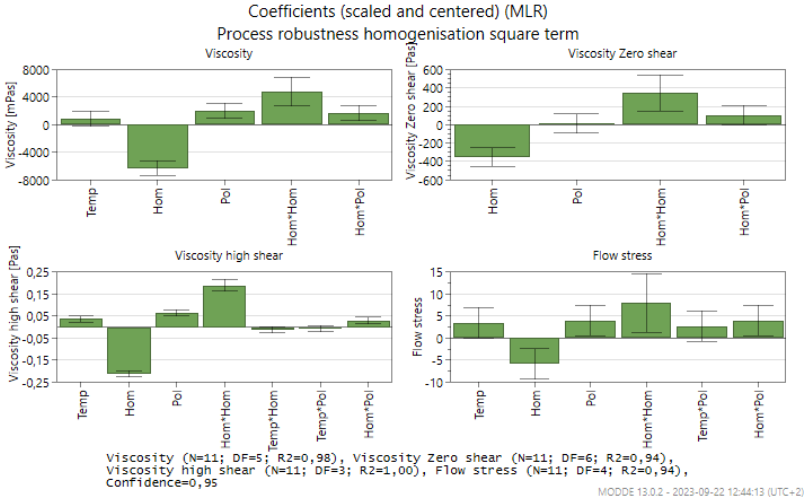
## Raw data inspection

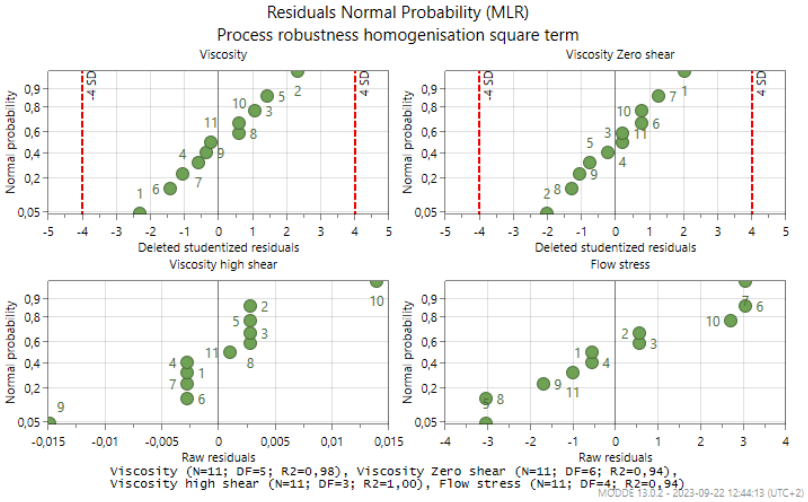


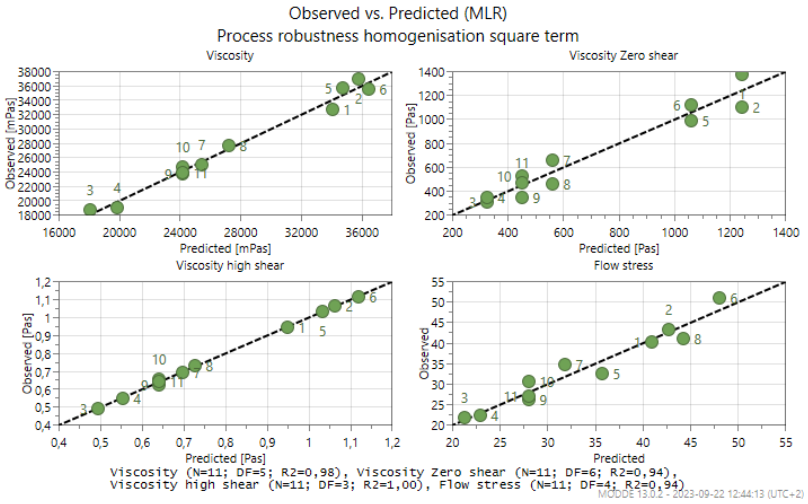



## Model diagnostics






## Predictions

*Insert here predicted results*

## Conclusion

*Insert here a conclusion*