# Evaluation of adhesive properties of semisolid preparations

Theory

The adhesive properties of the preparation allow a longer stay at the site of application, thus increasing the resulting therapeutic effect. The adhesive properties can be evaluated on a rotational rheometer using the sequence *Squeeze and pull off test with analysis*. The test takes place in two phases, when the material is first squeezed and then the upper geometry is pulled off. Several parameters are used to evaluate the test: i) the maximum force in the first phase (positive) is suitable eg for evaluating spreadability or extrusion from the tube, ii) the maximum force in the second phase (negative) required to break adhesive bonds is a measure of adhesive/cohesive forces, iii) the area under the force time curve, iv) the time required for the force to decrease by 90 %.

Figure 1: Graphical representation of the course of the adhesive test
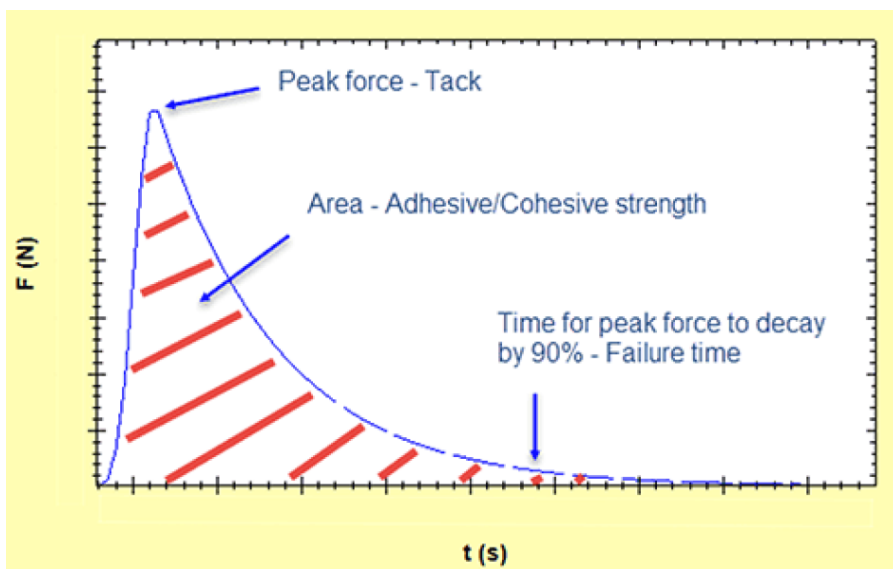
Material and devices

Semisolid excipients or medicinal products (as specified by the teacher)

Absolute rotational rheometer Kinexus Pro + Malvern Instruments

Measuring geometry PU 40

Method

1. Prepare the rheometer for measurement according to the teacher's instructions.

2. In the instrument SW, select the *rSolution_0019 Determination of pressure sensitive tack and adhesion using axial measurements.rseq* and follow the instructions.

3. Enter the test parameters:

Temperature	Contact time	Contact force
32 °C	10 s	1 N

4. Perform the test five times with the newly applied sample.

Conclution

Evaluate the adhesive properties of the tested materials and discuss the importance of bioadhesive/mucoadhesive properties in the application and therapeutic effect of preparations.
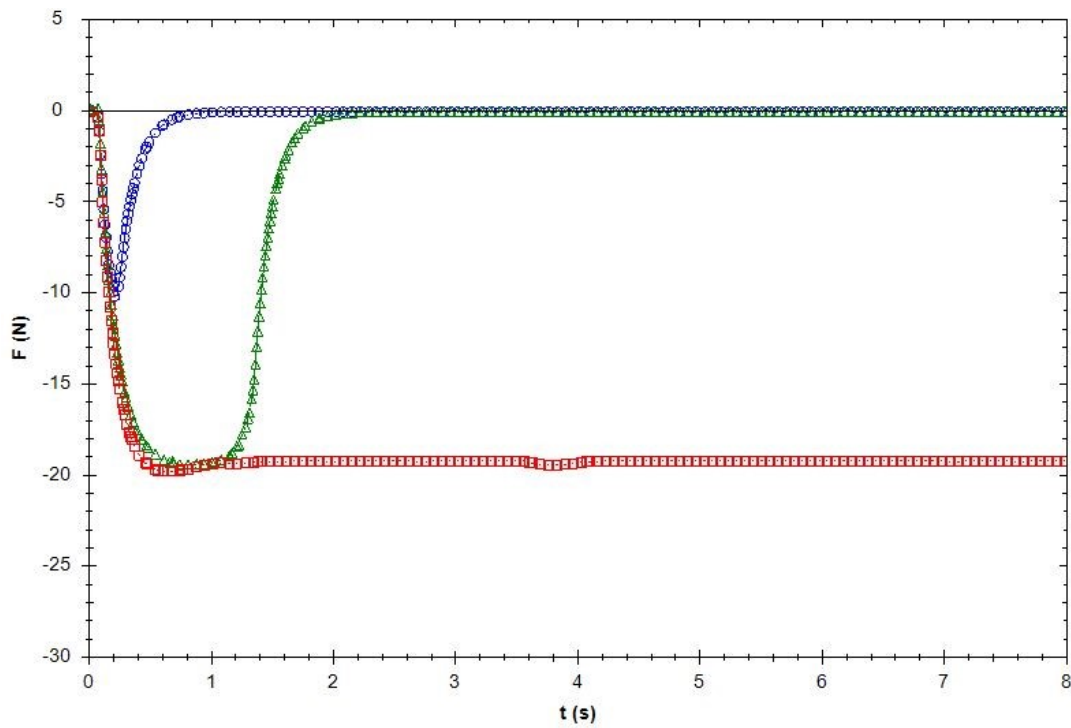
Protocol

Name of student:

Sample:

Device:

Geometry:

Test sequence:

Test variables:

Figure 1. Maximal detachment force F_{max} (N) vs. test time

Measurement	Sample 1 F_{max} (N)	Sample 2 F_{max} (N)	Sample 3 F_{max} (N)
1.	19.88	19.40	9.99
2.	19.65	19.50	9.44
3.	20.61	19.49	10.05
4.	19.99	19.43	10.27
5.	19.80	19.48	10.19
Average ± SD	19.99 ± 0.33	19.46 ± 0.04	10.05 ± 0.31