

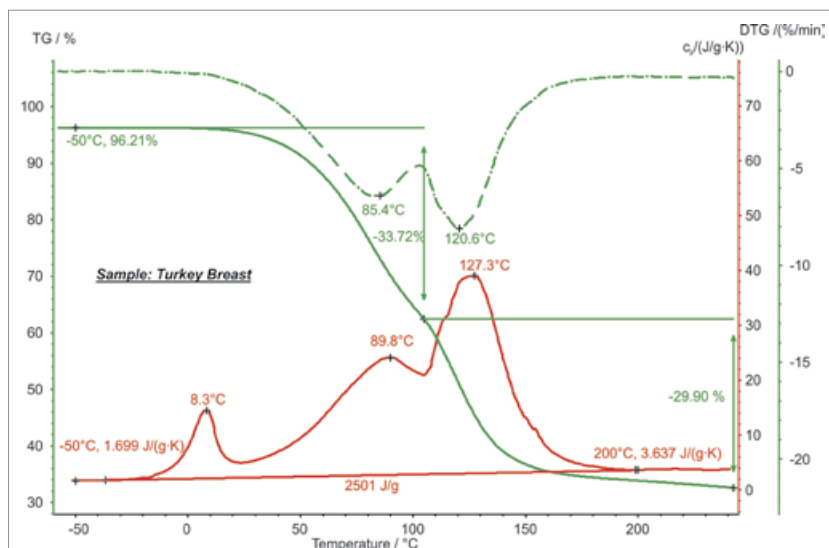
APPLICATION SHEET

ORGANICS – FOOD

TURKEY MEAT

Thermal Analysis offers powerful tools for the investigation of food and its packaging materials: using Thermogravimetry (TG) and Differential Scanning Calorimetry (DSC), for example, drying, aging, thermal stability, melting and other phase transformations, purity, the influence of addi-

tives and the specific heat capacity can be studied. The following example describes simultaneous TG+DSC (=STA) measurements on turkey breast meat which revealed mainly the moisture content as well as the temperature-dependent specific heat c_p .



Instrument

STA 449 C Jupiter®

Test Conditions

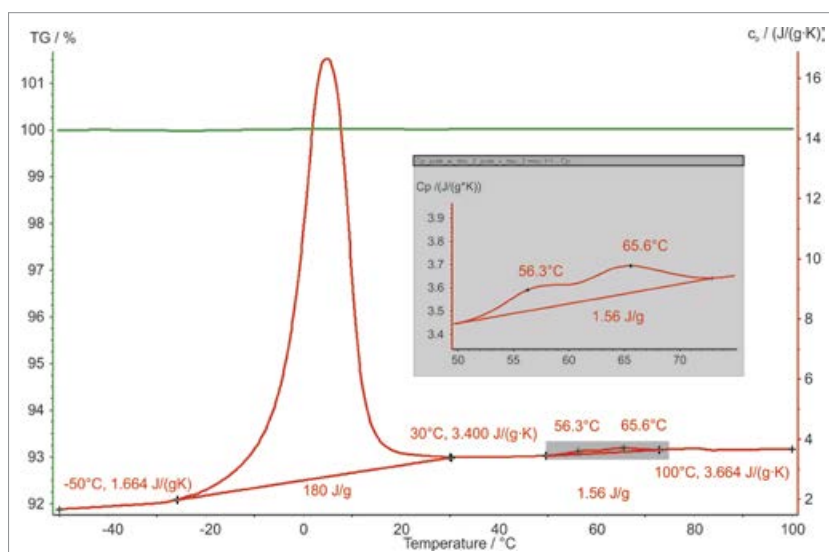
Temperature range	50°C ... 240°C
Heating/cooling rates	10 K/min
Atmosphere	Helium at 70 ml/min
Sample mass	approx. 25 mg
Crucible	Aluminium
Sensor	TG-DSC type E

Results

Depicted in figure 1 (page 1) above are the temperature-dependent mass change, rate of mass change and specific heat of a turkey breast sample measured with a crucible with pierced lid. Prior to starting the measurement, the sample lost 3.8% of its initial weight because of drying of the sample. Upon heating to 240°C, two mass-loss steps of 33.7% and 29.9% were observed which are due to the evaporation of moisture and the beginning pyrolysis of the sample. Maxima in the rate of mass change occurred at 85°C and 121°C. The specific heat was 1.7 J/(g·K) at -50°C. Between -20°C and 200°C, the c_p curve is dominated by the melting peak at 8°C and further endothermic peaks at 90°C and 127°C which are related to the mass loss. The entire enthalpy of these endothermic effects is 2.5 kJ/g. At 200°C a c_p value of 3.6 J/(g·K) was measured.

APPLICATION SHEET

ORGANICS – FOOD



The figure above shows the result of another STA measurement with a sealed crucible. Below ~100°C where the crucible remains closed, no mass changes were observed. The cp curve is in accordance with the measurement of the first figure: 1.7 J/(g·K) at -50°C, 3.4 J/(g·K) at 30°C and 3.7

J/(g·K) at 100°C. Apart from the melting peak of water with an enthalpy of 180 J/g, further two overlapping endothermic peaks at 56°C and 66°C with an entire enthalpy of 1.6 J/g were observed. These effects could be due to melting of fat or denaturation of the protein content.