**Thermal degradation of citrus pectin - Influence of acidic and alkaline pre-treatment**

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Thermal degradation of dry pectin powder has been described as a process of demeth­oxylation and depolymerisation during storage for two weeks at temperature > 50 °C and relative humidity (RH) of > 60 %1. Apart from the environmental conditions T and RH, also physical and molecular characteristics of pectin seemed to affect the extent of the reactions. However, this thermal degradation was examined without considering the course of the reaction. Based on this work as well as on other studies, particularly on pectin-water interactions2,3, it was concluded that a modification of pectin (to tailor specific functional properties) can have a major influence on the thermal degradation, too. Commercial pectin samples used in the latter study3 may have varied in processing conditions and botanical origin and, thus, the results might have been additionally affected by other factors. Therefore, the aim of the present study was to investigate the impact of defined pectin modifications and the resulting molecular structures on the course of the thermal degradation and on the properties of the degraded pectins.

Commercial high-methoxylated citrus pectin was demethoxylated to 60 and 40 % degree of methoxylation (DM) either by an acidic procedure using HCl or by an alkaline procedure using NaOH. To ensure that material properties resulting from precipitation, drying and mil­ling were similar, the commercial pectin has also been dissolved, re-precipitated and milled. All samples were stored in a climate chamber at 60 °C and 80 % RH for four weeks. Samples were collected every seven days. DM, galacturonan content (GC), intrinsic viscosity (IV) and colour were determined and the samples were investigated for their thermal stability by DSC/TG.

Course of degradation and final properties of the pectin samples differed considerably depending on the type of modification. Samples from acidic demethoxylation were most rapidly degraded and showed the lowest final values for DM and IV. All other samples showed a slower rate of degradation and lower extents of demethoxylation and depoly­merisation after thermal treatment. In thermal analysis, the DTG-curve of all samples of thermally treated pectin shifted to a lower temperature, indicating a decrease in thermal stability. The extent of this shift differed in dependence on the modification, too.

In summary, it must be assumed that the extent of the different reactions leading to degradation of pectin during thermal treatment (i.e. demethoxylation or different depoly­merisation reactions) depends on the molecular parameters of the pectin with the DM playing a major role..

*References:*

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