Composted urban wastes and the humic acid (HA)-like fractions isolated from them have been studied by CPMAS $^{13}$C-NMR spectroscopy. The quantitative changes in the major macromolecular domains (alkyl, O-alkyl, H-aromatic and hetero-substituted aromatic) of the HA-like fractions were recorded in the course of 49-day industrial composting, in order to assess to which extent this process has lead to the formation of active colloidal material comparable to soil humus substances, as well as to establish relationships with the compost maturity defined in terms of plant production in field experiments.

The $^{13}$C NMR of the whole compost at progressive transformation stages showed no clear trends: Composting causes simultaneous decrease of all C-types, and extended composting does not lead to the accumulation of predominantly aromatic colloidal material structurally comparable to soil HAs.

The HA isolated before and after composting show a strongly aliphatic character indicated by the large signal intensity in the 0-45 ppm chemical shift range. However, it is noteworthy that the prominent carbohydrate signals in the 60-105 ppm range of the HA from the fresh urban waste almost completely disappeared from the spectrum of the compost HA. Another change during composting in the spectral profile is the concentration in alkyl carbons, indicating polymethylene structures with unexpected stability against degradation. Even after composting, no increase was observed in the concentration of carboxyl groups or aromatic structures. Due to the dominant polyalkyl domain of the material under study, most of the signals in the aromatic/alkenoic region (120-155 ppm) might correspond to unsaturated fatty acids (physically occluded, esterified and/or C-C linked via typical condensation reactions of olefinic double bonds). In addition, this low-intensity region can include resonances of lignin carbons such as C$_{1}$ and C$_{2}$ in syringyl, and C$_{1}$ in vanillyl units. As indicated above, lignin—in addition to some hemicellulose and protein—contributes to the intensity of the 56 ppm methoxyl signal, whereas the major peak at 33 ppm is mainly due to alkyl carbons such as those in waxes, polyesters and, to a some extent, polypeptides.