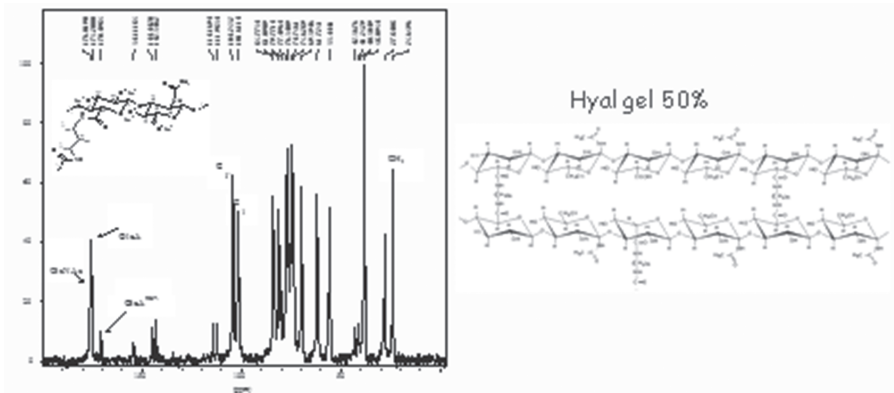


**Fig. 7.** Reaction scheme for the formation of the Hyal Hydrogel. The reaction involves the formation of an amide bond between the carboxylic groups of the polymer and the amine group of the diamine by using EDC and NHS as chemical activators (Adapted from Barbucci et al. 2000).



**Fig. 8.** NMR spectrum of the Hyal hydrogel with the figure of the homogeneous structure with alternating crosslinked arm (Adapted from Barbucci et al. 2006).

## Organization of Water and Polymer-water Interactions

It is well known, that equilibrium water content as well as state of water, influence the properties of the hydrogel. In fact, as we have already said, given the paucity of the amount of solid material, polymer and cross-linking agent, present in a hydrogel which is also less than 5% of the mass, the properties and characteristics of a hydrogel depend on the organization of water. The characteristics of water in the hydrogel are primarily determined by specific polymer–water interactions and by geometrical confinement of water in the walls of the hydrogel.

A better understanding of these topics is of fundamental importance for improving our knowledge on the structure–property relationships in hydrogels. Water in hydrogels has very often been divided, on the basis of the different experimental techniques,