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Identificación de la tesis

1.Título y subtítulo. **“Caracterización estructural de fibras lyocell y su comportamiento frente a procesos de degradación”**	
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SUMMARY

In the last decades there has been great scientific and technological interest in the development of new methods of spinning cellulosic fibres. The technologies applied for this purpose should satisfy not only the economical requirements but also the modern ecological standards. To date only the NMMO process, based on the use of the N-methylmorpholine-N-oxide hydrate solvent offers a commercially viable alternative to the existing method of production of solvent-spun cellulosic fibres. The product has appeared in the market under the generic name of lyocell (CLY), and offers over conventional viscose fibres an easy and environmentally friendly production process.

Due to the recent appearance of lyocell fibres, the purposes of this work was to achieve a better understanding of their structure, to explain their special physical properties and behavior under finishing treatments like fibrillation, dyeing, enzyme. Moreover, it has been investigate the effects of direct dyeing, enzyme and fibrillation treatments on the properties of lyocell fibres.

In the chapter II of the present study lyocell fibres have been characterised by Fourier transform infrared spectroscopy (FT-IR) and thermal analysis, using differential scanning calorimetery (DSC) and thermogravimetric analysis (TG). The FT-IR absorption bands are assigned mainly to crystalline cellulose II and amorphous cellulose, and the results show that lyocell fibres are more crystalline than the viscose-type fibres. On the order hand, the thermal analysis indicate that lyocell is thermally the most stable compared with traditional viscose fibres (modal and viscose).

In the chapter III, it has been characterised the influence of lyocell fibre structure on the main influencing parameter in the yield of dyeing with direct dyes through the study of equilibrium isotherms with C.I. direct blue 1 dye. The free internal volume has been calculated for the lyocell fibre. The thermodynamics parameter calculated that govern the dyeing process, states that the dyeing of lyocell fibres presents less stability, namely less energetic bonds between dye and fibre than other regenerated cellulosic fibres, probably due to the more crystallinity and high orientation of lyocell fibres. A model has been developed that predicts the experimental results satisfactorily.

On the other hand, in the chapter IV, the kinetic of the enzymatic hydrolisis of lyocell fibres with cellulases enzymes have been determined. Kinetic parameters were calculated from the experimental results during cellulase treatment of lyocell and compared with those obtained for modal and viscose fibres. On comparing regenerated fibres, the lyocell samples have the minimum reaction rate. These differences between regenerated cellulose fibres can be explained by more crystalline and less accessible structure of lyocell.

Finally, in the chapter V, the influence of fibrillation and defibrillation treatments on the mechanical, structural, dyeing and reactivity to enzymes properties have been studied. Stress-strain curves, dyeability, enzyme kinetics, morphology by SEM and crystallinity by FTIR have been evaluated. It has been observed that the physic-mechanical treatment of fibrillation produces extensive fibrillation on the surface of the lyocell fibres, while those that were enzyme treated appear smoother. Both treatments cause a significant decrease of the tenacity of lyocell yarn, particulary after the treatment. The dyeability study with C.I. direct blue 1 shows that the dyeing rate increases with both treatments compared with the untreated fabric, and it is bigger after fibrillation treatment. After fibrillation treatment the fibres are more easily degraded by the cellulases enzyme, due to the increase of the specific surface of the fibre. FTIR spectroscopy results indicate that decrystallization takes place on treatments.