

ÍNDICE DE CONTENIDO

Agradecimientos	3
Resumen.....	5
Resum.....	7
Abstract	9
Fórmulas.....	15
Abreviaciones.....	17
I. Introducción.	21
I.1. Polímeros y el impacto medioambiental asociado.....	23
I.2. Clasificación de polímeros.....	26
I.2.1. Polímeros de origen petroquímico no biodegradables.....	31
I.2.2. Polímeros de origen petroquímico biodegradables.....	33
I.2.3. Polímeros de origen renovable no biodegradables.....	36
I.2.4. Polímeros de origen renovable biodegradables.....	37
I.3. Tecnología del ácido poliláctico (PLA).....	41
I.3.1. Introducción al PLA.....	41
I.3.2. Obtención del PLA.....	44
I.3.3. Características principales del PLA.....	49
I.3.4. Industria del PLA.....	53
I.3.5. Limitaciones del PLA.....	64
I.4. Soluciones a las limitaciones del PLA.....	65
I.4.1. Utilización de copolímeros / oligómeros.....	65
I.4.2. Utilización de mezclas de materiales (blends).....	71
I.4.3. Plastificantes.....	74
I.4.4. Otras técnicas de modificación.....	78
I.5. Aplicaciones del PLA en la industria.....	81
II. Objetivos.....	87
II.1. Objetivos globales.....	89
II.2. Objetivos parciales.....	89
III. Resultados y discusión.....	93
III.1. Mezclas de PLA con estireno-etileno-butileno-estireno (SEBS).....	97
III.1.1. Introduction.....	105
III.1.2. Materials and methods.....	108
III.1.2.1. Materials.....	108
III.1.2.2. Preparation of PLA/SEBS blends.....	109
III.1.2.3. Characterization of PLA/SEBS blends.....	110
III.1.3. Results and Discussion.....	111
III.1.3.1. Mechanical properties of PLA/SEBS blends.....	111

III.1.3.2. Morphology of PLA/SEBS blends.	114
III.1.3.3. Thermal Properties of PLA/SEBS blends.	116
III.1.3.4. Dynamic mechanical behaviour of PLA/SEBS blends.	118
III.1.4. Conclusions.	122
III.1.5. References.	123
III.2. Mezclas de PLA con policarbonato (PC).	131
III.2.1. Introduction.	139
III.2.2. Materials and methods.	142
III.2.2.1. Materials.	142
III.2.2.2. Preparation of PLA/PC blends.	142
III.2.2.3. Characterization of PLA/PC blends.	144
III.2.3. Results.	145
III.2.3.1. Mechanical properties PLA/PC blends.	145
III.2.3.2. Morphology of PLA/PC blends.	147
III.2.3.3. Thermal properties of PLA/PC blends.	149
III.2.3.4. Dynamic mechanical behavior of PLA/PC blends.	152
III.2.3.5. Color measurement and wetting properties of PLA/PC blends.	153
III.2.4. Conclusions.	155
III.2.5. References.	156
III.3. Mezclas de PLA con oligómero de ácido láctico (OLA).	161
III.3.1. Introduction.	169
III.3.2. Materials and methods.	171
III.3.2.1. Materials.	171
III.3.2.2. Preparation of PLA/OLA blends.	172
III.3.2.3. Characterization of PLA/OLA blends.	173
III.3.3. Results.	174
III.3.3.1. Mechanical properties of PLA/OLA blends.	174
III.3.3.2. Morphology of PLA/OLA blends.	177
III.3.3.3. Chemical properties of PLA/OLA blends.	179
III.3.3.4. Thermal properties of PLA/OLA blends.	180
III.3.3.5. Dynamic mechanical properties of PLA/OLA blends.	183
III.3.3.6. Color properties of PLA/OLA blends.	184
III.3.3.7. Wetting properties of PLA/OLA blends.	186
III.3.4. Conclusions.	186
III.3.5. References.	187
III.4. Plastificación de PLA con monoterpenoides no esterificados.	197
III.4.1. Introduction.	203
III.4.2. Experimental.	205
III.4.2.1. Materials.	205

III.4.2.2. Theoretical solubility parameters of PLA and monoterpenoids.....	205
III.4.2.3. Preparation of PLA formulations with monoterpenoids.....	207
III.4.2.4. Characterization of PLA and monoterpenoids.	208
III.4.3. Results and Discussion.....	210
III.4.3.1. Mechanical properties of plasticized PLA.	210
III.4.3.2. Thermal properties of plasticized PLA.....	212
III.4.3.3. Dynamic mechanical thermal properties of plasticized PLA.	215
III.4.3.4. Chemical properties of plasticized PLA.....	217
III.4.3.5. Morphological properties of plasticized PLA.	218
III.4.3.6. Wetting properties of plasticized PLA.	219
III.4.3.7. Color properties of plasticized PLA.	220
III.4.4. Conclusions.	222
III.4.5. References.	223
IV. Conclusiones.....	229
IV.1. Conclusiones generales.	231
IV.2. Conclusiones parciales.....	232
V. Anexos.....	237
V.1. Referencias	239
V.2. Listado de figuras	260
V.3. Listado de tablas.....	263