
Introducción general	1
1.1. Estado actual de la acuicultura	3
1.1.1. La acuicultura en España	5
1.2. Materias primas	6
1.3. Fuentes alternativas	10
1.3.1. Sustitución proteica	10
1.3.2. Sustitución lipídica	12
Bibliografía	19
Objetivos y plan de trabajo	27
Combined replacement of fish meal and oil in practical diets for fast growing juveniles of gilthead sea bream (<i>Sparus aurata</i> L.): Networking of systemic and local components of GH/IGF axis	37
3.1. Introduction	40
3.2. Materials and methods	41
3.2.1. Diets	41
3.2.2. Growth trial and fish sampling	42
3.2.3. Chemical composition analyses	44
3.2.4. GH and IGF-I radioimmunoassay	47
3.2.5. RNA extraction and RT procedure	47
3.2.6. Real-time PCR	48
3.2.7. Statistics	49
3.3. Results	49
3.4. Discussion	57
References	63
High levels of vegetable oils in plant protein-rich diets fed to gilthead sea bream (<i>Sparus aurata</i> L.): growth performance, muscle fatty acid profiles and histological alterations of target tissues	71
4.1. Introduction	74
4.2. Materials and methods	76
4.2.1. Diets	76
4.2.2. Growth trial and tissue sampling	76
4.2.3. Histology and tissue lipid content determinations	77
4.2.4. Fatty acid analyses	80
4.2.5. Statistical analyses	81

4.3. Results	81
4.3.1. Growth performance.....	81
4.3.2. Tissue fat deposition and histological alterations.....	83
4.3.2. Tissue fat deposition and histological alterations.....	84
4.3.3. Muscle fatty acid profile.....	85
4.4. Discussion.....	91
References	95
Tissue-specific robustness of fatty acid signatures in cultured gilthead sea bream (<i>Sparus aurata</i> L.) fed practical diets with a combined high replacement of fish meal and oil	
	103
5.1. Introduction	106
5.2. Materials and methods.....	107
5.2.1. Diets.....	107
5.2.2. Growth trial and tissue sampling.....	107
5.2.3. Lipid analysis.....	109
5.2.4. Statistical analysis	110
5.3. Results	111
5.3.1. Growth performance.....	111
5.3.2. Tissue lipid content.....	111
5.3.3. FA composition	113
5.4. Discussion.....	121
Literature cited.....	125
The time course of fish oil wash-out follows a simple dilution model in gilthead sea bream (<i>Sparus aurata</i> L.) fed graded levels of vegetable oils	
	131
6.1. Introduction	134
6.2. Matherials and methods.....	135
6.2.1. Diets.....	135
6.2.2. Growth-out trial	135
6.2.3. Fish oil finishing trial and sampling protocol.....	138
6.2.4. Proximate analyses	138
6.2.5. FA analyses	138
6.2.6. Dilution model.....	139
6.2.7. Statistical analysis	140
6.3. Results	140
6.3.1. Growth performance.....	140
6.3.2. Lipid content and tissue FA profile	142

6.4. Discussion.....	149
Literature cited.....	153
Discusión general	157
7.1. Crecimiento y nivel de sustitución de aceites de pescado	159
7.2. Criterios de sostenibilidad. Análisis “FIFO”	167
7.3. Valor nutritivo del producto final. Cinéticas de ácidos grasos	169
7.4. Análisis instrumental “nariz electrónica”	174
7.5. Seguridad alimentaria	177
7.6. Salud y bienestar animal.....	182
7.7. Análisis global	185
Bibliografía	189
Conclusiones.....	197
Resúmenes.....	201
