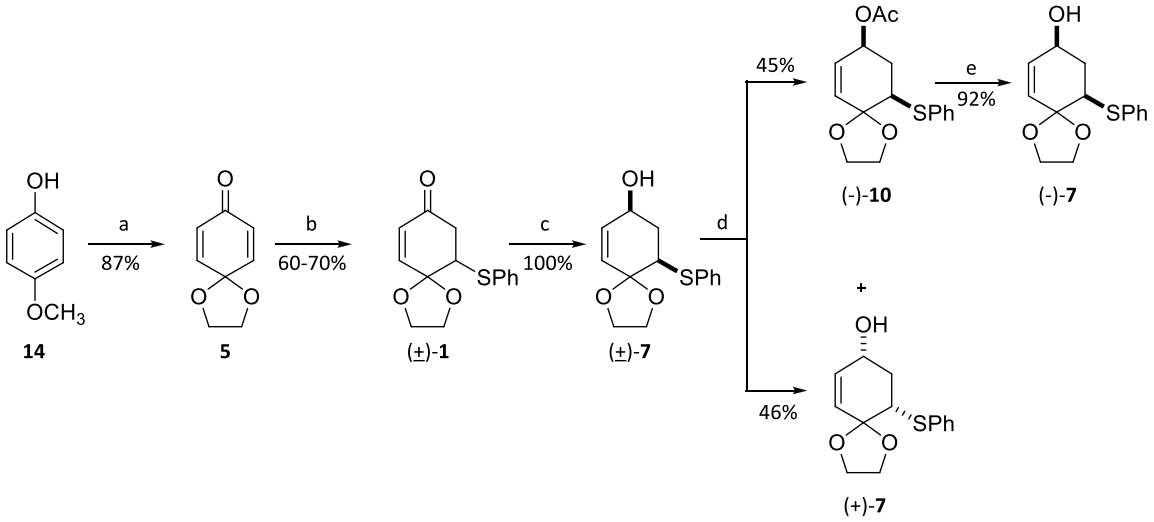
1. SUMMARY

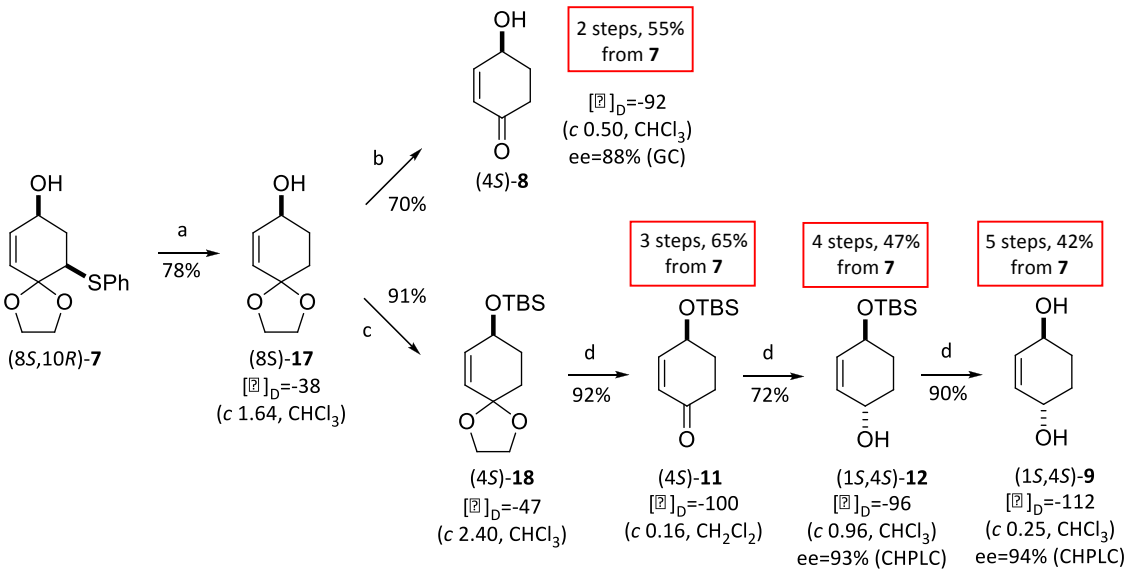
In this thesis a methodology for the preparation of both enantiomers of **7** in a 10 g scale as been established by taking advantage of an enzymatic acetylation to resolve the racemate (Scheme 76). These chiral alcohols have been used as starting materials for the synthesis of diverse natural products with potential biological properties, as well as interesting chemical intermediates.



Reagents and conditions: (a) PIFA, $HOCH_2CH_2OH$, CH_2Cl_2; (b) PhSH, $LiOH{\cdot}H_2O$, $CHCl_3$ reflux; (c) $NaBH_4$, CH_2Cl_2/CH_3OH; (d) Novozyme®435, $CH_3CO_2CH{=}CH_2$, diisopropyl ether; (e) NaOMe, CH_3OH.

Scheme 76. Synthesis of (+)- and (-)-**7**.

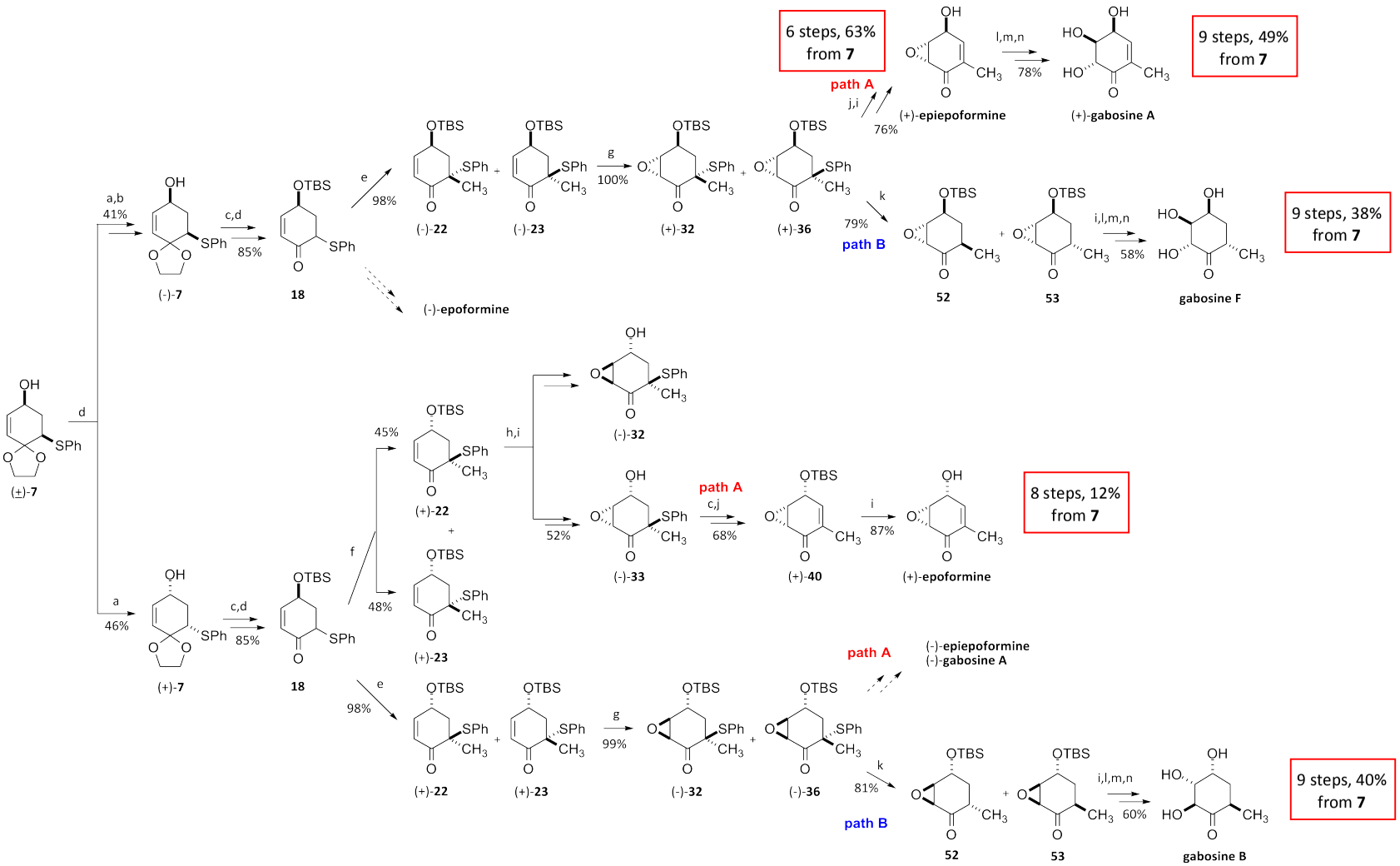
First, we dealt with the synthesis of both enantiomers of the 4-hydroxy-2-cyclohexenone, (+)- and (-)-**8**, and their silyl ethers (+)- and (-)-**11**. Application of the synthetic sequence depicted in Scheme 77 starting from (8*S*,10*R*)-**7** delivered the levorotatory enantiomer (4*S*)-**8** in 2 steps and 48% yield, and, the levoratory derivative (4*S*)-**11** in 3 steps and 57% yield. The practical syntheses developed in our laboratories deliver these compounds in high enantiomeric excesses and good yields. Moreover, the multigram scale preparation favours their use as precursors for the synthesis of more complex molecules with potential biological activity. Starting from ketone (4*S*)-**11**, the syntheses of both antipodes of *trans*-cyclohex-2-ene-1,4-diol, (+)- and (-)-**9**, and its silyl ether (+)- and (-)-**12**, which are very important intermediates in the synthesis of organic compounds as well as in polymer chemistry. Their syntheses have been successfully carried out in 65% and 72% yield, respectively, improving the previously published works.



Reagents and conditions: (a) Bu_3SnH, AIBN, toluene; (b) montmorillonite K-10, CH_2Cl_2; (c) TBS-im., CH_2Cl_2.

Scheme 77. Synthesis of (4*S*)-**8**, (4*S*)-**11** (1*S*,4*S*)-**12** and (1*S*,4*S*)-**9**.

On the other hand, both enantiomers of **7** were our material of choice to undertake a systematic synthesis of gabosines and anhydrogabosines through a sterodivergent strategy involving an oxidation/pyrolysis or a reduction of the C-S bond. The oxidation/pyrolysis pathway (path A) allowed the synthesis of (+)- and (-)-epiepoformin, (+)- and (-)-epoformin and (+) and (-)-gabosine A (Scheme 78). Finally, reduction of C-S bond (path B) delivered gabosines B and F.



Reagents and conditions: (a) Novozyme 435®, $CH_3CO_2CH{=}CH_2$, diisopropyl ether; (b) NaOMe, CH_3OH; (c) TBSCl, imidazole, CH_2Cl_2; (c) Montmorillonite K-10, CH_2Cl_2; (e) CH_3I, NaH, THF; (f) CH_3I, K^tBuO, THF; (g) ^{t}BuOOH, Triton B, THF; (h) H_2O_2, Triton B, THF; (i) $Et_3N{\cdot}3HF$, THF (j) i) *m*-CPBA, $CHCl_3$, ii) $CHCl_3$ reflux; (k) Bu_3SnH, AIBN, toluene; (l) Ac_2O, DMAP, ACN; (m) $BF_3{\cdot}Et_2O$, toluene; (n) MeONa, CH_3OH.

Scheme 78. Synthesis of (+)- and (-)-epiepoformin, (+)- and (-)-epoformin, (+)- and (-)-gabosine A, gabosine F and gabosine B.