Supplementary material

The impact of different cultivation systems on the content of selected secondary metabolites and antioxidant activity of *Carlina acaulis* plant material

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Table S1. Organogenesis on explants originated from *Carlina acaulis* L. plants.

Organ	Medium	Plant morphology	Percentage of explants regenerating into:	
			Roots	Shoots
Roots	A	glabrous	1.06	6.38
		tomentose	0	0.59
	B	glabrous	0	7.32
		tomentose	3.70	10.37
	C	glabrous	0	0
		tomentose	0	0.67
	D	glabrous	0	0
		tomentose	0	0
	E	glabrous	0	0
		tomentose	0	0
Leaves	A	glabrous	3.75	0
		tomentose	0.88	0
	B	glabrous	0	0
		tomentose	0	0
	C	glabrous	0	0
		tomentose	0	0
	D	glabrous	0	0
		tomentose	0	0
	E	glabrous	0	0
		tomentose	0	0

Table 2. Physical characteristics of callus tissue formed on *Carlina acaulis* L. explants.

Medium	Plant morphology	Characteristics of callus formed on explants:	
		Leaves	Roots
A	glabrous	compact, hard, grainy, light green	compact, hard, grainy, cream / beige / light green
	tomentose	compact, hard, grainy, light green / cream	compact, hard, grainy, cream / light green
B	glabrous	friable, grainy, moist, cream	friable, grainy, moist, cream / beige
	tomentose	friable, grainy, moist, cream	friable, grainy, moist, cream / beige
C	glabrous	hard, grainy,moist, cream	hard, grainy, moist, cream / beige
	tomentose	hard, grainy,moist, cream	hard, grainy, moist, cream / light green
D	glabrous	hard, grainy, moist, cream	soft, grainy, moist, cream / beige
	tomentose	hard, grainy, moist, cream	soft, grainy, moist, cream / light green
E	glabrous	soft, grainy, moist, cream / light green	soft, grainy, moist, cream / light green
	tomentose	soft, grainy, moist, cream	soft, grainy, moist, cream / beige

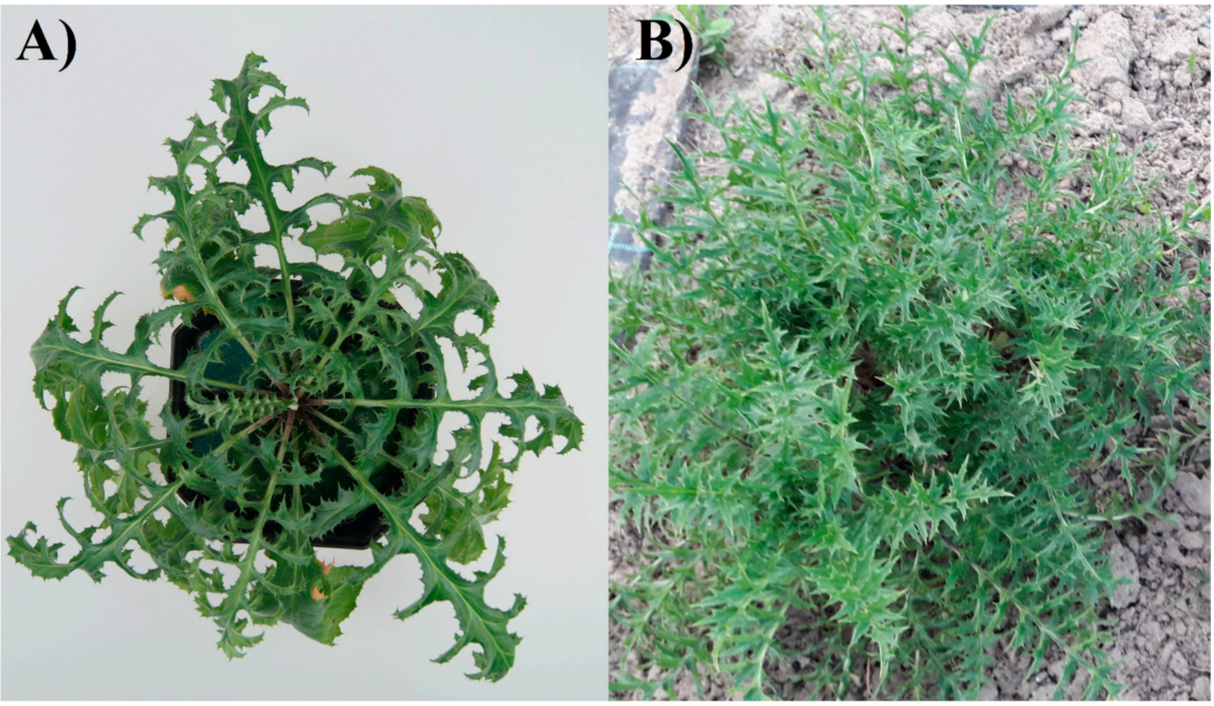

Figure S1. Photographs of examples of *Carlina acaulis* L. plants obtained in hydroponic cultures (A) and soil cultivation (B).

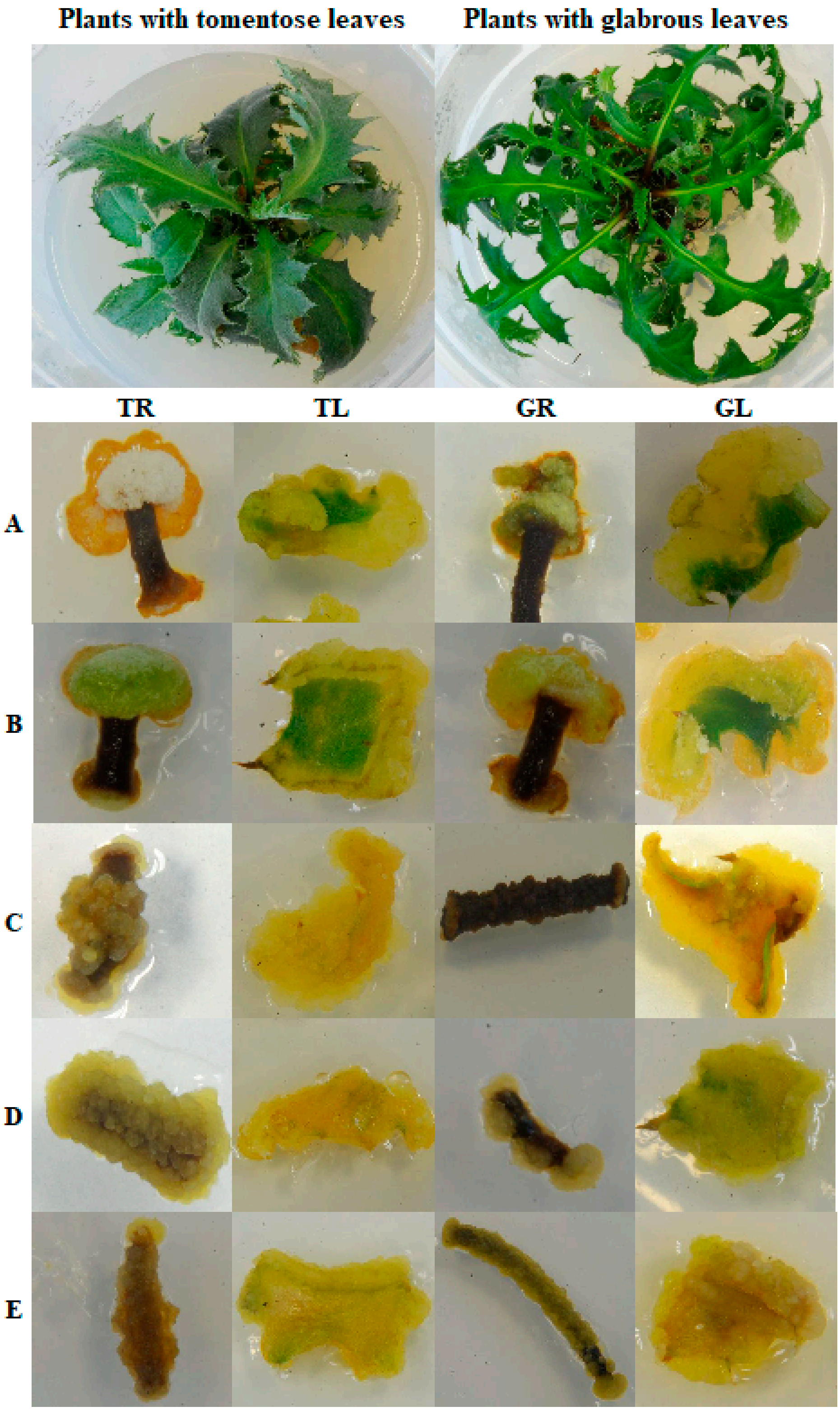

Figure S2. Photographs of sample callus tissues obtained from the roots and leaves of *Carlina acaulis* L. plants, using A-E media.