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Introduction

In the framework of a project ("Tropical Plant Factory/METABO") aiming to valorize high-added value bioactive metabolites obtained from tropical plants grown into greenhouses, twenty five plant species belonging to the Euphorbiaceae family were obtained from "Tropical Plant Factory/Plant HP" project - ULiège/InBioS, from Meise Botanic Garden collections, from "Observatoire du Monde des Plantes" collections - ULiège and from our pharmacognosy lab collection.



Figure 1 Growing *Euphorbia peplus* (Plant HP/Tropical Plant Factory project) - Meise Botanic Garden (Brussels) - Observatoire du Monde des Plantes (Sart Tilman)

Methodology

A total of 40 samples were collected and dichloromethane as well as methanol crude extracts were prepared from each of them.

Their cytotoxic activity was evaluated *in vitro* on two human cancerous cell lines (MDA-MB-231 breast carcinoma and A2058 melanoma), using the Presto Blue assay (time = 72h). Two doses (10µg/ml and 50µg/ml) of each extract were tested in triplicate (n=1) and the growth inhibition was calculated.

The activities were classified into three levels according to the IC₅₀ (promising : < 10µg/ml ; moderate: 10-50µg/ml ; weakly or not active : > 50µg/ml).

Results

Almost all the tested species were found cytotoxic towards the A2058 melanoma cells with a promising cytotoxic activity detected for 10 of them (*Jatropha gossypifolia*, *Euphorbia griffithii*, *Euphorbia grandicornis*, *Euphorbia ingens*, *Euphorbia tirucalli*, *Euphorbia esula*, *Euphorbia candelabrum*, *Euphorbia lathyris*, *Jatropha curcas*, *Euphorbia paganorum*), while 13 species were moderately active.

On the contrary, none of the tested Euphorbiaceae species was found highly active against MDA-MB-231 breast carcinoma cells, while ten of them showed only moderate cytotoxic properties against this cell line. Our results indicate a potent cytotoxicity and selectivity against melanoma cancer cells for active extracts obtained from Euphorbiaceae plants.



Figure 2 Active *Euphorbia* species (from right to left)
Euphorbia candelabrum, *Euphorbia ingens*, *Euphorbia tirucalli*, *Euphorbia grandicornis*, *Euphorbia paganorum*, *Jatropha gossypifolia*, *Euphorbia lathyris*, *Euphorbia esula*, *Jatropha curcas*, *Euphorbia griffithii*

Cytotoxic activity of Euphorbiaceae extracts (IC₅₀ values in µg/ml)

Sample Number	Euphorbia species	Collected Part	Place of collect	Cell lines		MDA MB 231 (Breast carcinoma)		A2058 (Melanoma)		Extraction Yields	
				DCM extract	MeOH extract	DCM extract	MeOH extract	DCM extract	MeOH extract		
1	<i>Jatropha gossypifolia</i>	Leaves	Burkina Faso	>50	>50	10_50	< 10	1,7 %	6,1 %		
2a	<i>Euphorbia griffithii</i>	Leaves	Vottem	>50	10_50	< 10	< 10	3,7 %	38,5 %		
2b	<i>Euphorbia griffithii</i>	Stem	Vottem	10_50	>50	< 10	>50	2,0 %	16,1 %		
3	<i>Euphorbia grandicornis</i>	Stem (succulent)	Meise (IN)	10_50	>50	< 10	< 10	4,9 %	12,3 %		
4	<i>Euphorbia ingens</i>	Stem (succulent)	Meise (IN)	>50	>50	< 10	< 10	3,6 %	9,9 %		
5a	<i>Euphorbia tirucalli</i> *	Young stems	Meise (IN)	10_50	>50	10_50	< 10	3,0 %	6,4 %		
6a	<i>Euphorbia esula</i>	Leaves (+ flowers)	Meise (OUT)	>50	>50	>50	< 10	5,8 %	21,3 %		
6b	<i>Euphorbia esula</i>	Stem	Meise (OUT)	10_50	>50	10_50	10_50	1,3 %	3,7 %		
7	<i>Euphorbia candelabrum</i>	Stem (succulent)	Meise (IN)	10_50	>50	< 10	< 10	5,4 %	11,5 %		
8	<i>Euphorbia obesa</i>	whole plant	Meise (IN)	ND	ND	ND	ND	ND	ND		
9a	<i>Euphorbia characias subsp characias</i>	Stem	Meise (OUT)	10_50	10_50	>50	10_50	5,0 %	8,0 %		
9b	<i>Euphorbia characias subsp characias</i>	Leaves	Meise (OUT)	>50	10_50	>50	10_50	4,8 %	17,1 %		
10	<i>Euphorbia cyparissias</i>	Aerial parts	Meise (OUT)	ND	ND	ND	ND	7,0 %	11,9 %		
13c	<i>Euphorbia hirta</i>	aerial parts	Plant HP	>50	>50	>50	10_50	4,0 %	23,4 %		
14c	<i>Euphorbia peplus</i>	aerial parts	Plant HP	10_50	10_50	10_50	10_50	5,2 %	16,8 %		
15a	<i>Euphorbia helioscopia</i>	aerial parts	Plant HP	>50	>50	>50	10_50	2,8 %	13,0 %		
16a	<i>Euphorbia lathyris</i>	Leaves + stem	Plant HP	>50	>50	< 10	< 10	2,4 %	22,3 %		
16b	<i>Euphorbia lathyris</i>	Young plant	Plant HP	>50	>50	< 10	< 10	3,7 %	14,6 %		
17	<i>Jatropha curcas</i>	Leaves	Plant HP	>50	>50	< 10	10_50	1,0 %	16,8 %		
18	<i>Euphorbia tirucalli</i> *	Stem + Leaves	Plant HP	>50	>50	10_50	< 10	2,6 %	5,6 %		
19	<i>Euphorbia geroldii</i>	Leaves	OMP	>50	>50	10_50	10_50	4,0 %	26,6 %		
20	<i>Euphorbia stenoclada</i>	Leaves	OMP	10_50	>50	10_50	10_50	3,1 %	10,4 %		
21	<i>Euphorbia milii</i>	Stem + Leaves	OMP	>50	>50	>50	>50	3,1 %	13,3 %		
22	<i>Synadenium compactum = Euphorbia bicompecta</i>	Leaves	OMP	>50	10_50	>50	10_50	7,1 %	7,6 %		
23	<i>Synadenium grantii = Euphorbia umbellata</i>	Leaves	OMP	>50	10_50	>50	10_50	3,1 %	18,5 %		
24	<i>Manihot esculenta</i>	Leaves	OMP	>50	>50	>50	>50	3,7 %	19,1 %		
25	<i>Euphorbia paganorum</i>	aerial parts	Burkina Faso	>50	>50	< 10	< 10	1,6 %	4,7 %		

Conclusions

The results of this preliminary screening indicate a potent cytotoxicity and selectivity against melanoma cancer cells for active extracts obtained from Euphorbiaceae plants. Some of the most active species are actually under studies in our laboratory to isolate the compounds responsible for their promising activity.

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