



# Antioxidant Activities Of Different *Aloe Barbadensis* Extracts

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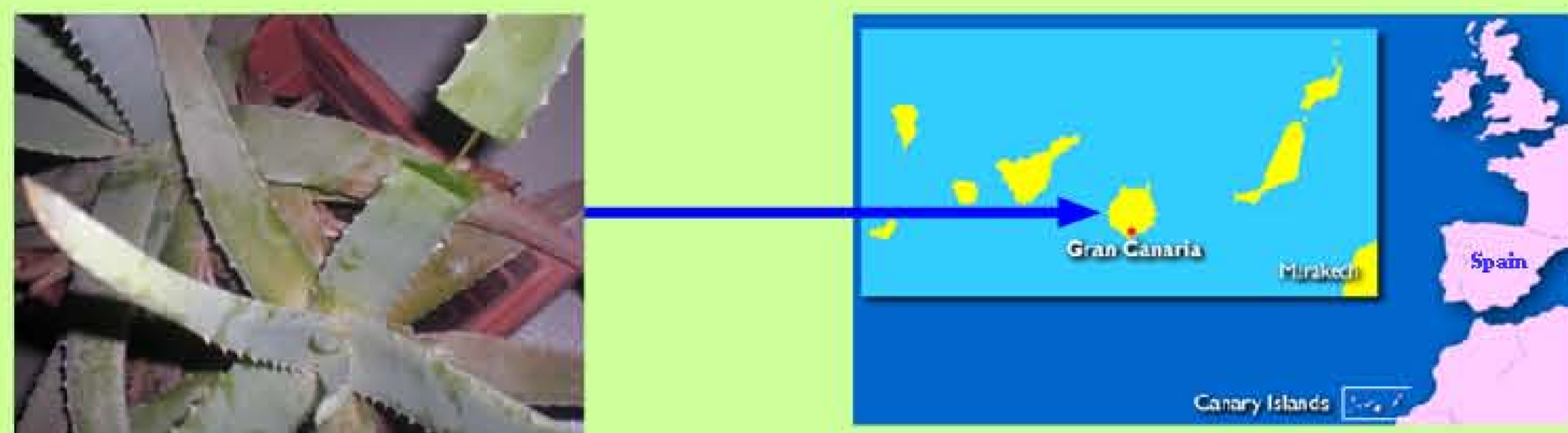
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## Introduction

In the regions of Canary Islands (African Northwestern Coast), it is prevailing all the year a high level of solar radiation and high temperatures (between 17 and 24 degrees). These weather conditions force plants to develop defense mechanisms against ultraviolet radiation and excessive production of free radicals through the accumulation of antioxidant substances such as phenolic compounds. Chemical and taxonomical studies of several species of plants from this region reported not only quality, but also quantity differences in the chemical composition, as compared to the rest of plants found in other areas (1). Phenolic compounds have been reported to improve the quality and nutritional value of food for their disease preventing potential (2) and the effects of different extracting solvents have been tested for the extraction of phenolic compounds from plant material (3). On the present study we compared the yields of extraction, total phenolic contents (TPC) and antioxidant activities of several extracts prepared with 1 gram of lyophilized materials from *Aloe vera*, *Aloe barbadensis* in 20 mL of solvent. In addition, the HPLC phenolic profile was also studied. In the Canary Islands, *Aloe vera* plants growth everywhere, and there is considerable belief in its beneficial action among the general public, being one of the few botanical medications with widespread domestic use.



## Yield

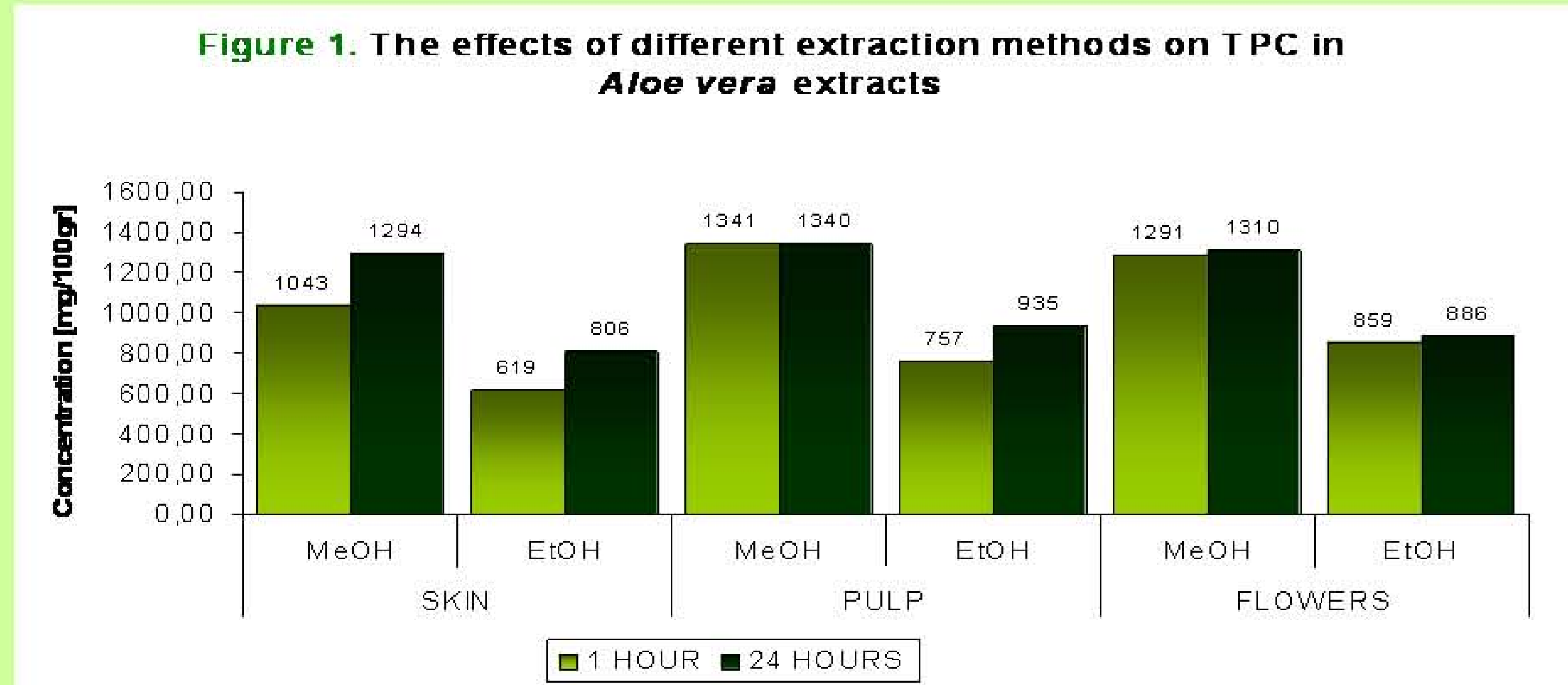
Yields of methanol and ethanol extracts were evaluated and presented in Table 1. As it can be observed, methanol gave the highest yields. These results seem to exhibit that methanol is preferred solvent for extraction of the chemical constituent of *Aloe vera* instead ethanol. The lowest yields were detected when ethanol was used for skin extraction (2.07% and 4.48%).

	Yield (% per 100 g of dry lyophilized plant material)			
	Methanol		Ethanol	
	1hour	24hours	1hour	24hours
Skin	9,25 ± 0,68	13,20 ± 0,19	2,07 ± 0	4,48 ± 0,19
Pulp	43,87 ± 0,95	49,82 ± 0,72	10,77 ± 0,05	18,37 ± 0,24
Flowers	26,00 ± 0,38	33,03 ± 0,24	6,20 ± 0,09	11,50 ± 0,24

Table 1.- The effects of different extraction methods on yield in *Aloe vera* extracts

## Determination of total phenolic contents

TPC was evaluated using the colorimetric Folin-Ciocalteu assay (4). A calibration curve of gallic acid (ranging from 0.050 to 0.9 mg/ml) was prepared (in methanol), and the results, determined by the regression equation of the calibration curve ( $y = 0.00029x - 0.00025$ ,  $r = 0.9992$ ), were expressed as mg gallic acid/100 g dry aloe material. As a general rule, methanol extracts gave higher content of polyphenols than ethanol extracts (Figure 1). No correlation was found between yields and TPC, thus methanol extracts of pulp showed the highest yields (43,87 and 49,82) and TPC, while ethanol extracts of flowers showed much lower yields (6,20 and 11,50) and similar TPC.



In table 2 are showed TPC in fruits and vegetables available in previously reported studies (5) to compare to our results.

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## Acknowledgements

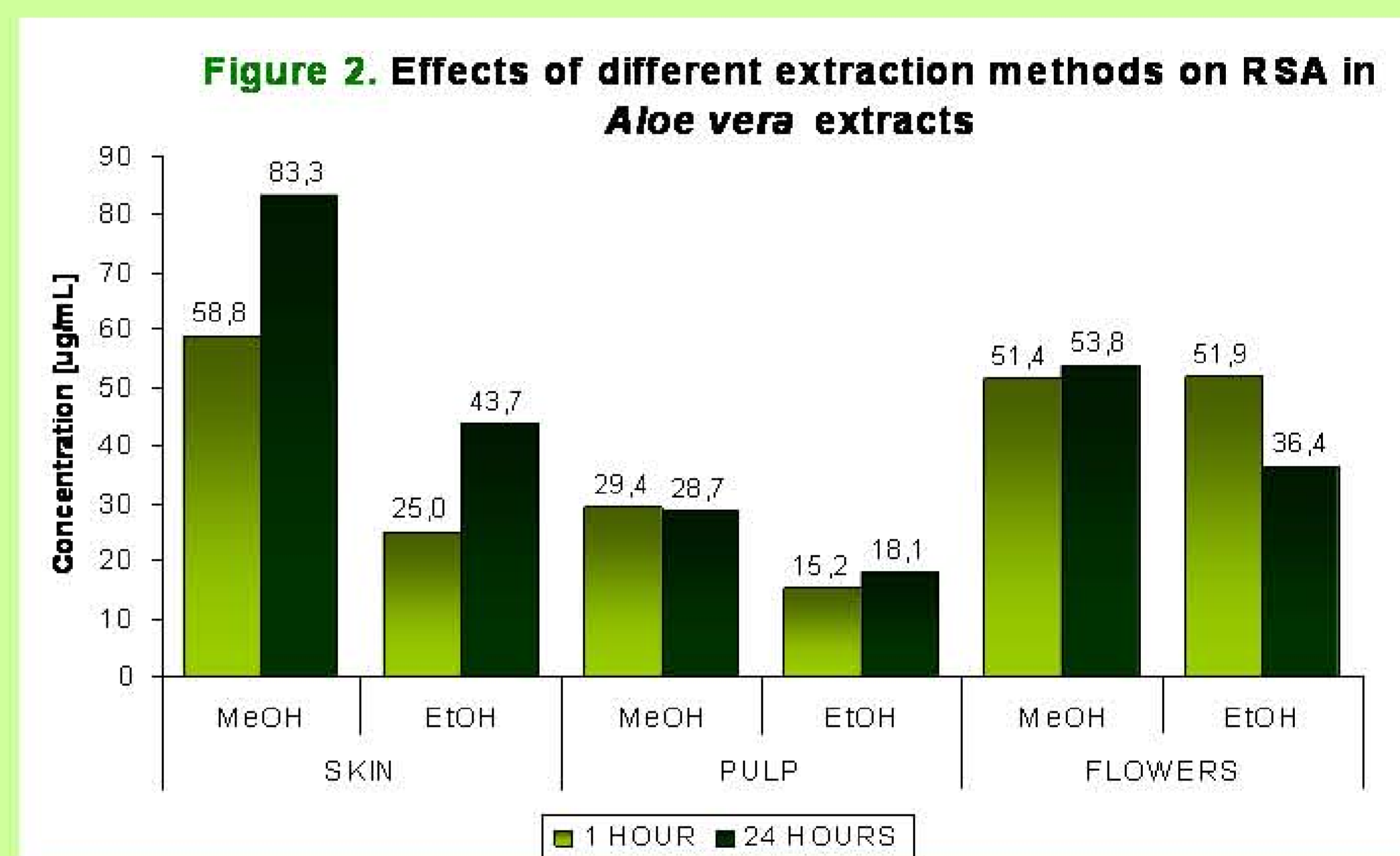
This research was supported by the Caja Insular de Ahorros de Canarias and the Consejería de Vivienda y Arquitectura, Agricultura, Ganadería y Pesca y Agua del Cabildo Insular de Gran Canaria.

Fruits	TPC (mg/100g)	Vegetables	TPC (mg/100g)
Apples "Gala"	964	Brussels sprouts	468
Nectarine	557	Carrot	1485
Plum "Wegierka"	1599	Tomato	1490
White grapes	793	Zucchini	850

Table 2.- Total polyphenol contents in dry mass in several fruits and vegetables

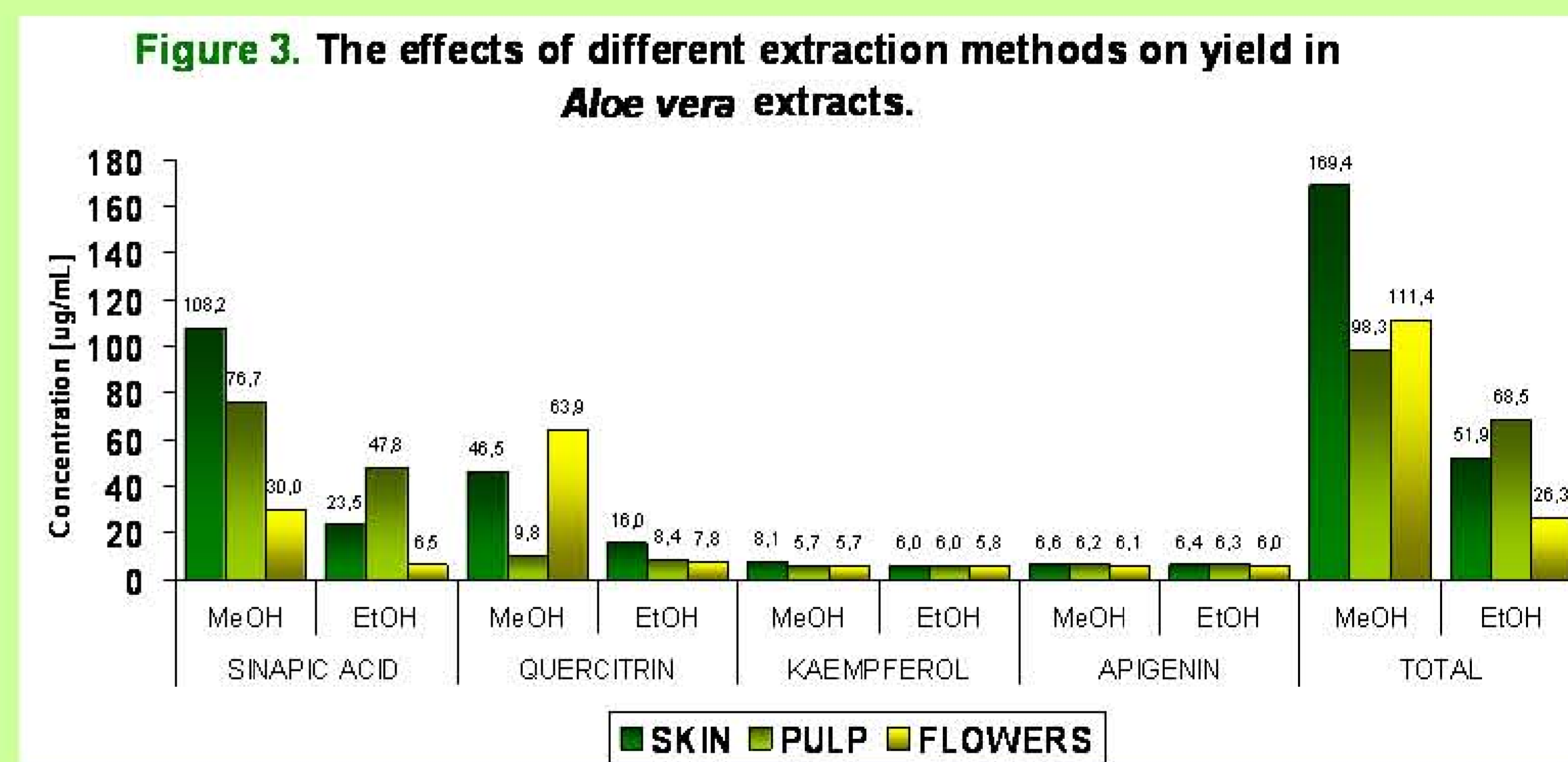
## DPPH radical-scavenging activity

The radical scavenging activity (RSA, %) of extracts on DPPH radicals was calculated by equation:  $RSA = 100 (1 - Abs \text{ in the presence of sample} / Abs \text{ in the absence of sample})$  (6). According to the results in Figure 2, methanol extracts showed the highest activity. By other hand, aloe pulp showed lower RSA than the other analyzed materials. No correlation between TPC and RSA was found.



## Analytical data

The identification and quantification of phenolics were carried out with a rapid and simple method of reverse phase high performance liquid chromatography (Figure 3). Extracts were prepared dissolving 0,100 grams of lyophilized aloe materials in 0,5 mL. Sinapic acid was by far the predominant polyphenol followed by quercitrin, which was superior in methanol extracts derived from flowers. Methanol seems to be better solvent than ethanol to extract these polyphenols in study.



## Conclusion

The extracting solvent significantly affected yields, TPC and RSA of several crude extracts from different plant materials of *Aloe vera*. HPLC analysis showed that polyphenols profiles of extracts depend on the used solvent. Several reports have convincingly shown a close relationship between antioxidant activity and total phenolic content in extracts (7). However, when the correlation between TPC and antioxidant activity of the extracts doesn't exist, it is concluded that phenolic compounds are not responsible of the antioxidant activity (8). Although valid in some cases, the typical approach used to analyze correlations between total antioxidant activity and total phenolics does not reflect the characteristics of phenolics or factors such as differences in the phenolic profiles between samples. The data obtained in this study showed no correlation between TPC and RSA. RP-HPLC analysis demonstrated that each extract has different amounts of phenolics, which have varying antioxidant potential.