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# Portulaca oleracea L.

## in the era of globalisation: a species of great nutraceutical value

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Ethnobotany of purslane (*Portulaca oleracea* L.) in Italy and morpho-biometric analyses of seeds from archaeological sites in the Emilia Romagna Region (Northern Italy)  
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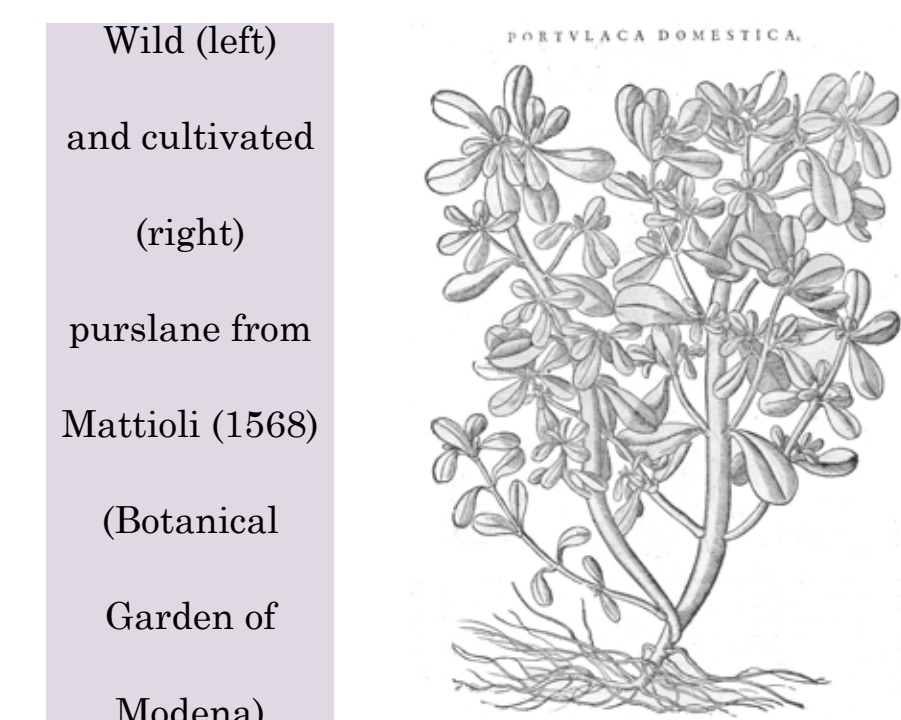
*Portulaca oleracea* L. is a common ruderal, synanthropic, cosmopolitan taxon, highly polymorphic, typical of warm sites (Danin and Raus, 2012; Danin et al., 2014; Danin et al., 2016). In Italy its status as a native species is doubtful (Pignatti, 1982). It is well known since the antiquity for its medicinal and nutrient qualities (Bosi et al., 2009): all parts of the plant have therapeutic properties (Gastaldo, 1987). It has been used for a long time as an analgesic, anti-inflammatory, antipyretic, diuretic, emollient, lenitive and anaphrodisiac. Many of such properties have been recently confirmed; furthermore, *P. oleracea* is very rich in omega-3 polyunsaturated fatty acids (Ezekwe et al., 1999), so that its use is recommended to contrast the excess of fatty acids assumed by fast foods (Picchi and Pieroni, 2005) and its seeds are good to counteract diabetes mellitus (El-Sayed, 2011).



Purslane from Durante (1585)  
(Botanica Garden of Modena)



Fruit of *P. oleracea* with seeds



Archaeological seeds of *P. oleracea* from Parma (10<sup>th</sup> - 11<sup>th</sup> cent. AD - L med: 1 mm)

site	layer	dating (cent. AD)	sample
1	Modena - ex Cassa di Risparmio	trench/30/31	1st 11
2	Modena - Novi Sad - vasca circolare	215	1st-2nd \
3	Classe - condotto idrico	well 3 north - sample 75	2nd-7th \
4	Modena - Palazzo Vaccari	9	5th-6th 10
5	Modena - Palazzo Solfmi	8	10th-11th \
6	Modena - Palazzo Solfmi	9 and ?	10th-11th \
7	Parma - Piazza Garibaldi	165	10th-11th 5.1
8a	Ferrara - Corso Porta Reno-via Vaspergolo	2645	11th 1.4
8b	Ferrara - Corso Porta Reno-via Vaspergolo	2640	11th 1.5
8c	Ferrara - Corso Porta Reno-via Vaspergolo	2659	11th 1.6
8d	Ferrara - Corso Porta Reno-via Vaspergolo	2395	11th-12th 1.7
8e	Ferrara - Corso Porta Reno-via Vaspergolo	217	11th-12th 1.8
9	Modena - Vescovado	112	12th-13th 8
10a	Argenta - via Vinarola-Aleotti	2.2	13th-14th 4.2
10b	Argenta - via Vinarola-Aleotti	2.3	13th-14th 4.3
10c	Argenta - via Vinarola-Aleotti	8.1	13th-14th 4.4
8f	Ferrara - Corso Porta Reno-via Vaspergolo	828	14th-15th 1.10
8g	Ferrara - Corso Porta Reno-via Vaspergolo	1095	14th-15th 1.12
11	Ferrara - Piazza Municipale	1050	15th 2
12	Lugo - Piazza Baracca	593	15th 6

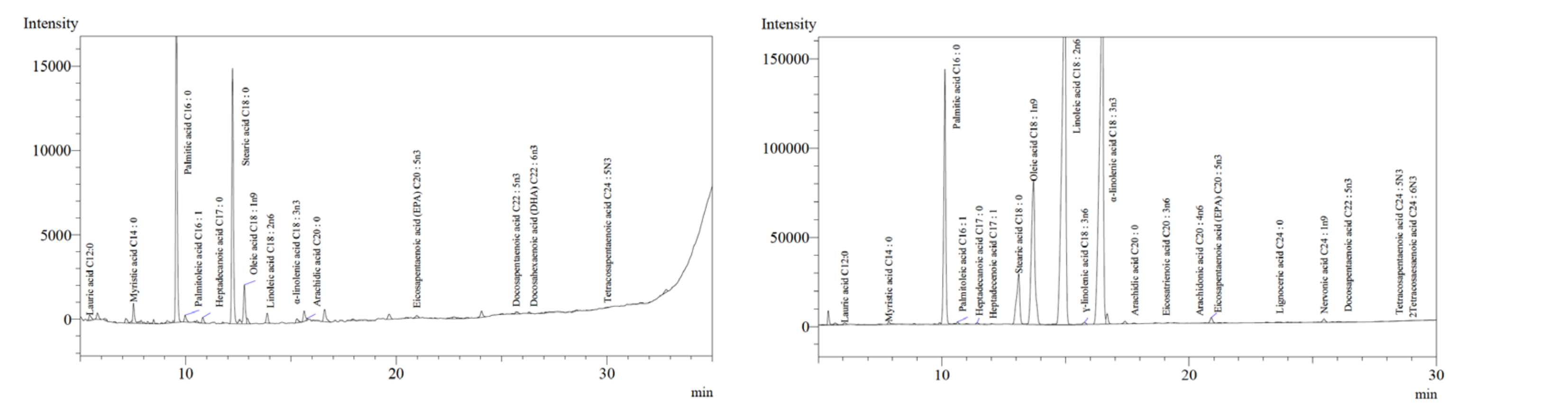
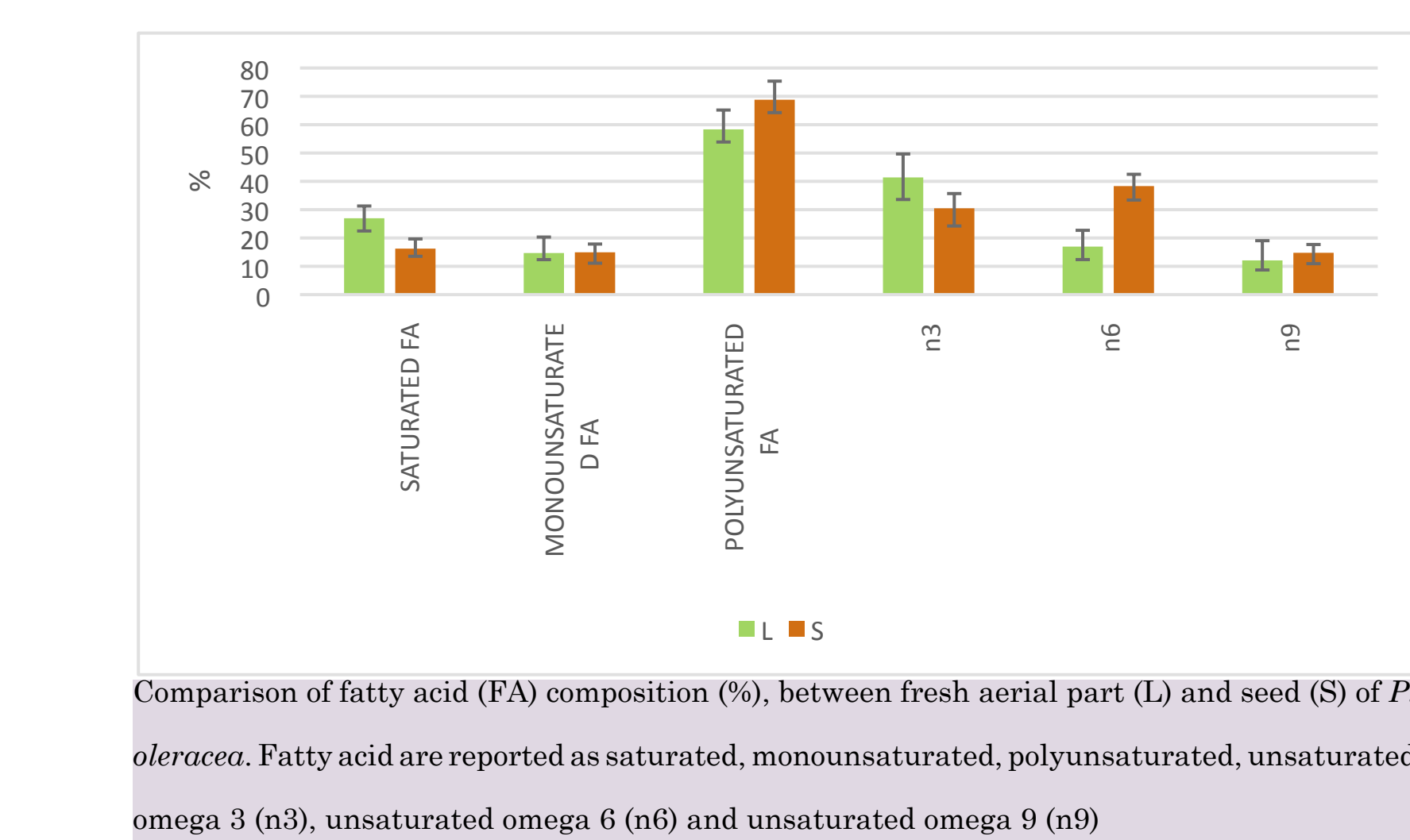
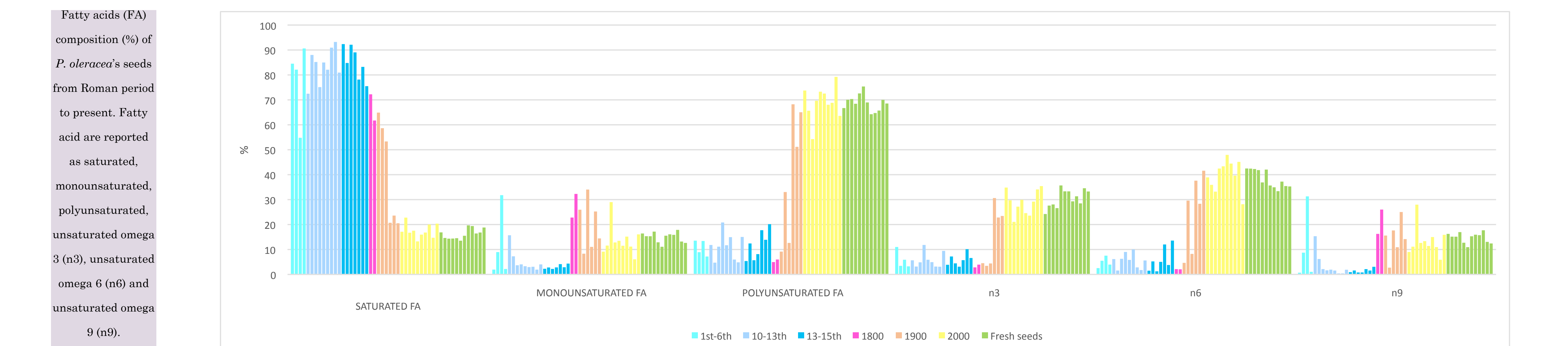
*P. oleracea*'s seeds  
from Roman period  
(1<sup>st</sup> century AD) to  
Renaissance (15<sup>th</sup>  
century AD)

*P. oleracea*'s seeds  
from Herbaria  
(from year 1862 to  
year 2011)

Year	Sample
1862	198 A
1881	196 B
1917	189 C
1920	138 D
1976	164 E
1992	126 F
1998	147 G
1999	136 H
2001	146 I
2004	168 J
2005	167 K
2005	169 L
2005	172 M
2005	182 N
2007	171 O
2008	166 P
2009	180 Q
2011	132 R

In this work we tested the content of fatty acids in seeds from Roman period to present, as a comparison to the content of fatty acids of the aerial parts of the plant: 12 fresh plant and seeds samples, collected in Summer 2015, 18 seeds samples coming from Italian herbaria, dating from 1862 to 2011, and 20 seeds samples coming from archaeological excavations, dated from 1<sup>st</sup> to 15<sup>th</sup> cent. AD. Total lipids were extracted according to a modified method of Folch et al. (1957) and methyl esters were analyzed by gas chromatography (GC)-FID.

We found a high content of polyunsaturated fatty acids in fresh plants and seeds. Moreover, a quite similar profile with comparable saturated, monounsaturated and polyunsaturated fatty acids was observed in both seeds and aerial parts of the plant, even if significant differences were measured in singular aerial percentages. Furthermore, comparing seeds samples from different historical periods, we determined an evident decrease in polyunsaturated fatty acids depending on increasing time, from ~69% of fresh seeds up to ~11% in archaeological samples with the consequent increase in saturated fatty acids. This is probably due to a degradation process, caused by atmospheric oxygen exposition and unsaturated fatty acids oxidation during time. The applied reported methodology would be useful for the determination of fatty acids content and profile also in ancient samples of seeds and parts of plants.



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