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plants MDPI

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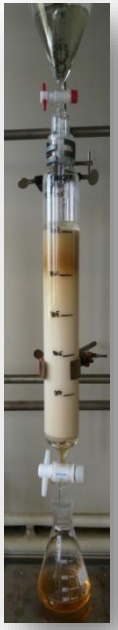
Sea fennel (*Crithmum maritimum* L.): a promising biosaline crop. Extraction, purification and chemical characterization of polar extracts

Crithmum maritimum

EXTRACTION

Percolation EtOH 70% 60°C

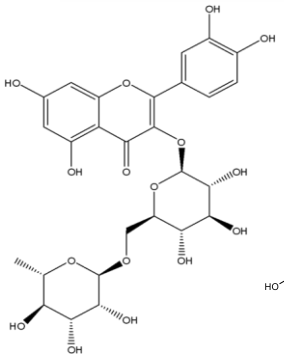
PURIFICATION



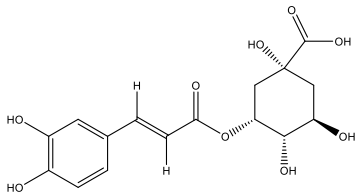
AMBERLITE XAD7HP

CHARACTERIZATION

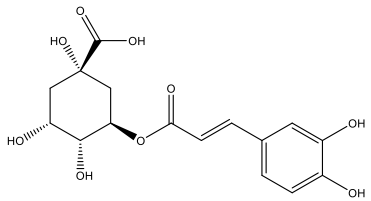
UHPLC-DAD-MS/MS



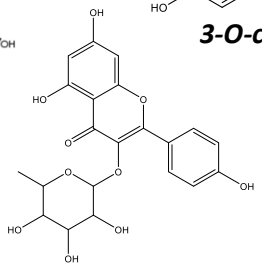
rutin



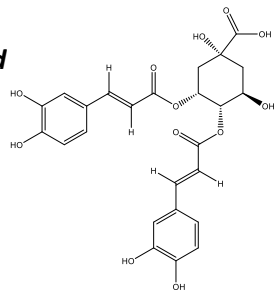
3-O-caffeoylquinic acid



5-O-caffeoylquinic acid



kaempferol-3-O-rhamnoside



4,5-di-O-caffeoylquinic acid

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Abstract

Sea fennel (*Crithmum maritimum*, L.) is a perennial halophyte, thrives on coastal cliffs and sometimes in sandy beaches along the Mediterranean, Pacific and Atlantic coasts.
This plant, native to southern Europe, survives under salinity conditions and has lots of food uses, so it is considered a promising biosaline crop. However, its commercial cultivation potential is not yet fully exploited.
This work aims to provide a complete quantitative and qualitative overview of the extract obtained from the aerial parts of *C. maritimum*. For this purpose aerial parts were dried, ground and extracted by percolation with ethanol 70% at 60°C. The purification was done using an Amberlite® XAD7HP sorbent resin. For the quantification was used an UHPLC-DAD-MS/MS system, equipped with electrospray ionization (ESI) and a Zorbax ODS (250 x 4.6 mm, 5 μm) column.
From the results emerges that the purified extract is richer than the unpurified one, furthermore the extract was mainly composed of phenolic compounds, among which hydroxycinnamic acids and flavonoids were the two main chemical classes. Among the former, chlorogenic acids, including 5-O-caffeoylquinic acid (10.5-22.36 mg g^{-1}), 3,5-di-O-caffeoylquinic acid (5.99-15.82 mg g^{-1}) and 4,5-di-O-caffeoylquinic acid (5.09-15.35 mg g^{-1}), were the most abundant ones. Among flavonoids, rutin (1.60-4.33 mg g^{-1}) and kaempferol-3-O-rhamnoside (0.07-0.33 mg g^{-1}) were the main constituents.
These results suggest improving the study of the relation between cultivation systems and nutraceutical values and support the use of this plant as a functional food or in nutraceuticals.

Keywords: *Crithmum maritimum*; sea fennel; UHPLC-DAD-MS/MS.

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Introduction

In the last years the climate changing impose an increase in research of new cultivation. In this context, sea fennel could be one possibility also thanks to his halophyte nature that allow it to grow under salinity conditions and with a low amount of water. In fact, *Crithmum maritimum* is a plant native to southern Europe, locally known with several popular names as finocchio marino, critmo, cretamo, paccasassi, bacicci, basiggia, erba di San Pietro and salissia, thrives on coastal cliffs and sometimes in sandy beaches along the Mediterranean, Pacific and Atlantic coasts.

Results and Discussion

Sample	Crude extract				Purified extract			
Compound	µg/g	%[a]	RSD%	DEV ST	µg/g	%[a]	RSD%	DV ST
5-O-caffeoylquinic acid	10550.08	27,94	0.16	17.15	22356.34	20,59	5.13	1146.34
rutin	1606.96	4,26	1.89	30.39	4333.69	3,99	2.82	122.43
3,5-di-O-caffeoylquinic acid	5996.18	15,88	0.54	32.33	15822.73	14,57	0.18	28.61
4,5-di-O-caffeoylquinic acid	5086.42	13,47	1.74	88.50	15349.71	14,14	1.29	197.38
kaempferol-3-O-rhamnoside	77.13	0,20	16.68	12.86	329.60	0,30	12.91	42.55

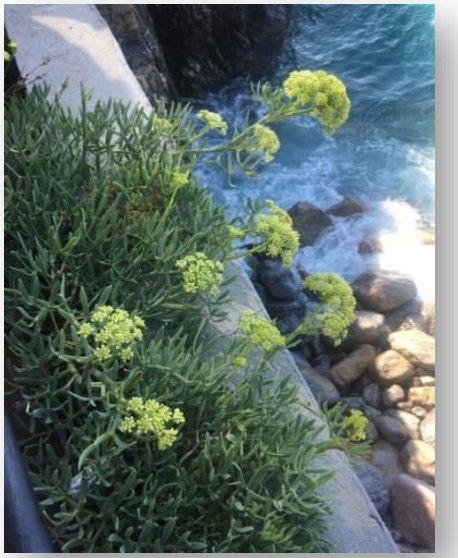
Conclusions

Crithmum maritimum

USES OF THE PLANT

BOTANICAL CHARACTERISTICS

EXPERIMENTAL PROCESS



- EXTRACTION
- PURIFICATION
- QUALI-QUANTITATIVE CHARACTERIZATION

FUNCTIONAL FOOD OR NUTRACEUTICALS

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