Technical documentation

Product name:	**qRE Echinacea purpurea (L.) Moench., roots**
Substance:	Echinacea purpurea (L.) Moench., roots dry extract
Plant source common names:	en: Purple coneflower; fr: Echinacée pourpre
Reference:	E0111
Packaging:	100 mg in a 1.5 ml borosilicate amber vial
Storage conditions:	Keep container closed. Protect from light and moisture. Keep at -15 °C to -25 °C.
Retest:	12 months

Botanical identification of plant source

Plants in our botanical garden are identified and a herbal voucher is prepared by an expert botanist.
Each batch collected for extraction is verified and identified.
Reference: Flora of North America http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=220004561

Method of production of dry extract

Whole plant or plant parts are collected, freeze-dried and coarsely ground. Extraction is performed by maceration in 50 % (v/v) aqueous ethanol (v/v) for 48 hours at room temperature. Ethanol is then evaporated under reduced pressure at less than 40 °C and the aqueous residue is freeze-dried.
Residual water content measurement is done by Karl Fischer titration.

Organoleptic characteristics of dry extract

Colour: Light brown
Odour: Non characteristic
Form: Fine powder

Recommended methods for use

Weight a precise weight of qRE and solubilise in the recommended solvent at the concentration indicated in the HPLC or HPTLC method described in this document.
Sonicate for 90 seconds (70 W).
Filter on a 0.45 µm PVDF membrane and put the resulting solution into HPLC dispenser or apply on the HPTLC plate.
Dose and analyse your extract with qRExtract using the HPLC / HPTLC methods described in this document or using your own methods.

HPTLC

Detection of chicoric acid

Layer: 10 × 10 cm HPTLC Nano-Sil-20 UV 254 (Carl Roth ref. N084.1)

Thin layer conditionnement: 1 h at room temperature and 33 % relative humidity

Elution solvent:

Elution solvent compound	Volume (ml)
ethyl acetate	100
water	27
formic acid	11
acetic acid	11

Developing distance: 70 mm from the lower edge

Initial spot volume and concentration:

chicoric acid: 2 µl of a 0.2 % (w/v) solution in ethanol 96 %

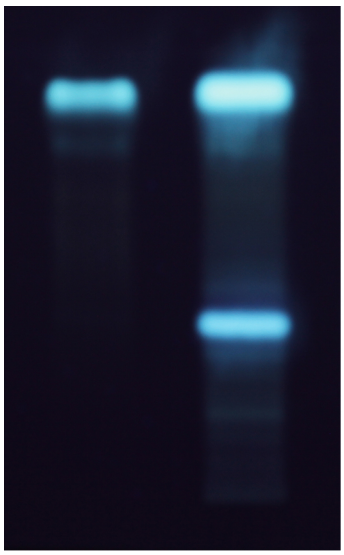
qRE: 4 µl of a 1.5 % (w/v) solution in 50 % (v/v) aqueous ethanol

Reagent mixture: Natural products - polyethylene glycol reagent (NP/PEG)

Preparation: Dissolve 0.25 g of diphenylboric acid 2-aminoethylester and 1.25 g of polyethylene glycol 400 in 25 mL of methanol.

Dip the plate in the reagent mixture and dry for 15 minutes at room temperature.

Expose to UV light at 365 nm.

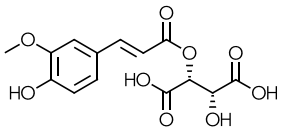
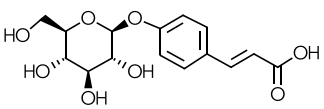
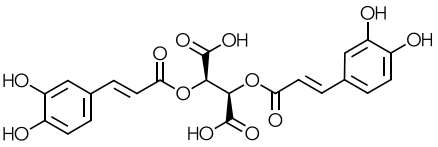
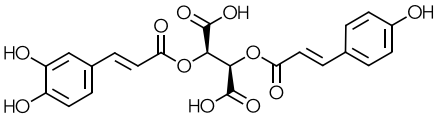
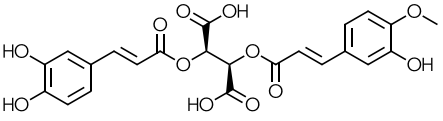
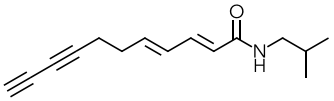


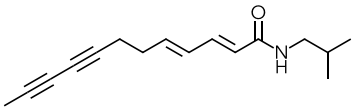
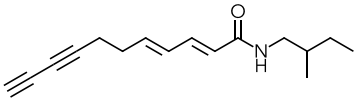
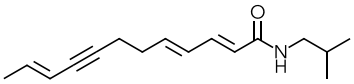
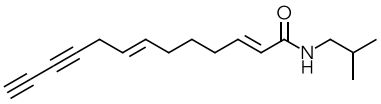
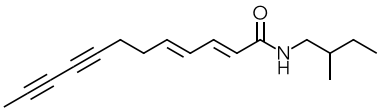
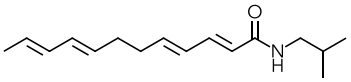
HPLC

Precolumn: Ascentis® Express C18 0.5 cm × 3.0 mm 2.7 µm
Column: Ascentis® Express C18 15 cm × 3.0 mm 2.7 µm
Sample: 8 µl 1.85 % qRE® (w/v) solution in 50 % (v/v) aqueous ethanol
Flow: 0.45 ml/min
Temperature: 25 °C
Mobile phase: A: 0.1 % formic acid (v/v) in water
B: 0.1 % formic acid (v/v) in acetonitrile
Detection: Diode Array Detector, 280 nm
Gradient:

Time (mn)	A %	B %
0	97	3
80	73	27
85	61	39
121	52.4	47.6

Quantified substances

Compound	CAS No	2D Structure	Peak No
Feruloyl tartaric acid	NA		1
p-coumaric acid O-hexoside	NA		2
Chicoric acid	70831-56-0		3
Caffeoyl coumaroyl tartaric acid	NA		4
Feruloyl caffeoyl tartaric acid isomer	NA		5, 6
Undeca-2,4-diene-8,10-diynoic acid isobutylamide (Z or E)	13891-74-2		9, 10

Compound	CAS No	2D Structure	Peak No
Dodeca-2,4-diene-8,10-diynoic acid isobutylamide (Z or E)	NA		11, 14
Undeca-2,4-diene-8,10-diynoic acid-2-methylbutylamide	NA		12
Dodeca-2,4,10-trien-8-ynoic acid isobutylamide	NA		13
Trideca-2,7-diene-10,12-diynoic acid isobutylamide	NA		15
Dodeca-2,4-diene-8,10-diynoic acid-2-methylbutylamide	NA		16
Dodeca-2,4,8,10-tetraenoic acid isobutylamide (E, E, Z, Z or E)	NA		17, 18
Unknown	NA	NA	7, 8