

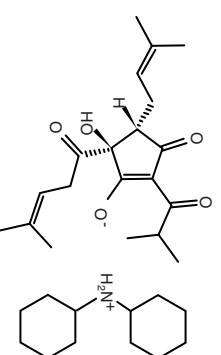
DCHA-Iso, ICS-I3

ICS-I3 is a purified preparation of the dicyclohexylamine salts of *trans*-iso- α -acids. It is deemed to have a total iso- α -acids content of 62.3% (w/w), though this figure takes into account only the major forms of the iso- α -acids that are present: *trans*-isocoumumolone, *trans*-isohumulone and *trans*-isoadhumulone. (N.B. Wortis and beers brewed with hops, hop extracts, pellets and all commercial “Iso” products invariably also contain substantial proportions of the corresponding *cis*-iso- α -acids - see User’s Guide supplied with the standard).

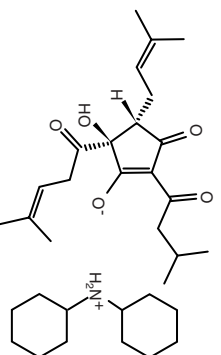
If you are using the recommended method, expect the area of the *trans*-isocoumumolone peak to be about 33.6% of the total peak area of all of the compounds included in the calibration. (**Caution:** This may not be the case for methods that use other mobile phases, or for measurement at different wavelengths).

ICS-I3 replaces ICS-I2. The new standard has been cross-checked against the old and will give similar results.

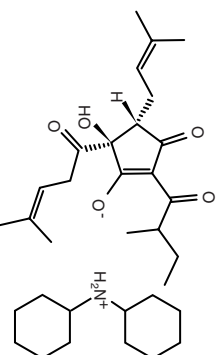
Structures of DCHA-Iso-alpha-acids



DCHA - *trans*-isocoumumolone
 $C_{32}H_{51}NO_5$
(mw 529.751)



DCHA - *trans*-isohumumolone
 $C_{33}H_{53}NO_5$
(mw 543.778)



DCHA - *trans*-isoadhumumolone
 $C_{33}H_{53}NO_5$
(mw 543.778)

DCHA-Rho, ICS-R2

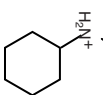
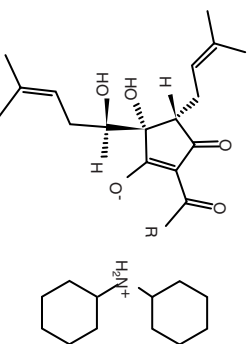
ICS-R2 is a purified preparation of the dicyclohexylamine salts of *cis*-p-iso- α -acids. This standard is deemed to have a total p-iso- α -acids content of 65.3% (w/w), though this figure takes into account only the major forms of the p-iso- α -acids that are present: two *cis*-p-isocoumumolones, two *cis*-p-isohumulones and two *cis*-p-isoadhumulones. (N.B. Commercial “Rho” products typically contain a significant proportion of a *trans*-p-isohumulone isomer - see User’s Guide supplied with the standard).

If you are using the recommended method, expect the combined area of the *cis*-p-isocoumumolones peaks* to be about 14.5% of the total peak area of all of the compounds included in the calibration. (**Caution:** This may not be the case for methods that use other mobile phases, or for measurement at different wavelengths).

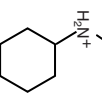
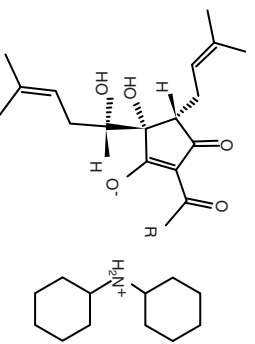
ICS-R2 replaces ICS-R1. The new standard has been cross-checked against the old and has an essentially identical response factor per unit of total *cis*-p-iso- α -acids.

* The supplied chromatogram shows two peaks, corresponding to the two *cis* forms of this particular iso- α -acid. However, it is not known which peak corresponds to which of the two forms shown below. (The same is also true for the p-isohumulones peaks).

Structures of DCHA-rho-iso-alpha-acids



DCHA-Rho, ICS-R2
(contains two *cis* forms of each rho-iso- α -acid)



DCHA-rho-iso-coumumolones & isoadhumulones
 $C_{32}H_{53}NO_5$
(mw 531.765)

DCHA-rho-iso-humulones & isocoumumolones
 $C_{33}H_{55}NO_5$
(mw 545.791)

Tetra, ICS-T2

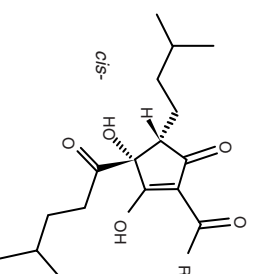
ICS-T2 is a purified preparation containing both *cis*- and *trans*-isomers of the tetrahydroisocoumumolones, tetrahydroisohumulones and tetrahydroisoadhumulones. In respect of these six isomers it is deemed to have a total tetrahydroiso- α -acids content of 99.4% (w/w).

If you are using the recommended method, expect the (combined) area of the tetrahydroisocoumumolones peak(s)* to be about 39% of the total peak area of all of the compounds included in the calibration. (**Caution:** This may not be the case for methods that use other mobile phases, or for measurement at different wavelengths).

ICS-T2 replaces ICS-T1. The new standard has a much higher *cis:trans* ratio than the old and this may result in a small reduction (typically 1 - 2% relative) to the value obtained for “total Tetra” in an unknown sample.

* The supplied chromatogram shows only one peak. However, it is often found that the two isomers of tetrahydroisocoumumolone are partially resolved.

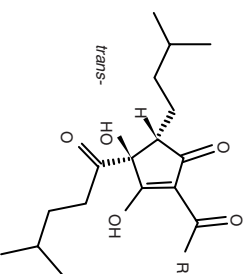
Structures of Tetrahydroiso-alpha-acids



cis-



Tetra, ICS-T2
(contains both *cis* & *trans* forms of tetrahydroiso- α -acids)



trans-

Tetrahydroisocoumumolones
 $C_{20}H_{32}O_5$
(mw 352.464)

Tetrahydroisohumulones & Tetrahydroisoadhumulones
 $C_{21}H_{34}O_5$
(mw 366.490)

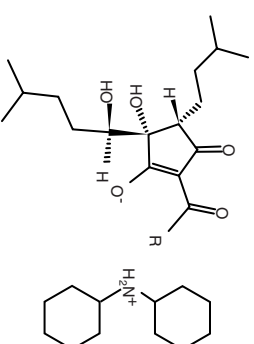
DCHA-Hexa, ICS-H1

ICS-H1 is a purified preparation of the dicyclohexylamine salts of *cis*-hexahydrodriso- α -acids. It is deemed to have a total hexahydrodriso- α -acids content of 65.7% (w/w), though this figure takes into account only the major forms of hexahydrodriso- α -acids that are present: two *cis*-hexahydroisocoumumolones, two *cis*-hexahydroisohumulones and two *cis*-hexahydroisoadhumulones.

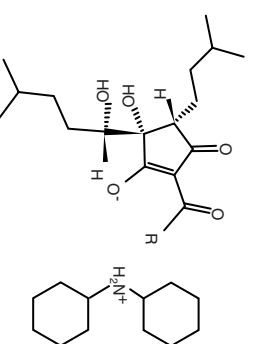
If you are using the recommended method, expect the combined areas of the *cis*-hexahydroisocoumumolones peaks* to be about 53% of the total peak area of all of the compounds included in the calibration. (**Caution:** This may not be the case for methods that use other mobile phases, or for measurement at different wavelengths).

* The supplied chromatogram shows two peaks, corresponding to the two *cis* forms of this particular iso- α -acid. However, it is not known which peak corresponds to which of the two forms shown above. (The same is also true for the p-isohumulones peaks).

Structures of DCHA-Hexahydroiso-alpha-acids



DCHA-Hexa, ICS-H1
(contains two *cis* forms of each hexahydrodriso- α -acid)



DCHA-hexahydroisocoumumolones
 $C_{32}H_{57}NO_5$
(mw 535.796)

DCHA-hexahydroisohumulones & isoadhumulones
 $C_{33}H_{59}NO_5$
(mw 549.823)