CLAIMS

1. A method for identifying and/or authenticating a sample, wherein the sample is a sample suitable to be analyzed by a mass spectrometer, wherein the method comprises the steps of:

   (i) adding at least one compound to the sample, wherein the at least one compound has a variable ionization;

   (ii) obtaining a mass spectrum of the at least one compound and determining a level of the at least one compound after addition to the sample;

   (iii) comparing the level of the at least one compound determined in (ii) to a reference level, wherein the reference level is a level of the same compound determined after addition to a reference sample; and

   (iv) identifying the sample based on the comparison in step (iii) and the effect of the sample on the level of the at least one compound,

   wherein the level is a mass spectrometry signal level,

   wherein the sample has an ion suppression, or has an ion enhancement effect on the at least one compound or wherein the sample does not substantially alter the ionization of the at least one compound,

   wherein the at least one compound added to the sample has a low molecular weight, and wherein the compounds are distinguishable in the mass spectrum.

2. The method of claim 1, wherein the ion suppression efficiency or the ion enhancement efficiency of the sample on the at least one compound is determined, and said ion suppression efficiency or said ion enhancement efficiency is compared to the ion suppression efficiency or to the ion enhancement efficiency of the reference sample on the same at least one compound, and based thereon the sample is identified,

   and/or

   wherein a similar or an identical level of the at least one compound compared to the reference level indicates that the sample corresponds to the reference sample; or

   wherein a difference in the level of the at least one compound as compared to the reference level indicates that the sample does not correspond to the reference sample,

and/or

wherein in step (iv) the sample is identified based on the particular pattern of ion suppression or ion enhancement of the at least one compound.

3. The method of any one of the preceding claims, wherein a sample is used in step (i) without experiencing a separation step, suitably such that the level(s) in step (ii) are determined without a chromatographic separation, and preferably wherein the mass spectrum is obtained by a mass spectrometer coupled to an ion source, in particular an electrospray ionization,

and/or

wherein in step (i) different concentrations of the at least one compound are added to the sample, and wherein in step (ii) the levels of the different concentrations of the at least one compound after addition to the sample are determined; or

wherein in step (i) the at least one compound is added to different concentrations of the sample and wherein in step (ii) the levels of the at least one compound after addition to the samples are determined,

and/or

wherein the method comprises to generate a dose response curve, in particular

wherein the dose response curve is based on the levels of different concentrations of the at least one compound; or

wherein the dose response curve is based on the levels of the at least one compound after addition to said different concentrations of said sample.

4. The method of any one of the preceding claims, wherein in step (i) at least 1 to 100, or preferably 1 to 15 compounds are added,

and/or

wherein the compounds are susceptible to an ion suppression and/or ion enhancement effect of particular substances comprised in the sample,

and/or

wherein the compounds have a different partition coefficient (logP), and/or a different pka.

5. The method of any one of the preceding claims, wherein in step (ii) the level of each of the at least one compound is determined, and wherein in step (iii) the level of each of the at least one compound is compared to each reference level.

6. The method of any one of the preceding claims, wherein the at least one compound is not comprised in the sample.

7. The method of any one of the preceding claims, wherein the at least one compound is selected from the group consisting of sulfaguanidine, naproxen sodium, sulfadimethoxine, ciprofloxacin, tetracycline hydrochloride, verapamil hydrochloride, terfenadine, leucine enkephalin acetate salt hydrate and reserpine.

8. The method of any one of the preceding claims, wherein the at least one compound has a concentration in the sample of at least 5 times the limit of quantification after addition to the sample,
and/or
wherein the at least one compound has a concentration in the sample after addition to the sample to suppress and/or enhance the level of the least one compound to 20±2% to 80±8% in comparison to the level of the same compound determined in the absence of the sample,
and/or
wherein further levels of a standard are determined, in particular for calibrating the method of any of the preceding claims,
and/or
wherein the sample is a pooled sample suitable for the use in quality control.

9. The method of any one of the preceding claims, wherein the sample is selected from the group consisting of wine, spirituous beverage, foodstuff, processed foodstuff, tea, coffee, herb extract, natural product, natural products extracts, beer, fruit juice (for example orange and apple), a pharmaceutical composition, a formulation of a

pharmaceutical, a body fluid, tissue extract, blood, blood plasma, blood serum, and urine, in particular wherein the sample is wine.

10. The method of any one of the preceding claims, wherein the sample and the reference sample are from the same sort,
and/or
wherein the reference sample is an authentic sample or a sample with a known composition,
and/or
wherein the reference sample is a wine sample of particular vintage, of a particular grape variety, or from a particular region, or from a particular producer.

11. The method of any one of the preceding claims, wherein the identification of the sample is the identification of a dilution of the sample,
in particular wherein the dilution of the sample is identified based on the comparison of the dose response curve of the sample to the dose response curve of the reference sample, in particular wherein the dose response curves are based on the levels of the different concentrations of the at least one compound or the level of a constant concentration of the at least one compound.

12. The method of any one of the preceding claims, wherein the method comprises a calibration step, wherein the sample comprises known compounds with known variable ionization and/or known ionization effects, such as a known ion suppression effect on the at least one compound, a known ion enhancement effect on the at least one compound or known to not substantially alter the level of the at least one compound, and wherein the sample is used to calibrate the method and/or the instruments employed in any one of the preceding claims.

13. Use of the at least one compound having a variable ionization in the method of any one of the preceding claims, wherein the compound having a variable ionization is susceptible to ion suppression effects.

14. Use of a kit comprising at least one compound having variable ionization, and optionally (a) reference level(s) of the reference sample in the method of any one of the preceding claims, wherein the compound having a variable ionization is susceptible to ion suppression effects.