of honey. This publication teaches that a low molecular weight fraction from honey has generalised anti-inflammatory effects and no immune-stimulatory effects. It does not discuss specific anti-inflammatory action.

It will be appreciated from the above that it would be useful to provide alternative methods of treating inflammatory conditions, including inflammatory conditions associated with the gastrointestinal tract.

It is an object of the invention to provide methods of treating inflammatory conditions, including inflammatory conditions associated with the gastrointestinal tract and/or to address the foregoing problems or at least to provide the public with a useful choice.

Further aspects and advantages of the product, compositions methods and uses will become apparent from the ensuing description that is given by way of example only.

Summary

Described herein are compositions comprising 3,6,7-trimethyllumazine, and methods of using the same for preventing, ameliorating or treating MMP-9 associated conditions, inflammation of the gastrointestinal tract, and/or inflammatory conditions associated with gastrointestinal tract. The inventors have identified that a pteridine from honey, 3,6,7-trimethyllumazine, has anti-inflammatory activity and MMP-9 inhibitory activity. Being able to isolate the compound and characterise the anti-inflammatory and MMP-9 inhibitory activity provides the ability to produce medicaments for various uses including the treatment, prevention and amelioration of conditions associated with MMP-9, including inflammatory conditions of the gastrointestinal tract.

In one aspect, the present disclosure provides a use of a composition comprising 3,6,7-trimethyllumazine in the manufacture of a medicament for preventing, ameliorating or treating an MMP-9 associated condition, wherein the composition: a) comprises a 3,6,7-trimethyllumazine concentration of greater than 5 mg/kg; b) comprises a honey extract comprising a concentration of 3,6,7-trimethyllumazine that is higher than the concentration of 3,6,7-trimethyllumazine found naturally occurring in the honey from which the extract was derived; c) comprises synthetic 3,6,7-trimethyllumazine and/or 3,6,7-trimethyllumazine isolated from honey; or d) has a standardised concentration of 3,6,7-trimethyllumazine obtained by: selecting a first composition with a known concentration of 3,6,7-trimethyllumazine; selecting at least one further composition with a known concentration of 3,6,7-trimethyllumazine; combining the first composition with the at least one further composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.

In a first particular example, the present disclosure provides a method of preventing, ameliorating or treating an MMP-9 associated condition in a subject, comprising administering to a subject in need thereof a composition comprising 3,6,7-trimethyllumazine. In one example, the MMP-9 associated condition is selected from gastrointestinal

inflammatory diseases, gastric ulcers (for example peptic ulcers), gastritis, MMP-associated inflammatory conditions, inflammatory bowel disease (IBD), Crohn's disease, ulcerative colitis, Irritable Bowel Syndrome (IBS), digestive diseases, Gastroesophageal Reflux Disease (GERD), heartburn, acid reflux, *Helicobacter pylori* infection, mouth ulcers, stomatitis, pharyngitis, gingivitis, esophageal ulcers, neuropsychiatric illnesses (such as schizophrenia, bipolar mood disorder, multiple

trimethyllumazineis determined by reverse-phase HPLC system.

In a fourth particular example the disclosure provides a method of making a composition with anti-inflammatory and/or MMP-9 inhibitory activity comprising:

a. testing a first composition comprising honey for 3,6,7-trimethyllumazine concentration;
b. testing at least one further composition comprising honey for 3,6,7-trimethyllumazine concentration;
c. selecting a composition comprising honey with a 3,6,7-trimethyllumazine concentration greater than about 5 mg/kg 3,6,7-trimethyllumazine;
d. selecting at least one further composition comprising honey with a 3,6,7-trimethyllumazine concentration greater than about 5 mg/kg;
e. combining the selected composition comprising honey to form a honey composition with a 3,6,7-trimethyllumazine concentration of at least from about 5 to about 80 mg/kg.

In another aspect, the disclosure provides a method of making a composition with anti-inflammatory and/or MMP-9 inhibitory activity comprising:

a. testing a first composition comprising honey for 3,6,7-trimethyllumazine concentration;
b. testing at least one further composition comprising honey for 3,6,7-trimethyllumazine concentration;
c. selecting a composition comprising honey with a 3,6,7-trimethyllumazine concentration greater than 5 mg/kg;
d. selecting at least one further composition comprising honey with a 3,6,7-trimethyllumazine concentration greater than from 5 mg/kg 3,6,7-trimethyllumazine;
e. combining the selected compositions comprising honey to form a honey composition with a 3,6,7-trimethyllumazine concentration of at least from 5 to 80 mg/kg,

optionally wherein the composition comprising honey is selected if it has a concentration of 3,6,7-trimethyllumazine greater than 5 mg/kg, 10 mg/kg, 15 mg/kg, 20 mg/kg, 25 mg/kg, 30 mg/kg, 35 mg/kg, 40 mg/kg, 45 mg/kg, 50 mg/kg, 55 mg/kg, 60 mg/kg, 70 mg/kg or 80 mg/kg.

In one example, the composition comprising honey is selected if it has a concentration of 3,6,7-trimethyllumazine greater than about 5 mg/kg, about 10 mg/kg, about 15 mg/kg, about 20 mg/kg, about 25 mg/kg, about 30 mg/kg, about 35 mg/kg, about 40 mg/kg, about 45 mg/kg, about 50 mg/kg, about 55 mg/kg, about 60 mg/kg, about 70

ii. identifying the composition as not having anti-inflammatory and/or MMP-9 inhibitory activity if it contains a 3,6,7-trimethyllumazine concentration lower than from about 5 mg/kg.

In another aspect, the disclosure provides a method of identifying a composition as having anti-inflammatory and/or MMP-9 inhibitory activity comprising:

a. testing a composition for 3,6,7-trimethyllumazine concentration; and
    i. identifying the composition as having anti-inflammatory and/or MMP-9 inhibitory activity if it contains a 3,6,7-trimethyllumazine concentration greater than from 5 mg/kg; or
    ii. identifying the composition as not having anti-inflammatory and/or MMP-9 inhibitory activity if it contains a 3,6,7-trimethyllumazine concentration lower than from 5 mg/kg,

optionally wherein the composition comprises honey.

In one example, the composition comprises honey or a honey extract.

In one example, the composition comprising honey is determined as having anti-inflammatory activity if it contains greater than about 5 mg/kg, about 10 mg/kg, about 15 mg/kg, about 20 mg/kg, about 25 mg/kg, about 30 mg/kg, about 35 mg/kg, about 40 mg/kg, about 45 mg/kg, about 50 mg/kg, about 55 mg/kg, about 60 mg/kg, about 70 mg/kg or about 80 mg/kg.

In one example, the composition is honey or a honey extract.

In one example, the composition with anti-inflammatory activity is suitable for use in any one of examples one to three.

In a sixth particular example, the disclosure provides a method of identifying a composition with anti-inflammatory and/or MMP-9 inhibitory activity suitable for use in a method of any of examples one to three, comprising:

a. testing a composition for 3,6,7-trimethyllumazine concentration; and
    i. identifying the composition as suitable for use in any of examples one to three if it contains a 3,6,7-trimethyllumazine concentration greater than from about 5 to about 80 mg/kg 3,6,7-trimethyllumazine; or
    ii. identifying the composition as not suitable for use in any of examples one to three if it contains a 3,6,7-trimethyllumazine concentration lower than about 5 mg/kg 3,6,7-trimethyllumazine.

In one example, the composition is identified as suitable for use in a method of any one of examples one to four if it contains a 3,6,7-trimethyllumazine concentration greater than about 5 mg/kg, about 10 mg/kg, about 15 mg/kg, about 20 mg/kg, about 25 mg/kg, about 30 mg/kg, about 35 mg/kg, about 40 mg/kg, about 45 mg/kg, about 50 mg/kg, about 55 mg/kg, about 60 mg/kg, about 70 mg/kg or about 80 mg/kg.

In one example, the composition is honey or a honey extract.

In one example, the 3,6,7-trimethyllumazine concentration is determined by

In a tenth particular example, the disclosure provides a use of a composition comprising 3,6,7-trimethyllumazine in the manufacture of a medicament for preventing, ameliorating or treating inflammation of the gastrointestinal tract in a subject.

In one example, the disclosure provides a use of preventing, ameliorating or treating conditions associated with inflammation of the gastrointestinal tract. In one example, the condition of the gastrointestinal tract is selected from: gastrointestinal inflammatory diseases, gastric ulcers (for example peptic ulcers), gastritis, MMP-associated inflammatory conditions, inflammatory bowel disease (IBD), Crohn's disease, ulcerative colitis, Irritable Bowel Syndrome (IBS), digestive diseases, Gastroesophageal Reflux Disease (GERD), heartburn, acid reflux, *Helicobacter pylori* infection, mouth ulcers, stomatitis, pharyngitis, gingivitis and/or esophageal ulcers.

In an eleventh particular example, the disclosure provides a use of a composition comprising 3,6,7-trimethyllumazine in the manufacture of a medicament for preventing, ameliorating or treating inflammation in a subject.

In another aspect, the disclosure provides a use of a composition comprising 3,6,7-trimethyllumazine in the manufacture of a medicament for preventing, ameliorating or treating inflammation, optionally wherein the inflammation is associated with the gastrointestinal tract, wherein the composition: a) comprises a 3,6,7-trimethyllumazine concentration of greater than 5 mg/kg; b) comprises a honey extract comprising a concentration of 3,6,7-trimethyllumazine that is higher than the concentration of 3,6,7-trimethyllumazine found naturally occurring in the honey from which the extract was derived; c) comprises synthetic 3,6,7-trimethyllumazine and/or 3,6,7-trimethyllumazine isolated from honey; or d) has a standardised concentration of 3,6,7-trimethyllumazine obtained by: selecting a first composition with a known concentration of 3,6,7-trimethyllumazine; selecting at least one further composition with a known concentration of 3,6,7-trimethyllumazine; combining the first composition with the at least one further composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.

In one example, the inflammation is associated with the gastrointestinal tract of a subject. In one example, the inflammation is associated with conditions selected from: gastrointestinal inflammatory diseases, gastric ulcers (for example peptic ulcers), gastritis, MMP-associated inflammatory conditions, inflammatory bowel disease (IBD), Crohn's disease, ulcerative colitis, Irritable Bowel Syndrome (IBS), digestive diseases, Gastroesophageal Reflux Disease (GERD), heartburn, acid reflux, *Helicobacter pylori* infection, mouth ulcers, stomatitis, pharyngitis, gingivitis and/or esophageal ulcers.

In one example, the inflammation is associated with a condition selected from: , neuropsychiatric illnesses (such as schizophrenia, bipolar mood disorder, multiple sclerosis), neurodegenerative disorders (such as traumatic brain injury, multiple sclerosis, and Alzheimer's disease), cardiovascular diseases, cancer and arthritis.

In a twelfth particular example, there is provided a method, use or composition of any one of the above examples, wherein the composition further comprises a COX-2 inhibitor.

In a thirteenth particular example, there is provided a method or use of any one of the above examples, further comprising co-administration of a COX-2 inhibitor.

Advantages of the above methods and uses may be varied. In some examples, the source of 3,6,7-trimethyllumazine is naturally occurring and able to be manufactured on a sustainable basis. 3,6,7-trimethyllumazine is not anticipated to have side effects

and it may be formulated in a wide variety of ways for various methods of administration.

In another aspect, the disclosure provides use of a composition comprising 3,6,7-trimethyllumazine for supporting or maintaining a subject's normal digestion, supporting or maintaining a subject's healthy digestion or supporting or maintaining a subject's general gut health and wellbeing, wherein the composition: a) comprises a 3,6,7-trimethyllumazine concentration of greater than 5 mg/kg; b) comprises a honey extract comprising a concentration of 3,6,7-trimethyllumazine that is higher than the concentration of 3,6,7-trimethyllumazine found naturally occurring in the honey from which the extract was derived; c) comprises synthetic 3,6,7-trimethyllumazine and/or 3,6,7-trimethyllumazine isolated from honey; or d) has a standardised concentration of 3,6,7-trimethyllumazine obtained by: selecting a first composition with a known concentration of 3,6,7-trimethyllumazine; selecting at least one further composition with a known concentration of 3,6,7-trimethyllumazine; combining the first composition with the at least one further composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.

This disclosure may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements and features, and where specific integers are mentioned herein which have known equivalents in the art to which this disclosure relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

Further examples of the disclosure, which should be considered in all its novel examples, will become apparent to those skilled in the art upon reading of the following description which provides at least one example of a practical application of the disclosure.

Brief Description of the Drawings

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a graph illustrating the fluorescence intensity generated by MMP-9 activity over the course of 10 min.

Figure 2 is a graph illustrating the percentage inhibition of MMP-9 activity from 3,6,7-trimethyllumazine ranging from 2.5–40 µg/ml. Data are shown as mean ± SEM. n=4. ****p<0.0001.

Figure 3 is a graph illustrating the correlation between 3,6,7-trimethyllumazine concentration and MMP-9 inhibition. The IC50 was calculated as 11.5 µg/ml. Data are shown as mean ± SEM. n=4.

Figure 4 is a graph illustrating MMP-9 activity measured by absorbance at 412nm over 120 min.

Figure 5 is a graph illustrating the percentage inhibition by 3,6,7-trimethyllumazine on the activity of MMP-9 (n=5, 2 reciprocal replicates each)

Figure 6 is a graph illustrating that there is no significant interaction between 3,6,7-trimethyllumazine and the chromogenic substrate (A) or the reaction product (B) over the course of 20 min.

Figure 7 shows a typical gelatin gel zymography showing gels incubated in normal developing buffer (column 3-5), 3,6,7-trimethyllumazine supplemented buffer

Claims:

1. Use of a composition comprising 3,6,7-trimethyllumazine in the manufacture of a medicament for preventing, ameliorating or treating an MMP-9 associated condition, wherein the composition:

    a) comprises a 3,6,7-trimethyllumazine concentration of greater than 5 mg/kg;
    b) comprises a honey extract comprising a concentration of 3,6,7-trimethyllumazine that is higher than the concentration of 3,6,7-trimethyllumazine found naturally occurring in the honey from which the extract was derived;
    c) comprises synthetic 3,6,7-trimethyllumazine and/or 3,6,7-trimethyllumazine isolated from honey; or
    d) has a standardised concentration of 3,6,7-trimethyllumazine obtained by:
        - selecting a first composition with a known concentration of 3,6,7-trimethyllumazine;
        - selecting at least one further composition with a known concentration of 3,6,7-trimethyllumazine;
        - combining the first composition with the at least one further composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.

2. The use of claim 1 wherein the MMP-9 associated condition is an inflammatory condition, optionally wherein the MMP-9 associated inflammatory condition is associated with inflammation of the gastrointestinal tract.

3. The use of claim 1 or 2 wherein the MMP-9 associated condition is selected from gastrointestinal inflammatory diseases, gastric ulcers, peptic ulcers, gastritis, MMP-associated inflammatory conditions, inflammatory bowel disease, Crohn's disease, ulcerative colitis, Irritable Bowel Syndrome, digestive diseases, Gastroesophageal Reflux Disease, heartburn, acid reflux, *Helicobacter pylori* infection, mouth ulcers, stomatitis, pharyngitis, gingivitis, esophageal ulcers, neuropsychiatric illnesses, schizophrenia, bipolar mood disorder, multiple sclerosis, neurodegenerative disorders, traumatic brain injury, Alzheimer's disease, cardiovascular diseases, cancer and arthritis.

4. Use of a composition comprising 3,6,7-trimethyllumazine in the manufacture of a medicament for preventing, ameliorating or treating inflammation, optionally wherein the inflammation is associated with the gastrointestinal tract,
wherein the composition:

   a) comprises a 3,6,7-trimethyllumazine concentration of greater than 5 mg/kg;
   b) comprises a honey extract comprising a concentration of 3,6,7-trimethyllumazine that is higher than the concentration of 3,6,7-trimethyllumazine found naturally occurring in the honey from which the extract was derived;
   c) comprises synthetic 3,6,7-trimethyllumazine and/or 3,6,7-trimethyllumazine isolated from honey; or
   d) has a standardised concentration of 3,6,7-trimethyllumazine obtained by:
      - selecting a first composition with a known concentration of 3,6,7-trimethyllumazine;
      - selecting at least one further composition with a known concentration of 3,6,7-trimethyllumazine;
      - combining the first composition with the at least one further composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.

5. The use of claim 4 wherein the inflammation is associated with conditions selected from: gastrointestinal inflammatory diseases, gastric ulcers, peptic ulcers, gastritis, MMP-associated inflammatory conditions, inflammatory bowel disease, Crohn's disease, ulcerative colitis, Irritable Bowel Syndrome, digestive diseases, Gastroesophageal Reflux Disease, heartburn, acid reflux, *Helicobacter pylori* infection, mouth ulcers, stomatitis, pharyngitis, gingivitis, esophageal ulcers, neuropsychiatric illnesses, schizophrenia, bipolar mood disorder, multiple sclerosis, neurodegenerative disorders, traumatic brain injury, Alzheimer's disease, cardiovascular diseases, cancer and arthritis.

6. The use of any one of the preceding claims wherein the origin of the 3,6,7-trimethyllumazine is honey, optionally wherein the honey is of a floral origin substantially from Leptospermum, optionally wherein the honey is of a floral origin substantially from: *Leptospermum scoparium, Leptospermum polygalifolium, Leptospermum subtenue*, and/or combinations thereof.

7. The use of any one of claims 1 to 5 wherein the origin of the 3,6,7-trimethyllumazine is nectar, roots, fruit, seeds, bark, oil, leaves, wood, stems or other plant material from *Leptospermum,* optionally wherein the origin of the 3,6,7-trimethyllumazine is nectar, roots, fruit, seeds, bark, oil, leaves, wood, stems or other plant material from a plant selected from: *Leptospermum scoparium, Leptospermum polygalifolium, Leptospermum subtenue*, and/or combinations thereof.

8. The use of any one of claims 1 to 5 wherein the 3,6,7-trimethyllumazine is synthetic.

9. The use of any one of claims 1 to 6 wherein the composition comprising 3,6,7-trimethyllumazine comprises honey or a honey extract.

10. The use of any one of the preceding claims wherein the composition comprises a therapeutically effective amount of 3,6,7-trimethyllumazine.

11. The use of any one of the preceding claims wherein the composition comprises:
    - from 2.5 µg/mL to 1000 µg/mL 3,6,7-trimethyllumazine; or
    - from 2.5 µg/mL to 80 µg/mL 3,6,7-trimethyllumazine; or
    - 2.5 µg/mL, 5 µg/mL, 10 µg/mL, 20 µg/mL, 40 µg/mL, 50 µg/mL, 60 µg/mL, 70 µg/mL or 80 µg/mL 3,6,7-trimethyllumazine.

12. The use of any one of claims 1 to 10 wherein the composition comprises:
    - from 5 mg/kg to 3000 mg/kg 3,6,7-trimethyllumazine; or
    - from 5 mg/kg to 80 mg/kg 3,6,7-trimethyllumazine; or
    - 5 mg/kg, 10 mg/kg, 15 mg/kg, 20 mg/kg, 25 mg/kg, 30 mg/kg, 35 mg/kg, 40 mg/kg, 45 mg/kg, 50 mg/kg, 55 mg/kg, 60 mg/kg, 70 mg/kg or 80 mg/kg of 3,6,7-trimethyllumazine.

13. The use of any one of the preceding claims wherein the composition comprising 3,6,7-trimethyllumazine is formulated as a liquid formulation, fast moving consumer

goods, capsule, tablet, chewable tablets, gels, lotions, powders, suppository, intravenous preparations, intramuscular preparations, subcutaneous preparations, solution, food, beverage, dietary supplement or sprays.

14. The use of any one of claims 1 to 11 wherein the composition comprising 3,6,7-trimethyllumazine has a standardised concentration of 3,6,7-trimethyllumazine obtained by:

- selecting a first composition with a known concentration of 3,6,7-trimethyllumazine;
- selecting at least one further composition with a known concentration of 3,6,7-trimethyllumazine;
- combining the first composition with the second composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.

15. The use of any one of claims 1 to 11 wherein the composition comprising 3,6,7-trimethyllumazine has a standardised concentration of 3,6,7-trimethyllumazine obtained by:

- selecting a first composition with a known concentration of 3,6,7-trimethyllumazine;
- combining the selected first composition with one or more of:
    - synthetic 3,6,7-trimethyllumazine;
    - isolated 3,6,7-trimethyllumazine;
    - a honey extract comprising 3,6,7-trimethyllumazine; and/or
    - 3,6,7-trimethyllumazine derived directly from a plant of the genus *Leptospermum*;

to form a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 mg/kg to 3000 mg/kg.

16. A method of making a composition with anti-inflammatory and/or MMP-9 inhibitory activity comprising:
    a. testing a first composition comprising honey for 3,6,7-trimethyllumazine concentration;
    b. testing at least one further composition comprising honey for 3,6,7-trimethyllumazine concentration;

c. selecting a composition comprising honey with a 3,6,7-trimethyllumazine concentration greater than 5 mg/kg;
d. selecting at least one further composition comprising honey with a 3,6,7-trimethyllumazine concentration greater than from 5 mg/kg 3,6,7-trimethyllumazine;
e. combining the selected compositions comprising honey to form a honey composition with a 3,6,7-trimethyllumazine concentration of at least from 5 to 80 mg/kg,

optionally wherein the composition comprising honey is selected if it has a concentration of 3,6,7-trimethyllumazine greater than 5 mg/kg, 10 mg/kg, 15 mg/kg, 20 mg/kg, 25 mg/kg, 30 mg/kg, 35 mg/kg, 40 mg/kg, 45 mg/kg, 50 mg/kg, 55 mg/kg, 60 mg/kg, 70 mg/kg or 80 mg/kg.

17. A method of identifying a composition as having anti-inflammatory and/or MMP-9 inhibitory activity comprising:
    a. testing a composition for 3,6,7-trimethyllumazine concentration; and
        i. identifying the composition as having anti-inflammatory and/or MMP-9 inhibitory activity if it contains a 3,6,7-trimethyllumazine concentration greater than from 5 mg/kg; or
        ii. identifying the composition as not having anti-inflammatory and/or MMP-9 inhibitory activity if it contains a 3,6,7-trimethyllumazine concentration lower than from 5 mg/kg,

optionally wherein the composition comprises honey.

18. The use of claim 1 or 4 wherein:
    a. the composition comprising 3,6,7-trimethyllumazine comprises a honey extract comprising a concentration of 3,6,7-trimethyllumazine that is higher than the concentration of 3,6,7-trimethyllumazine found naturally occurring in the honey from which the extract was derived;
    b. the composition comprising 3,6,7-trimethyllumazine comprises synthetic 3,6,7-trimethyllumazine and/or 3,6,7-trimethyllumazine isolated from honey; and
    c. the composition comprising 3,6,7-trimethyllumazine has a standardised concentration of 3,6,7-trimethyllumazine obtained by:
    • selecting a first composition with a known concentration of 3,6,7-trimethyllumazine;
    • selecting at least one further composition with a known concentration of 3,6,7-

trimethyllumazine;

- combining the first composition with the at least one further composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.

19. Use of a composition comprising 3,6,7-trimethyllumazine for supporting or maintaining a subject's normal digestion, supporting or maintaining a subject's healthy digestion or supporting or maintaining a subject's general gut health and wellbeing, wherein the composition:

a) comprises a 3,6,7-trimethyllumazine concentration of greater than 5 mg/kg;
b) comprises a honey extract comprising a concentration of 3,6,7-trimethyllumazine that is higher than the concentration of 3,6,7-trimethyllumazine found naturally occurring in the honey from which the extract was derived;
c) comprises synthetic 3,6,7-trimethyllumazine and/or 3,6,7-trimethyllumazine isolated from honey; or
d) has a standardised concentration of 3,6,7-trimethyllumazine obtained by:
    - selecting a first composition with a known concentration of 3,6,7-trimethyllumazine;
    - selecting at least one further composition with a known concentration of 3,6,7-trimethyllumazine;
    - combining the first composition with the at least one further composition to obtain a composition with a standardised 3,6,7-trimethyllumazine concentration of from 5 to 3000 mg/kg.