CLAIMS

1. A method of preparing an isothiocyanate containing product from *Brassicaceae* material comprising a glucosinolate comprising:

i) pre-treating the *Brassicaceae* material to improve the access of myrosinase to a glucosinolate;

ii) fermenting the material obtained by step i) with lactic acid bacteria to form the isothiocyanate containing product, and

wherein at least one of the following apply:

a) when pre-treating comprises maceration the *Brassicaceae* material is heated to a temperature that does not exceed about 75˚C;

b) the material obtained by step i) is fermented for about 8 to about 24 hours at about 20˚C to about 34˚C; and

c) the pre-treating comprises heating the *Brassicaceae* material to about 50ºC to about 70ºC reducing epithiospecifier protein (ESP) activity while maintaining endogenous myrosinase activity.

2. The method of claim 1, wherein the pre-treating comprises one or more of the following:

i) heating;

ii) macerating;

iii) microwaving;

iv) exposure to high frequency sound waves (ultrasound); or

v) pulse electric field processing.

3. The method of claim 1 or claim 2, wherein the pre-treating comprises heating the *Brassicaceae* material to about 50ºC to about 70ºC reducing epithiospecifier protein (ESP) activity while maintaining endogenous myrosinase activity.

4. The method of any one of claims 1 to 3, wherein pre-treating comprises one or both of:

a) heating occurs before macerating or wherein heating and macerating occur at the same time; or

b) heating the *Brassicaceae* material to a temperature of about 50ºC to about 70ºC followed by maceration.

5. The method of any one of claims 1 to 4, wherein at least one of the following apply:

a) the *Brassicaceae* material is macerated so that at least about 80% of the *Brassicaceae* material is of a size of about 2 mm or less;

b) the isothiocyanate containing product comprises at least about 10 times more isothiocyanate than macerated *Brassicaceae* material; and

c) the isothiocyanate containing product comprises at least about 2 times the expected maximum yield of isothiocyanate based on the extractable glucosinolate content of the *Brassicaceae* material.

6. The method of any one of claims 1 to 5, which comprises one or more of the following:

a) acidification of the isothiocyanate containing product from step ii) to a pH of about 4.4 or less;

b) wherein the fermentation in step ii) is at about 22˚C to about 34˚C;

c) wherein the fermentation in step ii) is at about 30˚C; and

d) post-treating the isothiocyanate containing product to inactivate microbes.

7. The method of any one of claims 1 to 6, wherein the lactic acid bacteria is:

i) the genera selected from *Lactobacillus, Leuconostoc, Pediococcus, Lactococcus, Streptococcus, Aerococcus, Carnobacterium, Enterococcus, Oenococcus, Sporolactobacillus, Tetragenococcus, Vagococcus* and *Weissella;*

ii) the species selected from *Leuconostoc mesenteroides, Lactobacillus plantarum, Lactobacillus pentosus, Lactobacillus brevis, Lactococus lactis, Pediococcus pentosaceus, Lactobacillus rhamnosus* and *Pedicoccus acidilacti*;

iii) the lactic acid bacteria lacks myrosinase activity;

iv) a) a combination of *Leuconostoc mesenteroides* and *Lactobacillus plantarum*;

b) a combination of *Leuconostoc mesenteroides*, *Lactobacillus plantarum* and *Lactobacillus pentosus*; or

c) a combination of *Leuconostoc mesenteroides*, *Lactobacillus plantarum* and *Lactobacillus rhamnosus*;

v) is BF1 deposited under V17/021729 on 25 September 2017 at the National Measurement Institute Australia and/or BF2 deposited under V17/021730 on 25 September 2017 at the National Measurement Institute Australia; or

vi) one or more of:

a) B1 deposited under V17/021731 on 25 September 2017 at the National Measurement Institute Australia;

b) B2 deposited under V17/021732 on 25 September 2017 at the National Measurement Institute Australia;

c) B3 deposited under V17/021733 on 25 September 2017 at the National Measurement Institute Australia

c) B4 deposited under V17/021734 on 25 September 2017 at the National Measurement Institute Australia; and

e) B5 deposited under V17/021735 on 25 September 2017 at the National Measurement Institute Australia.

8. The method of any one of claims 1 to 7, wherein the lactic acid bacteria is an isolated strain of *Leuconostoc mesenteroides* comprising one or more or all of the polymorphisms listed in Table 18 or 19 that differs from ATCC8293.

9. The method of any one of claims 1 to 8, wherein the lactic acid bacteria is an isolated strain of *Lactobacillus plantarum* comprising one or more or all the polymorphisms listed in Table 13, Table 14, Table 15, Table 16 or Table 17 that differs from ATCC8014.

10. The method of any one of claims 1 to 9, wherein the lactic acid bacteria is B1 deposited under V17/021731 on 25 September 2017 at the National Measurement Institute Australia.

11. The method of any one of claims 1 to 10, wherein the isothiocyanate containing product has one or more or all of the following features:

a) is resistant to yeast, mould and/or coliform growth for at least 4 weeks, or at least 8 weeks, or at least 12 weeks when stored at about 4ºC to about 25ºC;

b) comprises lactic acid bacteria at a concentration of at least 10^8 CFU/g; and
c) comprises an isothiocyanate bioactive derivative.

12. The method of any one of claims 1 to 11, wherein pre-treating comprises maceration and the isothiocyanate containing product comprises 10 times more isothiocyanate than macerated *Brassicaceae* material.

13. The method of any one of claims 1 to 12, wherein the glucosinolate is selected from one of: glucoraphanin (4-methylsulphinylbutyl), sinigrin (2-propenyl), gluconapin (3-butenyl), glucobrassicanapin (4-pentenyl), progoitrin (2(R)-2-hydroxy-3-butenyl), epiprogoitrin (2(S)-2-hydroxy-3-butenyl), gluconapoleiferin (2-hydroxy-4-pentenyl), glucoibervirin (3-methylthiopropyl, glucoerucin (4-methylthiobutyl), dehydroerucin (4-methylthio-3-butenyl, glucoiberin (3-methylsulphinylpropyl), glucoraphenin (4-methylsulphinyl-3-butenyl), glucoalyssin (5-methylsulphinylpentenyl), glucoerysolin (3-methylsulphonylbutyl), 4-mercaptobutyl, glucobrassicin (3-indolylmethyl), 4-hydroxyglucobrassicin (4-hydroxy-3-indolylmethyl), 4-methoxyglucobrassicin (4-methoxy-3-indolylmethyl), neoglucobrassicin (1-methoxy-3-indolylmethyl), glucotropaeolin (benzyl), and gluconasturtiin (2-phenylethyl).

14. The method of any one of claims 1 to 13, wherein the isothiocyanate is sulforaphane.

15. The method of any one of claims 1 to 14, the *Brassicaceae* is a *Brassica.*

16. The method of any one of claims 1 to 15, wherein the *Brassicaceae* is selected from *Brassica oleracea, Brassica balearica, Brassica carinata, Brassica elongate, Brassica fruticulosa, Brassica hilarionis, Brassica juncea, Brassica napus, Brassica narinosa, Brassica nigra, Brassica perviridis, Brassica rapa, Brassica rupestris, Brassica septiceps* and *Brassica tournefortii.*

17. An isolated strain of lactic acid bacteria selected from:

a) BF1 deposited under V17/021729 on 25 September 2017 at the National Measurement Institute Australia;

b) BF2 deposited under V17/021730 on 25 September 2017 at the National Measurement Institute Australia;

c) B1 deposited under V17/021731 on 25 September 2017 at the National Measurement Institute Australia;

d) B2 deposited under V17/021732 on 25 September 2017 at the National Measurement Institute Australia;

e) B3 deposited under V17/021733 on 25 September 2017 at the National Measurement Institute Australia;

f) B4 deposited under V17/021734 on 25 September 2017 at the National Measurement Institute Australia; and

g) B5 deposited under V17/021735 on 25 September 2017 at the National Measurement Institute Australia.

18. A probiotic composition comprising lactic acid bacteria selected from one or more or all of:

a) BF1 deposited under V17/021729 on 25 September 2017 at the National Measurement Institute Australia;

b) BF2 deposited under V17/021730 on 25 September 2017 at the National Measurement Institute Australia;

c) B1 deposited under V17/021731 on 25 September 2017 at the National Measurement Institute Australia;

d) B2 deposited under V17/021732 on 25 September 2017 at the National Measurement Institute Australia;

e) B3 deposited under V17/021733 on 25 September 2017 at the National Measurement Institute Australia;

f) B4 deposited under V17/021734 on 25 September 2017 at the National Measurement Institute Australia; and

g) B5 deposited under V17/021735 on 25 September 2017 at the National Measurement Institute Australia.