Claims

1. A flour composition derived from fungal fermentation of plant material with an active, edible, higher fungus, said fungus being white rot fungi selected from the genuses Pleurotus, Lentinula, Ganoderma, Volvariella, Auricularia, Armillaria, Flammulina, Pholiota, Tremella and/or Hericium, the flour composition having a total metabolizable carbohydrate level of between 0.1 – 10% by weight and comprising between 30 – 90% by weight dietary fibre, wherein the dietary fibre includes 10-70% by weight beta glucans.

2. The flour composition of claim 1, wherein the flour composition has less than 300 calories/100g flour.

3. The flour composition of claim 1 or 2, wherein the dietary fibre includes 40% - 65% by weight fungal derived 1,3 and 1,6 beta glucans.

4. The flour composition of any one of claims 1 - 3, wherein the flour composition has a linoleic acid content of 10% of the total fat content of the flour composition, or greater.

5. A process for the production of a flour composition derived from fungal fermentation of plant material, the flour composition having a total available carbohydrate level of between 1 – 50% by weight, the process including the steps of:

a) hydrating, drying or maintaining a lignocellulosic plant material substrate to achieve a substrate moisture level between 45% – 95%;
b) sterilising the substrate of a);
c) inoculating the sterile substrate with an active, edible, higher fungus, said fungus being white rot fungi selected from the genuses *Pleurotus*, *Lentinula, Ganoderma, Volvariella*, *Auricularia*, *Armillaria*, *Flammulina*, *Pholiota*, *Tremella* and/or *Hericium*;
d) incubating the inoculated substrate at 18°C – 40°C for a period of 5 – 28 days to produce a fermented substrate;
e) drying the fermented substrate of d); and
f) milling the dried, fermented substrate to form a flour composition;

g) wherein the process includes the further step of adding a functional additive being a food grade nitrogen to the substrate prior to inoculation.

6. The process of claim 5, wherein the active, edible, higher fungus used for inoculation in step c) is added at an amount of 5-50% w/w of the hydrated lignocellulosic plant material.

7. The process of any one of claims 5-6 or the flour composition of any one of claims 1-4, wherein the flour composition is gluten-free and the plant material is lignocellulosic plant material selected from one or more gluten free plant materials selected from the group consisting of kiwifruit, apple, pear, orange, carrot, grape, mango, tomato, avocado, berries, bean, pea, lime, lemon, feijoa, cassava, onion, parsnip, beetroot, banana, peach, nectarine, paw, pineapple, melon, mesquite, watermelon, acorn, hazelnut, chestnut, grape, chickpea, chia, potato, coconut, almond, soybean, sorghum, arrowroot, amaranth, taro, cattails, quinoa, buckwheat, corn, rice, atta, hemp, teff, by-products thereof and derivatives thereof.

8. The process of any one of claims 5-6 or the flour composition of any one of claims 1-4, wherein the plant material is derived from low starch fruit or vegetables selected from the group consisting of kiwifruit, apple, pear, orange, carrot, grape, mango, tomato, avocado, berries, bean, pea, lime, lemon, feijoa, onion, beetroot, banana, peach, nectarine, paw, pineapple, melon, watermelon, coconut, soybean, by-products thereof and derivatives thereof.

9. The process of any of claims 5-8, wherein the step of hydrating, drying or maintaining the lignocellulosic plant material substrate achieves a substrate with a moisture content of between 55% - 90%.

10. The process of any one of claims 5-9, wherein the white rot fungi is selected from the genus Pleurotus.

11. The process of any one of claims 5-10, wherein the step of drying the fermented substrate includes drying the substrate at a temperature of 30° – 70°C.

12. The process of any one of claims 5-11, wherein the step of drying occurs under vacuum conditions.

13. The process of any one of claims 5-12, wherein the incubation step d) is performed under air flow.

14. The process of any one of claims 5-13, wherein the incubation step d) is carried out in an incubation space wherein the humidity is between 90% and 100%.

15. Use of a flour composition according to any one of claims 1-4, or 7-8, for creating lower calories baked goods.

16. Use of a flour composition according to any one of claims 1-4, or 7-8, to replace completely or partially traditional flours.

17. Use of a flour composition according to any one of claims 1-4, or 7-8, outside the food industry as an ingredient in adhesive, industrial filler, binders and/or cosmetics, or to create biodegradable packing.