9th February 2020

Tim Thornewell
Mycological Developments Ltd
Box 156
WHANGAREI
NORTHLAND 0140

To Whom it may concern

I have been involved in mushroom growing, spawn production, mushroom culture importation, wild strain isolation and improvement, substrate manufacture in New Zealand since the 1980's and through my company Mushroom Gourmet since the 1990's and Mycological Developments Ltd since the 2000's.

Technicians have been importing refrigerated container loads of 'ready to grow' mushroom substrate bags enabling them to sell a range of edible fungi that fruit from these bags. They have been selling the mushrooms either without declaring them to be assembled overseas from overseas ingredients, or they have been labelling the mushrooms as NZ grown.

I would like to briefly share my knowledge around the story of how the edible fungi substrate logs are prepared to get to New Zealand, hoping to clarify the actual facts in the face of claims from some in the industry that seem to obscure these facts from the general public by omission or suggestion.

The mushrooms discussed are those derived from sawdust blocks initiated and prepared in Japan, Australia, Holland, Hong Kong or China, but it would be natural to have any labelling apply to growers where all the work and materials are NZ sourced.

1- I would like to confirm that a *mushroom*[1], as sold in shops, is the *fruit**[A 2] of the *living fungus*[3].

2- The living fungus is hidden in the '*Bag of Sawdust*[4]' that is prepared by the *grower*[5] by four distinct technical, time-consuming and costly processes

a-mixing raw materials, (wood/straw plus nutrients plus chemicals*[F])moistening and bagging into purpose-made polypropylene bags

b- sterilising (121C for 2-6 hours)

c- inoculating in a sterile room with a small piece of mushroom *root*[6] at a rate of 1-2% of the volume of the damp sawdust

d- propagating the 'Bag of Sawdust' in *clean-rooms*[7] over a period of 3-12 weeks at 18-24C and 70-80% humidity.

3- The living fungus, hidden in the sawdust, is an out-growth expansion of the ROOT of the mushroom fruit that was placed in at point 2c

4- The ROOT grows from 1-2% of the volume of the sawdust to massively expand and colonise 100%*[B] of the damp sawdust and now instead of being loose sawdust is tightly bound, much like a solid block of polystyrene*[C]

Ingredients required to construct a mushroom sawdust 'log' plus water

When a farmer in a foreign country has invested 4-12 weeks of time, money and expertise in producing the mushroom organism, it is packed into a refrigerated shipping container where it achieves a state of dormancy.

Upon arrival at the purchaser's destination the bag of sawdust, now called a shiitake or oyster mushroom grow-log or sawdust-log, is warmed up watered and kept in a moist atmosphere. This is a simple process involving watering, spraying or fogging in a temperature generally in the range of 12-22C. The process is so simple that merely unwrapping the sawdust log and placing it in a bucket of damp sand will encourage it to fruit within 3-14 days. This period could be accurately described as less than 1/10 of the time taken to do the technical work of growing the living fungus in the foreign country of preparation.

Mushroom sawdust 'log' . The mushroom 'root' as expanded to colonise all of the mixture, and is ready for fruiting

- I therefore claim that it is misleading to describe the mushrooms emanating from such a process as grown in NZ.

- I firmly believe that the New Zealand consumer is entitled to know where 90% of the growing cycle of the mushrooms they are choosing to buy from New Zealand shops took place.

- I believe that the existence of and origin of the sawdust, the water, any chemical or natural additives, any spawn or chemical additives in the spawn and the air supplied to the growing fungus would ideally be declared in recognition of the importance that the buying public puts on food safety and transparency.

I believe discerning customers would understand that a label as below, would be the minimum expectation for labelling.

"these mushrooms were picked in New Zealand from raw materials sourced in 'X' and manufactured in 'Y' country and are believed to meet 'Z' conditions of health and safety as required by growers in New Zealand"

## How the above relates to

## The DRAFT FOR CONSULTATION Consumer Information Standards (Origin of Food) Regulations 2019

REGARDING THE BELOW INFORMATION PERTAINING TO MUSHROOMS OR EDIBLE FUNGI in particular

fruit or vegetable— (a) means a plant, or the part of a plant, that can be eaten as food; and 2 Consultation draft Consumer Information Standards (Origin of Food) Regulations 2019 Part 1 r 6 (b) includes a mushroom or edible fungus*[A], coco

Part 2
Information must be disclosed Information that must be disclosed 9 Information that must be disclosed (1) This table sets out the information that must be disclosed for a type of regulated food (the origin information): Type of regulated food Origin information Fruit or vegetable The 1 or more

(2) A fruit or vegetable was grown in a country if— (a) it was materially increased in size,*[B] or materially altered in substance*[C], in that country by natural development; or (b) it germinated or otherwise arose in that country*[D]

TERMS

| | |
|---|---|
| MUSHROOM | the roots or myclia of an edible fungus |
| FRUIT | the structure that emanates from the mushroom to create spores |
| LIVING FUNGUS | the hidden root mass either under-ground or in timber |
| BAG OF SAWDUST | the wood, nutrient and chemical mixture for growing the living fungus |
| GROWER | a person who prepares the raw materials ready for the living fungus to grow |
| ROOT | technically mycelium, the root grows into a complex interconnected mass |

*F MATTERS RELATING TO THE RAW MATERIALS and how they relate to the interests of the end consumer

As with any living organism the liquids and nutrients taken in affect the nutrient and contaminant status of said organism.

In horticulture leaf samples are taken to detect nutrient and chemical imbalances or residues.
In dairying leaf samples are analysed because grass health affects cow health which affects production and milk quality.

Mushroom fruit bodies absorb nutrients from the growing mix through the roots. This affects what minerals/chemicals/protein/heavy metal content is exhibited.

For instance, button mushrooms are touted as a great source of Selenium in New Zealand. This selenium is exhibited only because poultry are fed it to avoid health problems, they then excrete it into the manure that button mushroom farmers make their compost with.

There are many nutrients that can be used to enhance the yield of mushrooms from sawdust mixes, they may be chemical, animal or plant based. They may also be from genetically modified soybeans in the form of branded supplements that seem to be allowed to be used in NZ in the button mushroom industry.

Formaldehyde is widely used overseas as a foot bath for workers, general steriliser for substrates and for supplements, including button mushroom supplements available in NZ.

For these reasons I believe that consumers need to be able to read about the provenance of their edible fungi. They may also be concerned to know what conditions workers are working under and where trees used for making the sawdust were growing.

Ideally they need to know that a certifying body with a NZ equivalent is overseeing and testing the inputs. In the absence of this the consumer needs to know where the fungus was prepared so they can ask their own questions.

Sincerely
Yours

Tim Thornewell