



**Issue 12: Nov, 2021: This e-bulletin is aimed at health professionals, consumers, growers, farmers, packers, processors, distributors, retailers, and others in the plant foods area.**

## **Mushrooms as a main course**

Today's world class Irish mushroom industry had its origins in ground breaking mushroom research conducted at Kinsealy Research Centre (An Foras Taluntais) in the 1970s, 80s and 90s. Dynamic entrepreneurs engaged with the outcomes and the rest is history. The discussion below relates entirely to the common white mushroom (*Agaricus bisporus*) which accounts for most of the retail sales. However, other types of mushrooms are commanding more shelf space in recent years. One may ask 'why consider mushrooms as a main course' - - - the simple answer is 'why not - - they are excellent'.

### **Flexitarianism**

Flexitarians make a conscious decision to eat red meat two or three times per week and to be largely vegetarian on the other days. This decision is based on eating more healthily as well as awareness of the high carbon footprint of red meat production. Non flexitarian consumers are also aware and are following this trend. This offers a major opportunity for mushroom producers to promote mushrooms as the main component of meals i.e. on a weight basis. Traditionally, mushrooms are used as a starter, e.g. breaded mushrooms, or as a side order or accompanying vegetable as part of a meal. This is fine and accounts for a large consumption of mushrooms. However, the opportunity to promote mushrooms as a main course seems ripe for exploitation.

### **Mushroom colour, flavour and texture**

Retailers require 'snow white' mushrooms with no blemishes or brown specks. Ironically, mushrooms that are allowed develop a small level of browning post-harvest are better flavoured than the very white ones. This was demonstrated in a trial at Kinsealy Research Centre in the 1970s where samples were picked on a Monday, Tuesday, Wednesday, Thursday and Friday. The 5 samples were sautéed on Friday and the oldest mushrooms received the best flavour taste panel ratings. Consumers are probably aware of this via the very mature flat breakfast mushrooms which have the best flavour of all. Mushrooms have a strong ability to soak up water as indicated by a weight gain of 30% for mushrooms soaked in cold water for 2h (Gormley & Walshe, 1974). This property lends itself to marinating where salt or sugar based marinades with a range of flavours (e.g. lemon & lime; tandoori; arrabiata; Cajun) can be applied to mushrooms via short soak times (10-15min) thus generating an exciting range of new flavours that complement the basic mushroom flavour. Marinating can easily be conducted by processors and/or consumers. Cooking button or small cup whole mushrooms in boiling water (6min) gives a product with an excellent texture that is chewy but not tough. The excellent texture is due to cell/mycelial turgor pressure. Mushrooms can be cooked by many other methods but boiling is best from a textural point of view. Boiled whole mushrooms can take the place of boiled potatoes or rice in a meal and can be included as the main ingredient (on a weight basis).

## Examples of mushrooms as a main course

Using mushrooms as a main course involves increasing the content of mushrooms so that they become the dominant item in a meal. Examples include breaded (French fried) mushrooms with a side salad and tartar sauce; boiled whole mushrooms with steak and fried onions; boiled whole mushroom salads; mushroom casseroles; mushroom/meat loaves; mushroom omelettes and pancakes; curried mushrooms. Most cookery books contain recipes for mushroom dishes and these can be converted to main course items by raising mushroom content so that it is the dominant ingredient. Two well-known books are 'Mushroom Cookbook' by Mimi Brodeur and 'The Mushroom Cookbook' by Michael Hymes & Liz O'Keefe.

## Nutritive value of mushrooms

Mushrooms are highly nutritious, are low in energy (93kJ/100g) and contain circa 92.5 (moisture), 3.25 (carbohydrate), 3.09 (protein), 0.54 (fat) and 1% (dietary fibre). They are a source of at least 10 vitamins (albeit in low amounts) and a number of minerals including potassium (318mg) and phosphorus (80mg/100g). The above can be called 'mainstream' nutrients. However, mushrooms also contain a wide range of bioactive compounds which are beneficial for health. These include chitin (N-acetylglucosamine) which has anti-hypertensive, anti-microbial and anti-cancer properties (Vetter, 2007). It is also linked to diabetic control and may be the agent in alcohol-insoluble-solids (AIS) separated from mushrooms that stimulated insulin production by rat pancreatic cell lines (Clarke *et al.*, 2019). Kalaras *et al.* (2017) showed that different types of mushrooms are excellent dietary sources of the key antioxidants glutathione and ergothioneine. A review of mushrooms in human nutrition and health concluded that many health promoting effects have been attributed to mushrooms but that few are supported by clinical trials (Rizzo, 2021). However, a study in UCD showed that white mushrooms (*Agaricus bisporus*) treated for 3s with a UVB dose of 1.5 J/cm<sup>2</sup> had an increased vitamin D<sub>2</sub> content which was absorbed into the bloodstream in clinical trial participants (Stepien *et al.* 2013).

**Conclusions:** The text above deals with white mushrooms (*Agaricus bisporus*). However, many other types of mushrooms are equally, if not more nutritious, and make excellent eating. Some better known ones are oyster (*Pleurotis ostreatus*), boletus (*Boletus edulis*) and shiitake (*Lentinula edodes*). Mushrooms are highly versatile foods and can be cooked/prepared in many ways. They are nutritious, have excellent flavour/texture, are quite filling and lend themselves as the major component of many types of meals. So try some as a main course - - you will not be disappointed!

## References

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Compiled by Professor Ronan Gormley, UCD Institute of Food & Health, School of Agriculture & Food Science, Belfield, Dublin 4. \*\*More information from [ronan.gormley@ucd.ie](mailto:ronan.gormley@ucd.ie)

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