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SLMNA NEWSLETTER

SRI LANKA MEDICAL NUTRITION ASSOCIATION OFFICIAL NEWSLETTER

Linking nutrition research to practise...

Message from Editors..

Look at life with a different eye in the wake of the pandemic ...!

Even though we keep dreaming about a "normal life", of course, the entry to a "new normal" world will not be all smooth sailing. After the intrusive arrival of the pandemic of Covid-19, at every corner of the current world exists a change and leaves us with unprecedented challenges where our lives are filled with uncertainty and insecurity. Keeping the series of un-answered questions aside, it's high time to see things differently, act accordingly and adapt flexibly, which is not a dream, but an achievable reality.

Rather than trying to go “back” to your old life, try experiencing something that could bring about a positive change that can take you forward. Have you ever realized that minimum physical inactivity, maximum healthiness in food, minimum stress and maximum immunity are solely the top priorities in the aftermath?

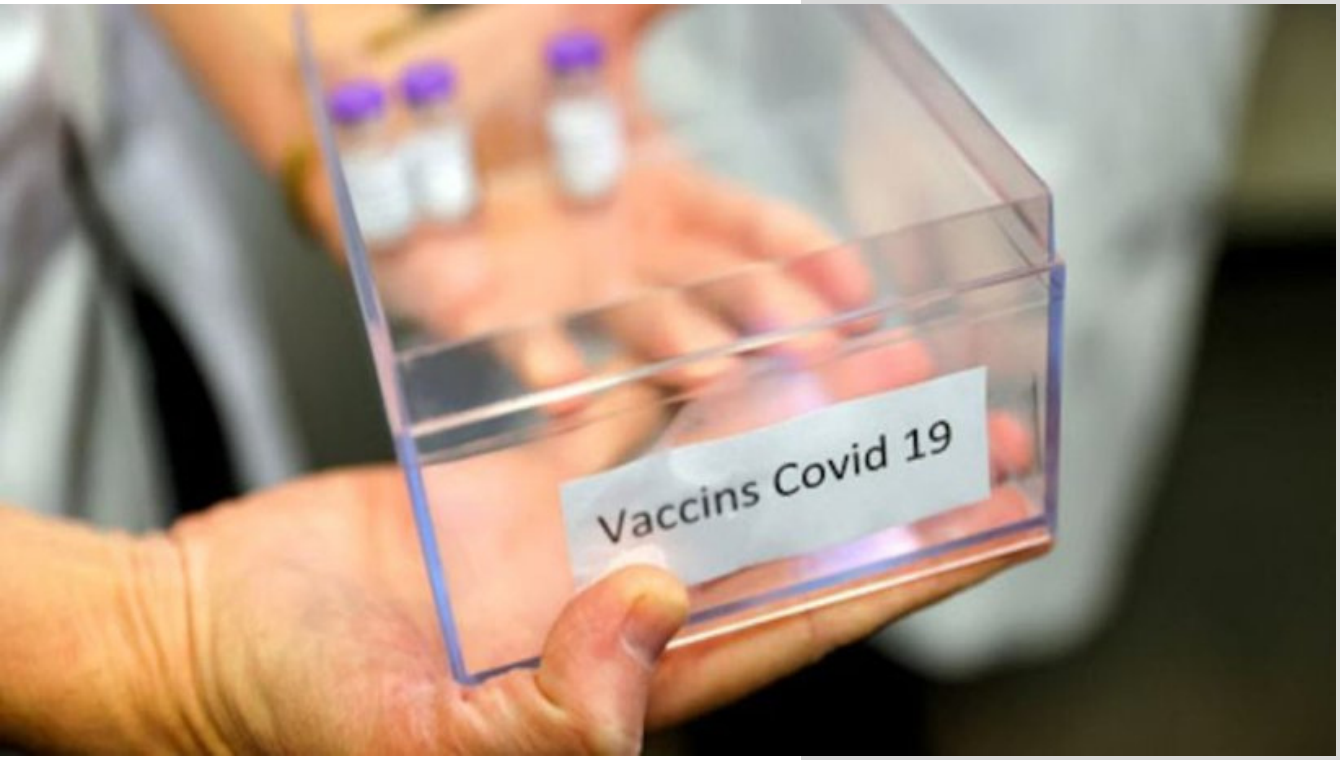
Let's try to "live" this "new normal life" rather than painstakingly looking forward to the "old normal". Take time for yourself, family and friends. Eat nutritious food. Be physically active. Learn a new skill. Stop, look around, breathe, be grateful, be with the loved ones. After all, the pandemic has helped us understand what is most important in life- Health, Family and Contentment.

Dr. Hasanthi and Dr. Udari

THIS MONTH'S FEATURED ARTICLES

- Capture of the Month
- Diverticular Disease
- Food of the Month - Mushrooms
- Past and Upcoming Events

CAPTURE OF THE MONTH



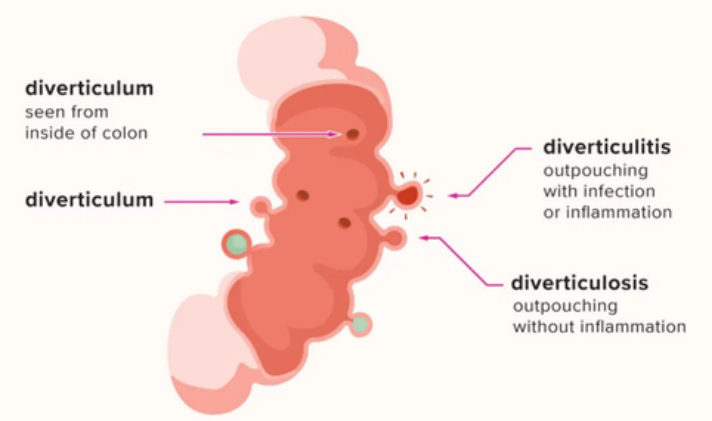
New hope...!

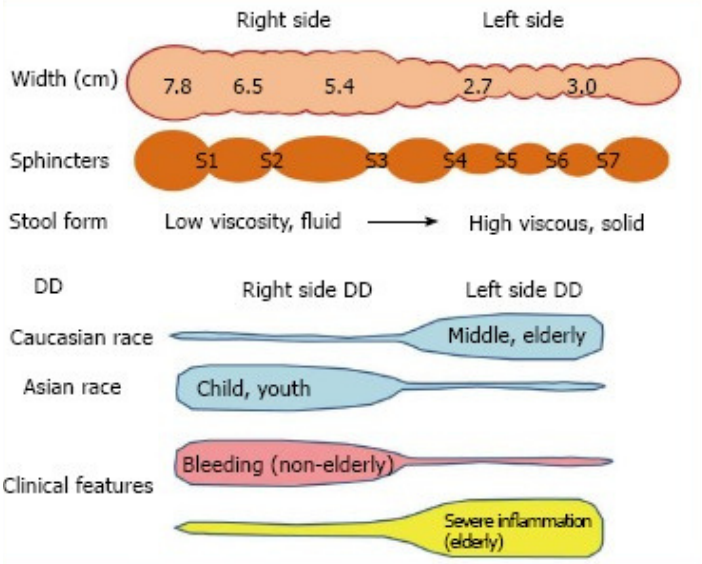
DIETARY ASPECTS OF DIVERTICULAR DISEASE

ARTICLE OF THE MONTH

By Dr.H.N.Hasini Dinushi

A. Diverticular Disease





Diverticular disease of the colon (DDC) includes a spectrum of conditions from asymptomatic diverticulosis to symptomatic uncomplicated diverticulosis, segmental colitis associated with diverticulosis, to acute diverticulitis with or without complications that may have serious consequences. (Gargallo CJ , Sopeña F, & Lanas A. 2015)

In western and industrialized countries, DDC is largely age-dependent and it is rare in young people. Also, it is rare in rural areas of non-industrialized countries. This geographic deviation is because of the consumption of fiber-poor diets in western countries. (Painter N, and Burkitt D 1971). DDC is predominantly left-sided in western countries (90% of patients) while it is 75-85% right-sided predominance in Asian countries. (Miura S, Kodaira S, and Shatari 2000).

The following figure shows distinctions in the background and symptoms of right and left diverticular disease. (Yoshiharu Uno and Jennifer C van Velkinburgh 2016)

B. Pathogenesis

Theoretically, the formation of a mucosal hernia needs intraluminal high pressure and a pre-existing defect in the involved muscle layer. The colonic walls with diverticula exhibit a thickening attributed to elastin deposition within the muscle fibres (taenia) (Whiteway J and Morson BC 1985). Colonic diverticula are more commonly found along the side of the taenia and the sites denote the weakest points where blood vessels penetrating across (Griffiths JD 1961). Furthermore, the type III collagen synthesis in patients with diverticulosis has been identified as higher than usual. This has been described as raising the chance of age-related changes in collagen composition. And also over-expression of metalloproteinases in colonic tissue has been described in patients with diverticular disease (Whiteway J and Morson BC 1985)

C. Risk Factors for DDC

The following figure shows the summary of predisposing and protective factors associated with primary and secondary prevention of acute diverticulitis. (Carola Severi 2018)

Predisposing factors

- ANTHROPOMETRIC & ANATOMIC FEATURES
  - BMI
  - Waist circumference
  - Waist-hip ratio
  - Pancolic diverticular
- LIFESTYLE
  - Smoking
- DIET
  - Red meat intake
- DRUGS
  - Aspirin
  - NSAIDS
  - Corticosteroids
  - Opioids

Protective factors

- LIFESTYLE
  - Vigorous physical activity
- DIET
  - High-fiber intake
- DRUGS
  - Statins
- OTHERS
  - Increased vitamin D levels

Factors need to be confirmed

- Alcohol
- Younger age
- Female gender>50 years old
- Genetic factors
  - Family history
  - TFNSF 15 polymorphism
  - LAMB4 variants
- Calcium antagonist
- Comorbidities
  - Cardiovascular diseases
  - chronic obstructive pulmonary disease
  - end-stage renal disease

D. Diet

Patients should be advised to consume a high fibre diet once the acute phase of diverticulitis has resolved. This recommendation is based upon the observational studies that suggested long-term fibre supplementation may reduce the incidence of recurrent diverticulitis. We do not counsel patients with a history of diverticulitis against consuming seeds, corn, and nuts.

Foods rich with Insoluble fibres are,

- ✔ Whole grain foods
- ✔ Beans and Peas
- ✔ Nuts and seeds
- ✔ Potato
- ✔ Green leafy vegetables
- ✔ Avocado, unripe bananas
- ✔ Grapes / Tomatoes with skin

Management of Uncomplicated Diverticulitis. (Review of the Guidelines Hayley You in 2019)

Historically, this has been managed with antibiotic therapy, but most international guidelines now recommend a clear liquid diet

and selective use of antibiotics on a case-by-case basis only. And also, antibiotic therapy has no clear benefit in reducing complications, shortening recovery, or preventing recurrence of episodes. A comprehensive outpatient management strategy for uncomplicated diverticulitis includes,

I. clear liquid diet for 2–3 days
II. low fibre diet until the pain improves
III. acetaminophen plus antispasmodics for pain
IV. use of antibiotics on a case-by-case basis

The clinical rationale behind the clear liquid diet is to rest the bowel. It will ameliorate abdominal pain through the prevention of hard stool formation. If there is a concern about a surgical approach, the clear liquid diets will offer a shorter period of fasting before the surgery, too. In conclusion, outpatient treatment is safe and is recommended for afebrile patients with uncomplicated diverticulitis who can tolerate oral hydration and have adequate family support.

Management of Complicated Diverticulitis

All guidelines currently recommend the use of intravenous broad-spectrum antibiotics and bowel rest for patients with complicated diverticulitis. The general agreement for managing small abscesses that less than 3 cm, is a bowel rest and using intravenous antibiotics or if larger than that it should be drained percutaneously. This is followed by oral antibiotics and a liquid or low residue diet as an outpatient. For recurrent cases of diverticulitis that could be managed without surgery, elective surgery is offered on a case-by-case basis. Peritonitis is a life-threatening complication of acute diverticulitis.

Major guidelines currently recommend fluid resuscitation, rapid antibiotic administration, and urgent surgery for patients with peritonitis and sepsis.

For the Prevention of diverticulitis, they recommend,

I. body mass index < 30 kg/m2
II. vigorous exercise
III. avoiding smoking
IV. limiting red meat consumption

The majority of patients with asymptomatic diverticulosis are offered no treatment or follow-up. (‘European e-Journal of Clinical Nutrition and Metabolism’, 2011).

Recommended principal treatment for asymptomatic diverticulosis

I. Fibre-rich diet
II. Non-absorbable antibiotics
III. Mesalazine as an alternative
IV. Probiotics

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MUSHROOMS: WHAT IS IT'S PLACE IN A HEALTHY DIET?

FOOD OF THE MONTH

By Dr. Channa Illangasinghe

Mushrooms are eukaryotic organisms classified in the kingdom of Fungi. (Blackwell, 2011). Human consumption of mushrooms (mycophagy) dates back thousands of years. The Food and Agriculture Organization (FAO) highlights a report that some edible species of mushrooms were found in an archaeological site in Chilli, which dated back to more than 13,000 years (Rojas and Mansur, 1995). They further describe that it is in China where the eating of wild mushrooms is first reliably documented. It was several hundred years before the birth of Christ (Aaronson, 2000). Humans have used mushrooms as a medicine or a supplement in conditions such as inflammation, cancer, atherosclerosis, hypertension, and diabetes for more than 5000 years. (Schwartz and Hadar, 2014) To date, China is the leading exporter of cultivated mushrooms. ('Wild Edible Fungi: A Global Overview of their Use and Importance to People', FAO, 2004)

There are more than 2,000 species of mushrooms in nature, but only around 25 are widely accepted as food, and very few are commercially cultivated. Mushrooms are considered as a flavoursome food with high nutritional and functional value, and they are also accepted as nutraceutical food. (Günç Ergönül et al., 2013) The most cultivated mushroom worldwide is Agaricus bisporus (button mushrooms), followed by Lentinus edodes, Pleurotus and Flammulina velutipes.

Mushroom production continuously increases with time, China being the biggest producer of mushrooms in the world. (Patel and Goyal, 2012) However, people still prefer wild mushrooms for their nutritional, sensory, and especially functional characteristics (Aida et al., 2009)

Nutritional Properties of Edible Mushrooms

Different edible mushrooms claim different nutritional properties. But as a whole, they all contain a healthy content of vitamins, minerals, dietary fibre, and some protein.

Low dietary lipid levels

Mushrooms have a low lipid content, more unsaturated fats than saturated, with an acceptable quantity of essential fatty acids; mainly cis-Linoleic acid[18:2 (n-6)] (Günç Ergönül et al., 2013)

Good source of protein

The average protein content of edible mushrooms ranges from 2% to 16% of dry weight. The percentage of essential amino acids are 50% to 62% of the total amino acid content. (Díez and Alvarez, 2001) Leucine, Valine, Glutamine, Glutamic and Aspartic acids are the most abundant amino acids (Manzi et al., 1999) The typical mushroom taste (umami taste) is given by the aspartic and glutamic acids (Valverde, Hernández-Pérez and Paredes-López, 2015). When compared with most plant foods, mushrooms have a good balance of amino acids and PDCAAS score. But the amino acid content of mushrooms tends to change with species, compost or soil they grow in and the amount of atmospheric nitrogen.

Good source of dietary fibre

The fibre content of mushrooms differs greatly with their morphological stage; fruit body, mycelium, or sclerotium. Mushrooms mainly have water-insoluble dietary fibres (Chitin and β-D-Glucans) which account for more than 90% of the total dietary fibres. And the consumption of mushrooms daily can give up to 25% of our daily dietary fibre requirement. (Cheung, 2013)

Very low in calories

27kCal to 30kCal per 100grams of fresh matter or from 344kCal to 450kCal per 100grams of dry matter (Kadnikova et al., 2015) (Mattila et al., 2002)

Rich in vitamins

Mushrooms provide significant amounts of vitamins B1, B2, niacin, folate, B12, C, D, and E with a small amount of vitamin K. (Heleno et al., 2010) Many mushrooms have vitamin B12 and it is the same form of vitamin B12 found in organ meat, and fish, which is highly bioavailable. But the amount of vitamin B12 is usually less than 2% of the RDA (2.4 mg/d). Nevertheless, since it is a highly bioavailable form of vitamin B12, it could be a good source for vegetarians as a means of getting vitamin B12 from the diet. (Feeney et al., 2014)

Mushrooms are a good source of Ergosterol. This Ergosterol is converted to vitamin D2 when they are exposed to UV light. (Feeney et al., 2014) The vitamin D2 level in wild mushrooms or UV treated cultivated mushrooms is likely to remain above 10µg/100g raw weight. It is a higher level than most vitamin D-containing foods. Also, it is similar to the internationally recommended daily requirement of vitamin D (400 to 800IU/d or 10 to 20µg/d depending on age and physiological status). Therefore, mushrooms can provide a good amount of vitamin D2 for those who prefer a vegetarian diet. (Cardwell et al., 2018) (Calvo et al., 2013) (WHO, 2015)

Rich in minerals

When compared to vegetables, mushrooms are a good source of minerals. They have a significant amount of Potassium(K), Phosphorus(P), Zinc(Zn), and Copper(Cu). Cultivated "White Button Mushrooms" (Agaricus bisporus) have a large amount of Selenium(Se) (3.2 mg/kg dry weight) (Mattila et al., 2001b).

Non-nutritive Health Benefits of Mushrooms

Antioxidant properties

Mushrooms are a good source of L-Ergothioneine. It is a sulphur-containing amino acid with antioxidant properties (Kıvrak, Kıvrak and Harmandar, 2016)

Anti-inflammatory properties

It is said that ergosterol peroxide could be the main bioactive compound with the anti-inflammatory properties. (Liaw et al., 2017)

Mushrooms act as prebiotics

Good to maintain healthy gut microbiome. (Hess et al., 2018)

Immune-modulatory effect

Anti-cancer effect

Many mushrooms possess anti-proliferative properties or anti-inflammatory properties or pro-apoptotic properties (Wang et al., 2018) (Lee et al., 2019)

Effects on controlling blood glucose levels

Mushrooms contain selenium, which increases insulin sensitivitv. (Wang et al., 2017)

Health Risks in the Consumption of Edible Mushrooms

Heavy metal poisoning

Sometimes mushrooms can accumulate heavy metals like Arsenic, Cadmium, Mercury and Lead. This depends on the species of mushroom and concentration of heavy metals in soil. (Kokkoris et al., 2019) This was found mainly in the wild edible mushroom species (Falandysz and Rizal, 2016)

Some genera (Agaricus, Macrolepiota, Lepista and Calocybe) accumulate high levels of cadmium and mercury even in unpolluted or mildly polluted soil. But the cultivated species, such as Agaricus bisporus and Pleurotus ostreatus contain only very low levels of heavy metals. (Kalač and Svoboda, 2000)(Fang et al., 2014)

How to Identify Non-edible Mushrooms?

1. They have a bright colour or strong odour.
2. They do not attract flies/insects.
3. They possess both volva and annulus (ring)
4. When they are boiled in hot water with clean onion slices, the onion slices turn into purple colour.
5. When they contact with silver cutleries (spoon), the contacted part of the silverware gets a blackish discolouration.

These facts could not be 100% reliable when selecting edible fungi. But these can be used as a rough guide to avoid non-edible/toxic mushroom species. (Department of Agriculture, 2014)

Most Commonly Consumed Mushrooms in the World

The most widely consumed mushrooms worldwide are,

1. Agaricus bisporus (Common button mushroom)

2. Lentinula edodes (Shitake mushrooms)

3. Pleurotus spp. (Oyster mushrooms)

4.Flammulina velutipes (Enokitake mushrooms / velvet foot / winter mushrooms)
(Reis et al., 2012)

Commonly Consumed Edible Mushrooms in Sri Lanka

Wild mushrooms are known to have more flavour and nutrients when compared with cultivated mushrroms.

Humbas bimmal (Termitomyces sparsibaris)

Edible, exellent taste.
5-6cm wide cap, 10-12cm long stalk,brown in colour. Initially, the cap is convex, but later becomes flat or depressed in the center. Both ring and volva are absent. Normaly found on the termite nests in single, all over the island.

Mahaweliya (Termitomyces alwisii)

Edible, and excellent taste.
5-7cm wide cap, initially umbonate, but gets flat with splitted margin with aging. Stem is stout and not tapering. Volva absent, but ring present when young. Brown in colour. Grows on termite nests and decaying wood in large numbers.

Heenweliya or Weli bimmal (Termitomyces microcarpus)

Edible, exellent taste.
Cap is 1.5-2.5cm wide, with splitted margin, brittle stem, pleasant odour. Associated with termite nests (on or around) or on grass lawns or bare lands. Grow in groups.

I*ndalolu (Termitomyces rajap)*

Edible, excellent taste.
Cap 3-6cm wide, stem 10-12cm long, thick milky white surface, margin is splited, ring present. On the base of termite nests.

Beli hathu (Pleurotus angustatus)

Edible, exellent tase, highly popular.

Cap is 4-8cm wide, spatulate, with irregular margines, white in colour, stem 6cm long. On dead wood, found in clusters of 10-15 mushrooms.

Urupaha bimmal (Sookara Maddhawa) (Lentinus giganteus)

Excellent edibility, taste is similar to pork, and one cap is enough for 3-4 families.
30-40cm wide, 4-8cm thick large cap, when young, cap is convex, later becomes flat. tough and leathery surface, dark brown-black in colour, have wart like scales, flesh is white in colour, stem is 1-5cm wide and 4-10cm long, tan in colour . On the ground, amoung grass. Commonly arise buried Jak roots.

Nutrition Profile of Mushrooms that are Commonly Consumed in Sri Lanka

Most commonly consumed mushrooms in Sri Lanka are the cultivated mushrooms. Below mentioned are the most common commercially cultivated mushrooms in Sri Lanka.

1. Lanka Oyster (Pleurotus zeylanicus)
2. American Oyster (Pleurotus angustatus, Pleurotus flabellarus)
3. Common button mushroom (Agaricus bisporus)
4. Abalone (Pleurotus cystidiosus)

Nutrients per 100g	Mushrooms, Abalone, Raw	Mushrooms, white, button, raw	Mushrooms, white, oyster, raw	Mushrooms, Chinese Shitake, raw
ID	AAD82	AAD83	AAD 87	AAD 118
Water	88.6 g	90.5 g	89.9 g	90.5 g
Energy	45 kcal	33 kcal	40 kcal	32 kcal
Total Protein	2.69 g	7.70 g	3.2 g	2.2 g
Total lipids	0.9 g	0.2 g	0.5 g	0.1 g
Ash	1.2 g	1.4 g	0.7 g	0.6 g
Total carbohydrate (by difference)	6.7 g	3.2 g	5.7 g	5.5 g
Fibre – total dietary	N/A	N/A	N/A	N/A
Calcium	7 mg	9 mg	4 mg	6 mg
Iron (Fe)	1.3 mg	5. 7 mg	1.5 mg	1.1 mg
Magnesium	N/A	N/A	N/A	N/A
Phosphorus	85 mg	139 mg	78 mg	46 mg
Potassium	487 mg	528 mg	214 mg	237 mg
Sodium	45 mg	08 mg	22 mg	7 mg
Zinc	0.1 mg	0.2 mg	0.2 mg	0.1 mg
Copper	0.04 mg	0.38 mg	0.06 mg	0.08 mg
Selenium	N/A	N/A	N/A	N/A
Vitamin C	8 mg	4 mg	10 mg	-
Vitamin B1	0.07 mg	-	0.04 mg	-
Vitamin B2	0.27 mg	-	0.31 mg	1.03 mg
Vitamin B3	2.8 mg	5.5 mg	3.9 mg	3.2 mg
Vitamin B5	N/A	N/A	N/A	N/A
Vitamin B6	N/A	N/A	N/A	N/A
Folate	N/A	N/A	N/A	N/A
Vitamin B12	N/A	N/A	N/A	N/A
Vitamin A	0 IU	0 IU	0 IU	0 IU
Beta carotene	0 µg	0 µg	0 µg	0 µg
Vitamin E	N/A	N/A	N/A	N/A
Vitamin D (total)	N/A	N/A	N/A	N/A
Vitamin D2	N/A	N/A	N/A	N/A
Vitamin D3	N/A	N/A	N/A	N/A
Vitamin K	N/A	N/A	N/A	N/A
Saturated fatty acids	N/A	N/A	N/A	N/A
Mono Unsaturated Fatty Acids (MUFA)	N/A	N/A	N/A	N/A
Poly Unsaturated Fatty Acids (PUFA)	N/A	N/A	N/A	N/A
Ergosterol	N/A	N/A	N/A	N/A

UV Treatment of Mushrooms in order to Increase Vitamin D Content and its Applicability to Sri Lanka

Fungi/mushroom have provitamin D2 (ergosterol) in their cell membranes, similar to the cholesterol in animals. It helps to strengthen the cell membrane, modulate membrane fluidity, and assist intracellular transport. (Weete, Abril and Blackwell, 2010)

When exposed to UV radiation, pro vitamin D2 (ergosterol) in the mushroom is transformed to pre-vitamin D2, which is then thermally isomerised in to vitamin D2 (ergocalciferol). This conversion is a temperature dependent, non-enzymatic, membrane-enhanced, catalytic mechanism. Pro-vitamin D4 also gets converted to vitamin D4 through a similar process. This is similar to the human skin vitamin D3 production by pro vitamin D3. (Keegan et al., 2013) (Holick et al., 2007)

The vitamin D2 content in wild mushrooms and sun-dried mushrooms are many times higher than the commercially cultivated fresh mushrooms since the latter is grown under dark conditions. (Mattila et al., 1994) (Jasinghe and Perera, 2005). But, with the exposure to the sunlight, there could be a significant (26%) loss of vitamin B2, (riboflavin), with some evidence of folate oxidation. (Simon et al., 2011) (United States Department of Agriculture, 2018)

UV treatment of mushrooms can be done by fluorescent UV lamps or by pulsed UV lamps during both the growing phase as well as during post-harvest phase. However, the more practical way is to do it during post-harvest phase. Studies have shown that this method gives more vitamin D2 production when compared with normal sun light. (Simon et al., 2011)

Stability of Vitamin D2 in Mushrooms During Storage and Cooking

Storage

UV treated fresh mushrooms can be stored in the refrigerator for 7 days or less without losing a nutritionally significant amount of vitamin D2 (Koyyalamudi et al., 2011) The UV-B treated and hot air-dried mushrooms showed a better shelf life. (Nearly eight months in dry, dark conditions at 20 ◦ C in well-closed plastic containers) (Slawinska et al., 2017)

Cooking

The duration and the method of cooking can affect the vitamin D2 content of mushrooms. Pan- frying (without oil) it for 5 minutes reduces vitamin D2 content in mushrooms only by 12%. But, boiling for 20 minutes or oven baking for 10 minutes reduce the vitamin D2 content by 35% (Mattila et al., 1999) (Ložnjak and Jakobsen, 2018)

Cost vs Benefit Assessment of Mushrooms

When considering the energy value, fibre content, protein, iron, zinc, calcium, vitamin C and vitamin D in mushrooms, they do not possess >20% of RDA of any nutrient mentioned above. But sun exposed or UV treated mushrooms may provide >175% of RDA of vitamin D. Unfortunately, the commercial mushroom cultivation in Sri Lanka is done in dark shelters to avoid pests. Therefore, the commercially cultivated mushrooms do not possess enough vitamin D. But we can encourage the consumers to expose the mushrooms to sunlight for 10-20 minutes prior cooking, to improve their vitamin D content.

As vitamin D deficiency is an emerging health problem in Sri Lanka and as food rich in vitamin D are not easily found, we can encourage people to consume more sun exposed mushrooms to cater their vitamin D needs.

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PAST EVENTS SINCE LAST PUBLICATION

1. Workshop on Keto Diet

A keto workshop was held on virtual platform in collaboration with Asian Institute of Ketogenic therapies. It was conducted on 9th and 16th January 2021.

2. Annual General Meeting

Annual General meeting (AGM) of Sri Lanka Medical Nutrition Association was held on 30th January 2021 at Neuro Trauma Auditorium at NHSL. AGM was chaired by the President Dr. Renuka Jayatissa. The new council was appointed.

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Dr. (Mrs) Renuka Jayatissa
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Dr. Janaka Marasinghe
Dr. Upul Abeykoon

Dr. Chandima Hathurusinghe
Dr. Samika Jananatha
Dr MadhukaThilakaratne
Dr. Sajid Nasim

3. Opening of the Completed Medical Nutrition Unit at Colombo North Teaching Hospital

The opening of a completed medical nutrition unit was held on 20th January 2021 at Colombo North Teaching Hospital. It was ceremonially declared open by the chief guest Dr.Amal Harsha De Silva and the guest of honour Dr. Renuka Jayatissa with the presence of Dr. Liyanage Ranaweera (Director CNTH), consultants of the hospital, representatives of SLMNA, former medical officers of Nutrition at CNTH and special grade nursing officers.

UPCOMING EVENTS

1. ASPEN Congress

ASPEN Congress will be held on 26th - 28th March 2021 at Arie Lagoon Hotel Negombo

STAY CONNECTED WITH

SLMNA

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