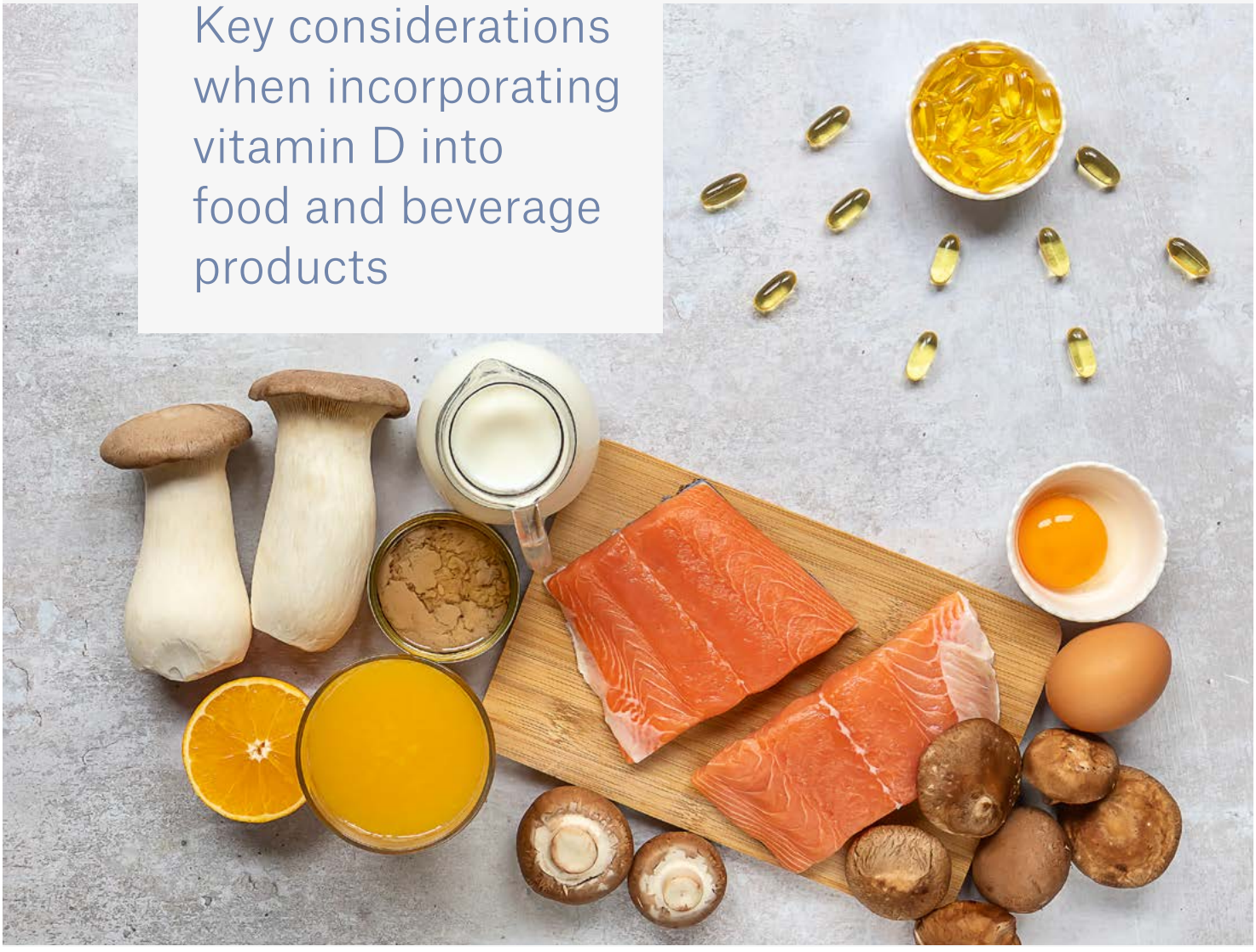
In focus

Vitamin D and preventative nutrition in the COVID-19 world

Key considerations when incorporating vitamin D into food and beverage products



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Consumer interest in food and beverage products that may improve immunity has surged during 2020. Over the next 12 months this is likely to shape the sector's health and wellbeing trend, with vitamin D poised to play a major role. However, care must be taken with product claims related to health and immunity benefits.

Consumer demand for preventative nutrition

COVID-19 has brought new meaning and focus to the health and wellbeing trend in the food and beverage sector. Innovation and uptake of preventative nutrition products accelerated in 2020, and this looks set to continue into 2021.

As consumers place greater emphasis on their health, many are proactively seeking products perceived as beneficial. This is particularly noticeable amongst younger age groups[1]. Alongside this, food and beverage manufacturers are optimising the nutritional profiles and benefits of mainstream and niche products alike.

This white paper looks at important considerations for food and beverage businesses wanting to leverage vitamin D as an immunity booster.

About Vitamin D

Vitamin D is thought to support the immune system by stimulating antimicrobial defence and inhibiting pathogen entry into tissues. It's been long associated with muscle and bone health, but more recently it's been linked to the human response to respiratory viruses. Over the past 12 months there has been much discussion of its role in reducing COVID-19 risks.

Opportunities for vitamin D

With extensive publicity surrounding the potential benefits of vitamin D, many consumers are keen to increase their intake. Traditionally, older age groups have been most interested in looking after their health and wellbeing. However, during the COVID-19 pandemic younger consumers have shown growing interest in the consumption of essential nutrients as a preventative measure.

Food and beverage manufacturers can support this with products fortified via supplementation or bio-fortification. The inclusion of substantiated nutrition and health claims on product labels also has an important role to play.

In April 2020, during the first UK lockdown, the British Government re-issued its existing vitamin D advice based on the SACN 2016 vitamin D and health report[2]. It said that to support muscle and bone health, all adults should take a vitamin D supplement of 10 micrograms/day during autumn and winter. In addition, people with little exposure to sunlight as well as ethnic minority groups with dark skin, from African and Afro-Caribbean and South Asian backgrounds, should take a vitamin D supplement all year round. During lockdown, this advice was extended to all people shielding or self-isolating, due to their lack of sunlight exposure.

Populations at risk

There is increasing evidence that people who are elderly, obese or have underlying health problems are more likely to die from COVID-19 or related complications. In addition, Black, Asian and Minor Ethnicity (BAME) individuals are prone to more debilitating symptoms which can be fatal.

Types of vitamin D and intake levels

There are two main forms of vitamin D, derived from different sources.

Vitamin D Cholecalciferol (D3) is made by the skin when exposed to the sun. However, due to the latitude of the UK, it can only be made from April to September when sunlight contains enough UVB.

Vitamin D Ergocalciferol (D2) can only be sourced from the diet and occurs naturally in products such as yeast, oily fish, egg yolks and meat. It's also available in fortified foods and milk products as well as food supplements.

When it's not possible to obtain adequate vitamin D from exposure to sunlight, it's advised that people consume foods or supplements which contain it.

Food and beverage manufacturers can fortify products through the addition of vitamin D or by using bio-fortified crops that have an elevated vitamin content[3].

Low vitamin D status	Low vitamin D status in Europe
One in 5 adults in UK	Common in black and minority ethnic groups
10% of 4 to 10-year olds	
25% of 11 to 18-year olds (39% in teenage girls)	

In 2016, Cashman et al[4] conducted a Europe-wide collaborative project involving 55,000 people across 15 European countries including the UK. It found that dark skinned ethnic minority groups had a 3 to 70-fold higher prevalence of vitamin D deficiency (<30 nmol/L) than white populations in the study. A study by Darling et al in 2020[5] involving more than 6,000 UK-based South Asians found that 55% had low vitamin D status (<25 nmol/L), 20% were very low (<15 nmol/L) and 824 participants had undetectable levels of hydroxyvitamins D concentration (10 nmol/L).

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Vitamin D and immunity: the evidence

Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data was published by Martineau et al[6] in 2017. This study has been widely cited as evidence to support supplementation of the nutrient.

However, in June 2020 SACN (Scientific Advisory Committee on Nutrition), NICE (National Institute of Clinical Excellence) and the Royal Society were asked to conduct three rapid reviews of the scientific evidence of Vitamin D supplementation[7]. NICE and the Royal Society looked at this in relation to reducing the risk of COVID-19. They concluded that the evidence did not support vitamin D supplementation to prevent acute respiratory tract infections in the general population.

Nevertheless, in mid-October the UK's Health Secretary and Food Standards Scotland urged people to take vitamin D supplements following recent evidence suggesting it can offer some degree of resilience against the coronavirus. This is based on growing evidence that groups which are deficient in vitamin D are also susceptible to COVID-19. This includes the elderly, black and ethnic minorities, obese people and those with diabetes.

Vitamin D is gaining much attention in the scientific community. Since the start of the pandemic, more than 1,500 scientific papers have explored its potential role in the fight against SARS-Cov-2 (COVID-19) infections.

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A snapshot of studies and key findings

Organisation	Study focus / conclusions	Reference
Queen Mary University Hospital in London	The CORONAVIT clinical trial was launched at the end of October 2020. Running for six months with 5,000 volunteers, it tests whether higher doses of vitamin D offer protection against winter respiratory infections including COVID-19.	Queen Mary University of London. (2020). *Clinical trial to investigate whether vitamin D protects against COVID-1.* [online]. Available at: https://www.qmul.ac.uk/iphs/news/items/clinical-trial-to-investigate-whether-vitamin-d-protects-against-covid-19.html
An expert panel of Swiss doctors, university professors and the Swiss Nutrition Society	This group reviewed the role of micronutrients in supporting a well-functioning immune system for optimal health, with a specific focus on viral infections. Its report highlights the importance of nutrition and the immune system during the COVID-19 pandemic, noting that the Swiss population is at risk of vitamin D deficiency. It recommended immediate use of supplements to fill the nutrition gap, especially for over 65s.	Berger, M., Bischoff-Ferrari, H., Zimmermann, M., Herter, I., Spieldenner, J. and Eggersdorfer, M. (2020). Nutritional status in supporting a well-functioning immune system for optimal health with a recommendation for Switzerland. Swiss Society of Nutrition [online]. Available at: https://www.praxis-lindspitz.ch/wp-content/uploads/2020/10/SGE-2020-COVID-Nutritional-status-in-supporting-a-well-functioning-immune-system-for-optimal-health-with-a-recommendation-for-Switzerland.pdf
Germany Cancer Research Centre	A report by this organisation concluded that vitamin D supplementation may reduce the severity of COVID-19 infections. It studied 9,940 men and women looking at the relationship between vitamin D status and mortality from respiratory diseases. The cohort was followed for 15 years and a link was found between vitamin D deficiency and increased respiratory mortality.	Brenner, H., Holleczek, B. and Schottker, B. (2020). Vitamin D Insufficiency and Deficiency and Mortality from Respiratory Diseases in a Cohort of Older Adults: Potential for Limiting the Death Toll during and beyond the COVID-19 Pandemic? *Nutrients*, [online] Volume 12(8). Available at: https://doi.org/10.3390/nu12082488
Dr Michael Holick, Boston University of Medicine	Research in the US has shown that vitamin D can help reduce the risk of coronavirus infection and the risk of complications from the virus.	Kaufman, H. W., Niles, J. K., Kroll, M. H., Bi, C., Hollick, M. F. (2020). SARS-CoV-2 positivity rates associated with circulating 25-hydroxyvitamin D levels. *PLOS ONE* [online]. Available at: https://doi.org/10.1371/journal.pone.0239252
University of Cantabria in Spain	A recent study has shown that 80% of COVID-19 patients are lacking in vitamin D.	Hernández J., Nan, D., Fernandez-Ayala, M. et al (2020). Vitamin D Status in Hospitalized Patients With SARS-CoV-2 Infection. *The Journal of Clinical Endocrinology & Metabolism* [online] Available at: https://academic.oup.com/jcem/advance-article/doi/10.1210/clinem/dgaa733/5934827

Conclusion

Vitamin D is an important nutrient and there is some evidence to suggest it can help improve immunity to respiratory diseases, including COVID-19. However, more data is required, and this will be an area to monitor over the coming months as new findings are published.

Regardless of the COVID-19 link, there is clearly a need for higher consumption of foods containing vitamin D in locations or amongst demographics where it difficult to make enough via exposure to the sun. For example, in the UK more than 50% of people are vitamin D deficient.

This presents an opportunity for the food and beverage industry to fortify products, enabling consumers to increase their intake. In 2010 the European Food Safety Authority (EFSA) panel on dietetic products, nutrition and allergies approved a health claim relating to vitamin D and immunity. This can be used on food and drink products which provide a sufficient amount of the vitamin.

Whilst a vaccine for COVID-19 has now been approved, increased consumer demand for food and beverage products that improve immunity is likely to continue. There is an opportunity to make it easier for consumers to improve the quality of their diet and their immunity levels both during the COVID-19 pandemic and beyond. The preventative nutrition trend is set to expand and accelerate, with consumers taking more interest in the health benefits of the products they buy and eat.

How Leatherhead can help

- If you are considering a new claim related to vitamin D, we can support a 'risk and return' based decision making process. We can also prepare documentation to qualify clear evidence-based positions
- We can aid the preparation of dossiers for the approval of new claims
- We are able to review global nutrition policies to keep you fully aware of imminent or longer term changes and assess the implications for your business
- Our literature reviews enable you to keep up-to-date with new papers and ongoing studies to inform product development. We also conduct nutrition horizon scanning and can provide access to academics involved in relevant work

References

[1]Perret, M., 2020. COVID-19 boosts consumer interest in healthy diets. [online] foodmanufacture.co.uk. Available at: <https://www.foodmanufacture.co.uk/Article/2020/09/02/Coronavirus-pandemic-prompts-surging-interest-in-healthy-diets> [Accessed 16 December 2020].
[2]2016. Vitamin D and Health. [ebook] Scientific Advisory Committee on Nutrition. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/537616/SACN_Vitamin_D_and_Health_report.pdf> [Accessed 4 December 2020].
[3]J. Guo J. A. Lovegrove JA, Givens DI (2019) Food fortification and biofortification as potential strategies for prevention of vitamin D deficiency Nutrition Bulletin https://doi.org/10.1111/nbu.12363|
[4]Cashman KD, Dowling KG, Škrabáková Z et al. (2016) Vitamin D deficiency in Europe: pandemic? American Journal of Clinical Nutrition 103: 1033-44.
[5]Darling AL, Blackbourn DJ, Ahmadi KR et al. (2020) Very high prevalence of 25-hydroxyvitamin D deficiency in 6433 UK South Asian adults: analysis of the UK Biobank Cohort. British Journal of Nutrition 1-12.
[6]Martineau AR, Jolliffe DA, Hooper RL et al. (2017) Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. BMJ 356 :i6583
[7]GOV.UK. 2021. Insufficient evidence for vitamin D preventing or treating ARTIs. [online] Available at: <https://www.gov.uk/government/news/insufficient-evidence-for-vitamin-d-preventing-or-treating-artis> [Accessed 27 November 2020].

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Leatherhead Food Research provides expertise and support to the global food and drink sector with practical solutions that cover all stages of a product's life cycle from consumer insight, ingredient innovation and sensory testing to food safety consultancy and global regulatory advice. Leatherhead operates a membership programme which represents a who's who of the global food and drinks industry. Supporting all members and clients, large or small, Leatherhead provides consultancy and advice, as well as training, market news, published reports and bespoke projects. Alongside the member support and project work, our world-renowned experts deliver cutting-edge research in areas that drive long term commercial benefit for the food and drink industry. Leatherhead Food Research is a trading name of Leatherhead Research Ltd, a Science Group Company.

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