Special Edition

JANUARY 2026

Newsletter

Nutrition Society of Sri Lanka

NSSL Annual Scientific Sessions Commemorative Issue

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President's Message

Enhancing Nutritional Literacy: A Shared Journey Towards a Healthier Nation

Dear Members of the Nutrition Society of Sri Lanka,
It gives me great pleasure to welcome you to this Special Edition of the NSSL Newsletter, published in conjunction with the NSSL Annual Scientific Sessions 2026 (January 24-25). As President, I am both proud and inspired to see our society continue its remarkable journey toward improving nutritional literacy and health across the nation.

This special issue celebrates not only our scientific progress but also the creativity and passion of our members. Through your research, innovations, and public health efforts, we are collectively shaping the nutrition landscape of Sri Lanka—transforming evidence into action and knowledge into community well-being.

Our Vision and Commitment
At the Nutrition Society of Sri Lanka, we remain steadfast in our mission to enhance nutritional understanding at every level of society. By combating misinformation, encouraging healthy eating habits, and promoting physical activity, we are laying the groundwork for a healthier future.

This newsletter stands as a vital part of that mission—serving as both a communication bridge and a learning platform. It brings together diverse voices from academia, clinical practice, and community engagement, showcasing how each of us contributes to a shared national vision of wellness.

Celebrating Creativity and Knowledge
In this special edition, we welcome not only scientific articles but also creative contributions that express the spirit of nutrition and well-being—poems, drawings, puzzles, and reflections. Such expressions remind us that nutrition is both a science and an art, deeply woven into our daily lives and cultural fabric.

I warmly invite all members to continue sharing their knowledge, insights, and creative work. Each contribution enriches our collective effort and strengthens our voice in national and global nutrition discourse.

Looking Ahead
As we move toward the NSSL Annual Scientific Sessions 2026, we stand on the threshold of new opportunities for collaboration, innovation, and public engagement. Through our upcoming workshops, community outreach, and symposiums, we will continue to empower both professionals and the public to make informed, evidence-based dietary choices.

Let us carry forward our shared commitment—with passion, creativity, and scientific rigor—to build a nutritionally literate and healthier Sri Lanka.
Thank you for your continued support and engagement with the Nutrition Society of Sri Lanka. Together, we are making a difference.

Prof. Ananda Chandrasekara
President | Nutrition Society of Sri Lanka

Editorial

Let's Take a Moment to Applaud, Accolade and Felicitate …

Let us all get together for 'One Health, One Nutrition: Ensuring Optimal Nutrition for People and the Planet' in-line with the theme of the most celebrated event in the NSSL's annual calendar - It is with great pleasure and pride that the NSSL releases this Special Edition of the NSSL Newsletter, in parallel to the Annual Scientific Sessions of the NSSL, 2026.

Yes, you heard it correct - This Edition of the Newsletter is Special … It is Special for three reasons. Firstly, because it is released further to the already released regular two annual Editions. Secondly, because this Edition is all about celebrations and achievements - The NSSL dedicates this Special Edition to celebrate not only our scientific achievements, but also to applaud, accolade and felicitate the creativity and community spirit of our members. Lastly, because this is the final Edition of the NSSL Newsletter under the patronage of the current President and the Editor.

This Special Edition too continue to have the recently introduced two new elements for the third consecutive time - The 'Featured Article' (An invited entry by a selected, leading expert in the fraternity) and the 'Celebrating the Twinkles' (A prudent attempt by the NSSL to celebrate an ardent author in-style), which were introduced to the Newsletter with the intension of further strengthening the readership of the NSSL Newsletter plus further encouraging the prospective authors. Because this Editon is special, this time we celebrate three well-deserved Twinkles …

While not forgetting to thank all the authors contributed to the NSSL Newsletter so far, on behalf of the NSSL, let me extend the invitation to all the prospective authors, to continue to bring about a stronger drive to the thought-provoking discussions in the field of nutrition and dietetics.

Finally, inviting all of you once again to embrace 'One Health, One Nutrition: Ensuring Optimal Nutrition for People and the Planet' and let's take a moment to applaud, accolade and felicitate each other …

Udara Dassanayake
(Consultant Nutritionist and Attorney-at-Law)

Editor | The Nutrition Society of Sri Lanka

The Nutrition Society of Sri Lanka

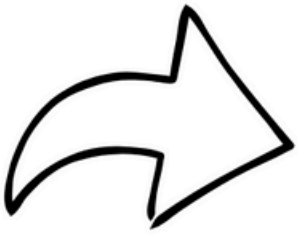
Presents

Annual Scientific Sessions 2026

24th & 25th January 2026

@ Cinnamon Lakeside Hotel,Colombo

One Health, One Nutrition: Ensuring Optimal Nutrition for People and the Planet



Scan Me

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Three Cheers to a True Hero of All Times - Prof. D.G.N.G. Wijesinghe

Prof. D.G.N.G. Wijesinghe - An excellent scholar, compassionate mentor and a visionary leader whose wealth of expertise and experience as an academic, researcher and administrator profoundly transformed the landscape of nutrition education and nutrition field in Sri Lanka, across generations.

The profound influence that Prof. Wijesinghe had on generations of nutrition professionals via his initiatives that strengthened the nutrition education and capacity building is commendable. He pioneered developing the curriculum of many Undergraduate and Postgraduate Nutrition Degree programmes in the national Universities in the island, including the first-ever of its kind in Sri Lanka, implemented in year 1996 titled 'Nutrition and Community Resource Management' - A three year Bachelor's Degree programme offered by the Wayamba University, which was later upgraded in year 2002 into a four year Special Degree programme and renamed as 'B.Sc. Food and Nutrition' and the M. Sc, M. Phil and Ph.D. Food and Nutrition Postgraduate Degree programmes offered by the Postgraduate Institute of Agriculture, University of Peradeniya are to list a few of his commendable contributions to the landscape of nutrition education in the country. Nevertheless, he had been an absolutely essential consultant to date, in all the Nutrition related Degree programme curriculum development and revision agendas in the country.

His legacy in this sphere extends beyond Sri Lanka. For example, Prof. Wijesinghe was the coordinator and the key resource person in the 'Review of Nutrition Curricular Offerings in Asia' among the Universities offering Food and Nutrition Degrees (B.Sc, M.Sc. and Ph.D. levels) in the six Regional Network member countries (Viz China, Indonesia, Philippines, Vietnam, Bangladesh and Sri Lanka), done in collaboration with the Regional Network on Food and Nutrition Planning (RN-FNP), based in the Philippines in year 2002.

The scholarly contributions of Prof. Wijesinghe were instrumental. With a wealth of experience of over 45 years since year 1980, as an academic at the capacity of both a lecturer and an examiner of the University of Peradeniya, Ruhuna University, Eastern University, Wayamba University, Sabaragamuwa University and Rajarata University plus the diverse positions that he held within the Board of Study of Food Science and Technology of the Postgraduate Institute of Agriculture (PGIA), including being a member of Board of Management, the Chaiman of the Board of Study and being the Head of the Department of Food Science and Technology of the Faculty of Agriculture of the University of Peradeniya for more than seven years had further paved the way to strengthen his seminal work. He is also an external examiner to the Postgraduate Degree programme of the Ballarat University and Deakin University of Australia.

Prof. Wijesinghe's legacy is multifaceted - His contribution to the fraternity both as a researcher and a research supervisor can never be forgotten. In addition to supervision of several on-going research studies to date, he has supervised more than 100 Postgraduate students of M.Sc, M.Phil. and PhD programmes plus over 80 final year Undergraduate research students.

He is also an award-winning researcher - Inter alia, he had authored several books/chapters in books and monographs plus altogether at least seventy-five articles in refereed journals, proceedings of international scientific sessions, non-refereed journals and proceedings of local scientific sessions. Prof. Wijesinghe is a paper reviewer to the Journal of Agricultural and Food Chemistry - Adelaide, Australia too.

Prof. Wijesinghe's mentorship extends beyond intellectual guidance to practical support - As a Master Trainer, his expertise and experience in the coordination and conduct of Nutrition training programmes both at national and international level, being a Nutritionist of the Sri Lankan Technical Committee on Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) formed under the FAO Initiative, being a member of the Sectoral Committee for Dairy Products and the Sectoral Committee for Cereals and Pulses of the Sri Lanka Standards Institute (SLSI) are only a handful of examples from the plethora of his contributions.

Not a surprise that he was the Nutrition Consultant and/or the National Nutrition Expert for numerous projects - World Vision projects, the 'Mainstreaming Biodiversity for Nutrition Improvement' project of the Ministry of Environment and 'Udakumbura Village Baseline Nutrition Survey' of the Biodiversity for Food and Nutrition (BFN) project, coordinated by the Ministry of Agriculture are only a few examples.

Several active roles and positions that he held within the Regional Network on Food and Nutrition Planning (RN-FNP) over the years (1998 - 2005) and the Nutrition Society of Sri Lanka (NSSL) from time to time, catalyzed his contributions towards encompassing the formulation and implementation of national nutritional policies and the advancement of scientific research.

Prof. Wijesinghe is a life member of the Nutrition Society of Sri Lanka (NSSL), the Sri Lanka Association for the Advancement of Science (SLAAS) and the National Agricultural Society of Sri Lanka. His major research areas of interest include community nutrition, food and nutrition, nutrition assessment and nutrition education.

Today, proudly we see the fruitful results of his foresight, visionary leadership and unwavering commitment towards enriching the nutrition landscape in the country - Though Prof. Wijesinghe is officially retired from the University service since year 2021, his groundbreaking endeavours and commendable contributions to the arena plus his legacy will forever be cherished.

Hence, this tribute is a humble effort of the NSSL to celebrate the enduring legacy and guiding spirit of Prof. D.G.N.G. Wijesinghe in cadence - Three cheers to a true Hero of all times !!!

High-five to Felicitate a NSSL Past President (2018 - 2019) Prof. Anoma Chandrasekara

Prof. Anoma Chandrasekara has been ranked among the top 2 % of scientists worldwide for the sixth consecutive year (2020 - 2025) according to the Stanford University - Elsevier standardized citation impact ranking, which is based on a comprehensive global author-level citation metrics database developed by Stanford University in collaboration with Elsevier. This prestigious ranking reflects sustained scholarly influence and research impact across multiple bibliometric indicators. In the 2025 ranking, Prof. Chandrasekara is placed first in the subfield of Food Science and second in the subfield of Nutrition and Dietetics, further underscoring her international standing in these disciplines.

Prof. Chandrasekara has been a consistent and dedicated advocate of the Nutrition Society of Sri Lanka (NSSL) over many years. She has served the Society in several key leadership roles, including a Council Member (2013 - 2014; 2020 - 2021), the Joint Secretary (2015), Vice President (2016 - 2017) and the President (2018 - 2019). Her tenure as President was marked by several landmark contributions, notably the successful leadership of FAO-funded national initiatives such as 'Revising and Upscaling the Sri Lankan Food-Based Dietary Guidelines' and 'Mainstreaming Nutrition into the Agriculture Sector in Sri Lanka', as well as the industry-funded project on 'Contextualizing, Revising and Updating Nutrition Guidelines for Young Children'.

She currently serves as Professor of Food Science and Nutrition in the Department of Nutrition and Dietetics, Wayamba University of Sri Lanka. Prof. Chandrasekara has established a distinctive and impactful research programme focusing on the bioactivities and mechanistic pathways of phenolic compounds derived from underutilized tropical foods - Including cereals, legumes, roots, tubers, and herbs, with relevance to wellness promotion and disease management. She is the author and co-author of over 50 peer-reviewed journal articles and book chapters, in addition to more than 200 abstracts presented at national and international scientific conferences.

Prof. Anoma Chandrasekara exemplifies multidisciplinary excellence as an academic, internationally recognised researcher, innovative food product developer, and eminent scientific communicator. She is a recipient of numerous professional accreditations, a frequent invited speaker, and a reviewer for several leading national and international scientific journals, including the British Journal of Nutrition. She also serves on the Editorial Board of the Journal of Food Production, Processing and Nutrition and is an accredited higher education teacher of the Staff and Educational Development Association (SEDA), United Kingdom.

The Nutrition Society of Sri Lanka takes great pride in applauding and congratulating Prof. Anoma Chandrasekara on this distinguished and well-deserved international recognition. Her sustained scholarly impact and service bring honour to the profession, the Society and the nation.

The Silent Heros
(Supporters behind the Screen)

Editorial supporter/Graphic designer - NSSL Newsletter 2024 June & 2024 December Editions

Mr. Nisal Baddege is currently working as a Research and Development Executive at Maliban Biscuit Manufactories. He holds a Bachelor's Degree in Food Science and Nutrition from Wayamba University of Sri Lanka. He is currently pursuing a Master's Degree in Food Science and Technology at the Postgraduate Institute of Agriculture, University of Peradeniya. He aims to broaden his knowledge and support innovative product development.

Editorial supporter/Graphic designer - NSSL Newsletter 2025 June Edition

Mr. Ashen S. Jayawardhana is a graduate from Wayamba University of Sri Lanka under the B.Sc. (Hons) in Food Science and Nutrition, specialized in Nutrition and Dietetics. He is a motivated character with experience in community-based nutrition interventions, research, and scientific communication. He contributed to the NSSL Newsletter through content editing and layout designing. His professional interests include public health nutrition, food quality assurance, and regulatory affairs.

Editorial supporter/Graphic designer - NSSL Newsletter 2025 December & 2026 Special Editions

Mr. Isuru Sanchaya Mendis is currently working as a Nutrition Executive at a reputed food manufacturing company, where he focuses on nutrition-related activities, labelling regulations, and regulatory compliance. He holds a Bachelor's Degree in Food Science and Nutrition with a specialization in Applied Nutrition. He is presently pursuing an MBA at Anglia Ruskin University, UK, and an LLB at the Open University of Sri Lanka. His academic and professional interests are centered around food labelling and advertising, nutraceuticals marketing, through which he aims to enhance his expertise and contribute to strategic brand development within the food industry.

Featured Article

'Featured Article' is a recently introduced segment to the NSSL Newsletter - An invited entry by a selected, leading expert in the fraternity. This segment was introduced to the Newsletter with the intension of further strengthening the readership of the NSSL Newsletter plus encouraging the prospective authors.

Dr. Renuka Jayathissa kindly accepted the NSSL's invitation to do the 'Featured Article' to this Edition of the NSSL Newsletter. In-line with the NSSL 2026 Annual Scientific Session's theme, she offered her expertise to enlighten us on a timely and a very pivotal aspect in nutrition under the title 'Silent Burden: Malnutrition, Micronutrient Gaps & Sarcopenia in Older Adults'.

Dr. Renuka Jayatissa
(M.B.B.S, M.Sc, M.D, FPGIM, FCCP)

Vice Chancellor and Head Faculty of Food and Nutrition,
International Institute of Health Sciences (IIHS) Multiversity,
Medical Specialist in Community Medicine and Nutrition Specialist,
President - College of Palliative Medicine, Sri Lanka (CPMSL),
President - Association of SAARC FOODS in Sri Lanka (SAFSL),
South Asia Regional Coordinator - Iodine Global Network (IGN),
Regional Coordinator - South Asian Association of Parenteral and Enteral Nutrition (SAPEN),

Dr. Renuka Jayatissa is the Vice Chancellor and Head of the Faculty of Food and Nutrition at the International Institute of Health Sciences (IIHS) Multiversity - A medical doctor with over 40 years experience, she specializes in public health and human nutrition. She has served as the Head of Nutrition at the Medical Research Institute and as a UNICEF Nutrition Specialist.

Dr. Jayatissa currently holds many key regional roles. Inter alia, to list a few are, the President - Association of SAARC FOODS in Sri Lanka (SAFSL), the South Asia Regional Coordinator - Iodine Global Network (IGN) and the Regional Coordinator - South Asian Association of Parenteral and Enteral Nutrition (SAPEN).

She is a widely published and award-winning expert and a renowned, most sought-after researcher in the fraternity. She is also the current President-elect of the College of Palliative Medicine, Sri Lanka (CPMSL).

The Silent Burden: Malnutrition, Micronutrient Gaps and Sarcopenia in Older Adults

Key Messages

- Malnutrition in older adults is common, preventable, and frequently missed
- Micronutrient deficiencies and sarcopenia can occur even among overweight individuals
- Early nutrition screening and food-based interventions are critical

As we age, physiological changes influence nutritional requirements, hydration status, and overall health. In older adults, adequate nutrition and hydration are essential to maintain physical function, cognitive health, independence, and quality of life. Yet malnutrition in later life remains a largely silent and under-recognised burden.

By 2042, nearly one in four Sri Lankans will be over the age of 60. This demographic transition demands greater attention to the nutritional needs of older adults. Healthy ageing is not achievable without appropriate nutrition, as age-related changes in metabolism, muscle mass, bone density, and digestion can significantly impair the body's ability to absorb and utilise nutrients effectively. In Sri Lanka, approximately one-third of older adults are at nutritional risk due to food insecurity, increasing vulnerability to infections, falls, prolonged hospitalisation, and functional decline.

Burden of malnutrition in older adults

Malnutrition in older adults develops gradually, driven by physiological changes, chronic illness, reduced dietary intake, and social vulnerability. Its consequences include frailty, sarcopenia, loss of functional ability, and increased morbidity and mortality. Unfortunately, these outcomes are often misinterpreted as inevitable consequences of ageing rather than preventable nutrition-related conditions.

Findings from the 2022 national micronutrient survey highlight the magnitude of the problem: nearly one-third of adults aged over 60 years and two-thirds of those over 80 years are underweight—an alarming indicator of frailty risk. At the same time, approximately one-third of older adults are living with excess body weight. This coexistence of undernutrition and overweight underscores the limitations of using body weight alone and reinforces the need to prioritise functional ability and quality of life rather than rigid weight-reduction strategies in older populations.

Research indicates that around one-third of older adults in Sri Lanka are living with frailty. This is not a minor concern, as frailty is closely associated with increased mortality, reduced independence, and poorer quality of life. Importantly, frailty and malnutrition are to a large extent preventable through timely nutrition and lifestyle interventions.

Micronutrient deficiencies and age-related muscle loss frequently coexist across all body sizes, including among those who are overweight or obese. Addressing this hidden burden requires a shift from disease-centred care towards preventive, nutrition-focused strategies embedded within healthy ageing frameworks.

Featured Article

Factors contributing to poor nutrition in older adults

Several interrelated factors contribute to nutritional vulnerability in older age:

- Reduced appetite due to hormonal changes, medications, depression, or cognitive impairment
- Diminished taste, smell, and vision, making food less appealing
- Poor oral and dental health, including tooth loss or ill-fitting dentures, limiting intake of fruits, vegetables, and protein-rich foods
- Chronic diseases and mobility limitations, which complicate food procurement, preparation, and consumption
- Medication–nutrient interactions, with some drugs affecting absorption or increasing fluid and nutrient losses
- Social isolation and loneliness, particularly among those living alone
- Smoking, alcohol use, and long-standing poor dietary habits
- Lack of enjoyment of food, especially during hospitalisation or long-term care
- Neurological conditions affecting chewing and swallowing (e.g. stroke, Parkinson's disease)
- Incontinence, leading to intentional restriction of fluid intake
- Fixed or limited incomes, restricting food choice and meal frequency

Recognising early signs of poor nutrition

Early identification of malnutrition is essential to prevent progression to severe health outcomes. Warning signs include:

- Unintentional weight loss or gain
- Fatigue, weakness, and reduced muscle strength
- Cognitive decline, confusion, depression, or memory impairment (often linked to vitamin B12 and other micronutrient deficiencies)
- Dry, brittle hair and nails
- Pale or dry skin, delayed wound healing
- Increased susceptibility to infections
- Gastrointestinal symptoms such as constipation, bloating, or nausea

Sarcopenia: Assessment and screening

The negative consequences of malnutrition and frailty are largely mediated through muscle failure. Older adults experience higher protein requirements due to anabolic resistance, reduced amino acid availability, and catabolic disease states.

Screening and diagnosis should use validated and practical tools, including:

1. SEFI – Simple Evaluation of Food Intake
2. SARC-F questionnaire
3. GLIM diagnostic criteria

Assessment approaches should be adapted to the care setting, with dietetic advice as the essential first-line intervention. Restrictive diets should be reviewed and discontinued where inappropriate.

Hydration: An often-neglected component of healthy ageing

Hydration is a critical but frequently overlooked aspect of nutrition in older adults. Age-related reductions in thirst sensation, declining kidney function, medication use, chronic illness, and extreme heat all increase the risk of dehydration.

Early signs of dehydration include dry mouth, cracked lips, dark-coloured urine, fatigue, dizziness, confusion, headaches, and poor skin elasticity. Dehydration significantly increases the risk of falls, constipation, urinary tract infections, kidney disease, delirium, and heat-related illness.

Featured Article

Role of a balanced and nutritious diet

A balanced diet supports healthy ageing by:

- Preventing and managing chronic diseases, including cardiovascular disease, diabetes, hypertension, and osteoporosis
- Strengthening immune function through adequate intake of vitamins (C, D, E) and minerals such as zinc
- Maintaining muscle mass and bone strength, supported by sufficient protein intake (1.0–1.5 g/kg/day), appropriate meal distribution (approximately 30 g protein per meal), adequate leucine intake, and sufficient calcium and vitamin D
- Preserving cognitive health, with diets rich in fruits, vegetables, less polished grains, healthy fats, omega-3 fatty acids, and B vitamins
- Improving digestive health, through fibre-rich foods and adequate fluid intake
- Supporting mental and emotional well-being, particularly when meals are shared socially
- Promoting longevity and independence, reducing falls, fractures, and disability

A simple guide: The healthy plate for older adults

A practical way to support healthy eating is the "healthy plate" approach:

- Half the plate: fruits and vegetables of varied colours
- One-quarter: Less polished grains (e.g. traditional rice, brown rice, oats, barley, quinoa)
- One-quarter: healthy protein sources (fish, pulses, eggs, poultry, nuts)
- Use healthy oils such as olive or canola; limit butter and coconut oil, if coconut milk and polsambal are used daily
- Choose water, tea, or coffee over sugary drinks; limit milk to one to two servings daily, preferably non-fat or low-fat calcium and vitamin D fortified milk

Oral nutritional supplements (ONS) may be used when food-based strategies are insufficient. When prescribed appropriately, ONS should provide at least 400 kcal and 30 g protein per day, contain fibre, and be given for a minimum of one month.

Moving forward: From awareness to action

Overcoming age-related nutritional and hydration challenges requires a proactive, multisectoral approach:

- Raising awareness of early warning signs
- Integrating routine nutrition screening into health services
- Strengthening social support and shared meals
- Supporting affordable, accessible, and nutrient-dense food options
- Addressing poverty and social protection needs

Conclusion

Malnutrition, micronutrient deficiencies, and sarcopenia in older adults are common, preventable, and consequential. Making this silent burden visible is essential to ensure that longer lives are also healthier, more independent, and more dignified. Nutrition must be positioned at the center of healthy ageing strategies, policies and services.

Featured Article

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Nutritional Psychiatry: Bridging Diet and Emotional Wellness

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In today's fast-paced and demanding world, mental health has become more important than ever before. Modern lifestyles, social pressures, economic uncertainties, and the growing influence of technology have significantly affected how people think, feel, and cope with daily life. In Sri-Lanka a national study covering 2018/19 versus 2021/22 found that the prevalence of high mental-health difficulties rose from 2.9% to 6.1% in adults. Also, depression among youngsters has increased significantly. Mental health is essential for overall well-being, as it influences how individuals handle stress, make decisions, build relationships, and contribute productively to society. With rising rates of depression, anxiety, and other psychological disorders across all age groups, prioritizing mental health is no longer optional but a global necessity.

Pharmacologically focused approaches have achieved a moderate reduction in the worldwide burden of poor mental health. However, indicators suggest that the burden of disease attributable to mental disorders will continue to rise worldwide during the coming decades. The World Health Organization (WHO) defines a mental disorder as "a clinically significant disturbance in an individual's cognition, emotional regulation, or behavior." These disturbances are frequently associated with distress or impairment in important areas of functioning. They develop as a result of many factors and influences. Potential causes of major depressive disorder (MDD) and or anxiety disorders are non-modifiable factors include genetics, perinatal infections, exposure to environmental hazards, social, cultural, economic, political, and environmental factors and more. Modifiable factors include stress, nutrition, financial strain, sedentary lifestyle, presence of comorbid conditions, addictions, social connectedness, and more. With increased number of risk factors, the risk of future depression also increases in a dose-response fashion

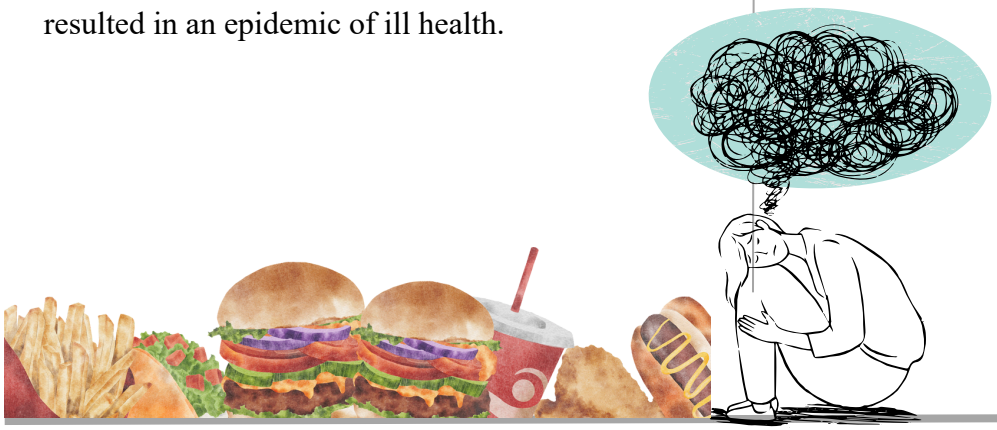
Nutrition plays a vital role not only in maintaining physical health but also in supporting mental well-being. Emerging research highlights a strong connection between dietary patterns and mental health outcomes, emphasizing that what we eat can significantly influence our mood, behavior, and cognitive functions. The Lancet Psychiatry published an article in 2015, which they stated, "Although the determinants of mental health are complex, the emerging and compelling evidence for nutrition as a crucial factor in the high prevalence and incidence of mental disorders suggests that diet is as important to psychiatry as it is to cardiology, endocrinology, and gastroenterology." Thus, understanding the relationship between nutrition and mental health is fundamental for promoting overall well-being and developing preventive strategies against mental disorders.

The current state, wherein populations in both developed and emerging economies preferentially consume nutrient-poor, energy-dense, highly processed foods, is historically unique and many people are both overfed and undernourished. Although caloric intake has increased, many individuals in affluent, developed nations do not meet the recommended intakes of several brain-essential nutrients, including B-group vitamins, zinc, and magnesium. Although slight improvements have been detected in the dietary intakes of sugar and fats, documented intakes of nutrient-rich and fibre rich vegetables and whole grains are far lower than recommended. These profound changes in dietary habits, along with tobacco use, insufficient physical activity, and harmful alcohol and recreational drug use, have resulted in an epidemic of ill health.

A traditional whole-food diet, consisting of higher intakes of foods such as vegetables, fruits, seafood, whole grains, lean meat, nuts, and legumes, with avoidance of processed foods, is more likely to provide nutrients that afford resiliency against the pathogenesis of mental disorders. The mechanisms by which nutrition might affect mental health are, at least, obvious. The human brain operates at a very high metabolic rate and uses a substantial proportion of total energy and nutrient intake, in both structure and function (including intracellular and intercellular communication), it is reliant on aminoacids, fats, vitamins, and minerals or trace elements. Dietary habits modulate the functioning of the immune system, which also moderates the risk of depression. The antioxidant defence system, which is also implicated in mental disorders, operates with the support of nutrient cofactors and phytochemicals. Additionally, neurotrophic factors make essential contributions to neuronal plasticity and repair mechanisms throughout life, and these too are affected by nutritional factors.

Diet and depression

Dietary patterns, rather than nutrient deficiencies, are more likely to account for depression symptoms. A dietary pattern characterized by high intake of fruit, vegetables, whole grains, fish, olive oil, low–fat dairy, and antioxidants, coupled with low intake of animal foods, was associated with a decreased risk of depression. Moreover, a dietary pattern characterized by high consumption of red or processed meat, refined grains, sweets, high fat dairy products, butter, potatoes, and high fat gravy, coupled with low intake of fruits and vegetables, is associated with an increased risk of depression.



Major Depressive Disorder (MDD) was more likely to develop in adults who frequently ate fast food compared to those who avoided it. Fried foods, refined grains, and sugary products are associated with increased rates of major depression and anxiety disorders. In the United Kingdom, individuals who reported an unhealthy diet also self-reported higher rates of depressive symptoms. There is a dose-response effect between types of fat intake and MDD rates. Diets higher in trans fats were associated with an increased risk of major depression. Diets higher in mono- and poly-unsaturated fats were weakly associated with lower rates of major depression.

Indeed, although not statistically powered to assess the prevention of new-onset depression, results from the large European PREDIMED study showed a strong trend towards a reduced risk for incident depression for individuals randomly assigned to a Mediterranean diet with nuts, and this protective effect was particularly evident in those with type 2 diabetes. Similarly, results of an indicated prevention trial showed that dietary counselling was as effective as psychotherapy at prevention of transition to case-level depression in older adults

Dietary patterns high in plant foods and emotional well-being

A plant-based dietary pattern with no meat, fish, or eggs in a randomized controlled trial showed significant improvement in depression symptoms in just 2 weeks. Preliminary randomized control trial evidence now exists for a link between improved diet and relief of major depressive episodes. In this study, “improved diet” consisted mostly of whole grains, vegetables, fruits, legumes, and nuts, with small allowances for fish, lean meats, eggs, and olive oil. Foods such as sweets, refined cereals, fried food, fast-food, processed meats, sugary drinks, and alcohol were reduced. Fruit and vegetable consumption have been associated with increased eudaimonic feelings (engagement, meaning, and purpose) and behaviors (curiosity and creativity) among young adults, improvement in depression, anxiety, and productivity.

Lower scores for mood disturbance among men and women, lower anxiety scores among men, and lower stress scores among women. Significant improvement in mood scores in 2 weeks for omnivores placed on a vegetarian diet (no fish or meat intake). Fewer negative emotions among vegetarians than omnivores, despite the lower intake of long-chain omega-3 fatty acids. Higher optimism, Improved health, quality of life, and productivity in the workplace, Lower risk of major depression in community dwelling adults. More positive attitudes on the day foods are eaten and on the following day among healthy young adults, suggesting that fruit and vegetable intake is the cause of a more positive attitude and not the reverse. Increases in scores for vitality, flourishing, and motivation in 14 days in young adults who were provided with two additional servings of fruits and vegetables a day on top of their normal diets, suggesting fruit and vegetable intake is important for psychological benefits

Positive mood and association with eating patterns

A positive mood helps one resist the temptation of unhealthy snacks through activating the centers of the brain that control long-term goals, such as health. Current evidence in the past several years, links have been established between nutritional quality and mental health, and scientifically rigorous studies have made important contributions to the understanding of the role of nutrition in mental health.

Many epidemiological studies, including prospective studies, have shown associations between healthy dietary patterns and a reduced prevalence of, and risk for, depression and suicide. Maternal and early-life nutrition is also emerging as a determinant of later mental health outcomes in children, and severe macronutrient deficiencies during crucial developmental periods have long been implicated in the pathogenesis of both depressive and psychotic disorders. A recent systematic review has now confirmed a relation between unhealthy dietary patterns and poorer mental health in children and adolescents. In adolescent girls age 11–19 years, happiness was significantly associated with lower body mass index (BMI), fruit and vegetable consumption, physical activity, meaningful time with family, and no exposure to second-hand smoke. In Chilean college students, being "very happy" was associated with eating fruits and vegetables daily, being physically active daily, having a favorable view of stress, and being younger and female. In view of the early age of onset for depression and anxiety, these data suggest that diet is a key modifiable intervention target for prevention of the initial incidence of common mental disorders.

Association of mood with specific nutrients

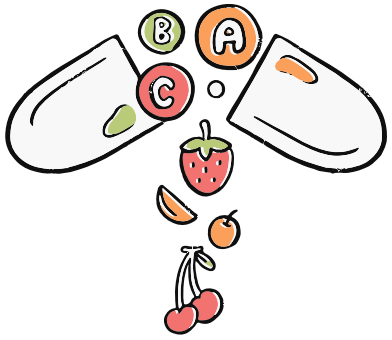
A randomised controlled trial designed to test the efficacy of dietary improvement as a treatment for major depression is underway. Several nutrients have been studied in relation to mental health. Supplements are not regulated by the US Food and Drug Administration (FDA) and they have the potential for toxicity. Convincing data suggests that selecting nutrient-based supplements (in isolation, or in combination), might provide many neurochemical modulatory activities that are beneficial in the management of mental disorders. Examples of these nutrient-based supplements include omega-3 fatty acids, S-adenosyl methionine (SAMe), N-acetyl cysteine (NAC), zinc, B vitamins (including folic acid), and vitamin D.

Omega-3 fatty acids (mercury-poor sources, such as non-fish sources) may be helpful in bipolar disorder, post-traumatic stress disorder (PTSD), depression and prevention of psychosis. In pregnant women, there is a positive association between low omega-3 levels and higher incidence of maternal depression. Possible mechanisms include modulation of neurotransmitter (serotonin, norepinephrine, or dopamine) re-uptake and synthesis, enhancement of cell membrane fluidity, and neurogenesis via up-regulation of brain-derived neurotrophic factor (BDNF).

SAMe (S-adenosyl-L-methionine) is an important component of the final methyl group being added during the production of serotonin, norepinephrine, and dopamine that regulate mood. A small double-blind, randomized clinical trial (N = 73) did show SAMe to be an effective antidepressant adjunct to a SSRI (Selective Serotonin Reuptake Inhibitor) and clinically augmented the effects of pharmaceutical antidepressants.

NAC (N-acetylcysteine) has evidence of efficacy in bipolar depression, schizophrenia, trichotillomania, and other compulsive and addictive behaviours. This amino acid-based compound has glutamate modulatory effects, and anti-inflammatory, antioxidant, and neuroprotective activity.

Folate, or vitamin B9, can help in the production of serotonin and dopamine and a deficiency of B9 (folate) has been reported in depressed populations, and in poor responders to antidepressants. When used with antidepressant medication, it has been shown to improve the efficacy or shorten the response time. Vitamin D is a neurosteroid, with data suggesting that low maternal concentrations are implicated in schizophrenia risk, and deficiency is likewise linked to increased depressive symptoms



Zinc is an abundant trace element that is involved in cytokine modulation and hippocampal neurogenesis via upregulation of BDNF and modifies N-methyl-D-aspartate and glutamate activity. Zinc deficiency has been linked to increased depressive symptoms, and evidence is emerging that zinc supplementation improves depressed mood, mainly as an adjunctive intervention with antidepressants. Among women of child-bearing age, deficiencies of folate, vitamin B12, calcium, iron, selenium, zinc, and omega-3 fatty acids were more common among depressed versus non-depressed women. Further, studies have shown improvement in mood with intake of saffron, turmeric, probiotics, flaxseeds, walnuts, and carbohydrate-rich evening meals as well.

The current treatment approaches for psychiatric disorders can be further enhanced by placing greater emphasis on preventive strategies. Given the growing global burden of mental illnesses, identifying and addressing modifiable risk factors has become an urgent priority. Among these, diet and nutrition stand out as crucial determinants, offering significant potential for the prevention and management of mental disorders and it is now time to acknowledge its importance within the field of psychiatry. Integrating nutritional medicine into mainstream psychiatric practice supported by ongoing research, education, policy development, and public health initiatives represents a necessary step toward a more comprehensive approach to mental health care.

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Celebrating the Twinkles

‘Celebrating the Twinkles’ is a recently introduced Feature to the NSSL Newsletter - A prudent attempt by the NSSL to celebrate an ardent author in-style, in recognition of the selected author’s continuous contribution to the NSSL Newsletter.

In-line with the Annual Scientific Sessions (2026) - I.e. The most celebrated event in the NSSL’s annual calendar, this Edition of the Newsletter is delighted with pride to celebrate the continuous contribution of three lucky shortlisted Twinkles - Viz, Mr. Gihan Wijelath, Ms. Akshana R. Sriyaratna and Ms. K.N. Nilmini.

Mr. Gihan Wijelath

Ms. Akshana R. Sriyaratna

Ms. K.N. Nilmini

Mr. Gihan Wijelath,
Department of Agricultural,
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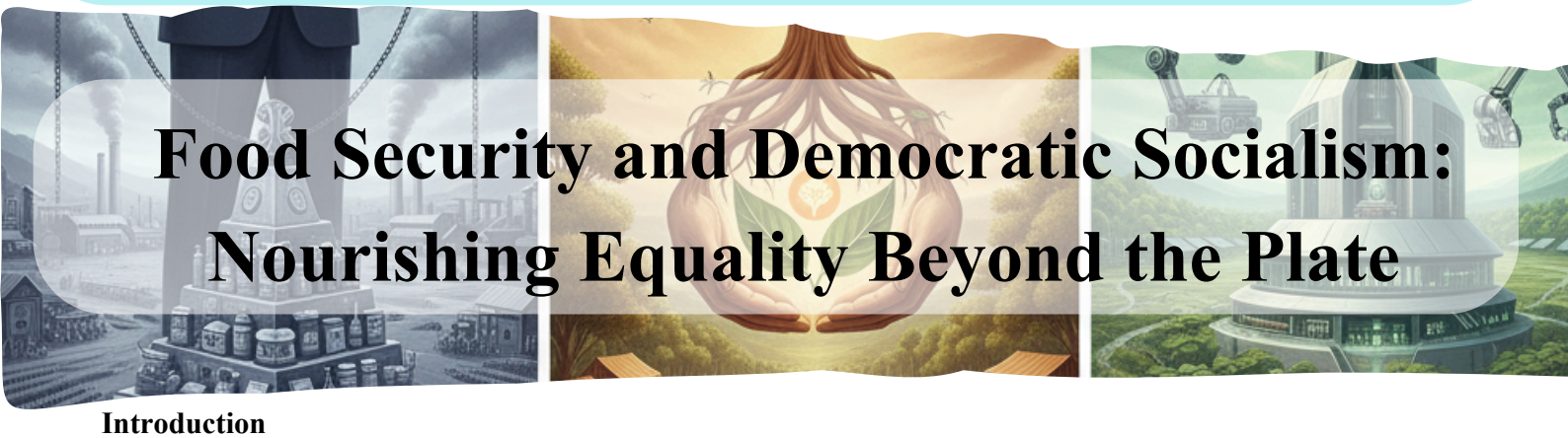
Mr. Gihan Wijelath is a Sri Lankan-born, PhD researcher in Food Science and Technology at the Department of Agricultural, Food and Nutritional Science, University of Alberta, Canada. He earned his BSc in Food Science and Technology and MSc in Analytical Chemistry from the University of Peradeniya. Before pursuing his doctoral studies, he held key managerial positions in the food industry, specializing in quality assurance, food safety, and regulatory compliance. His current research focuses on food byproduct valorization for sustainable proteins and bioactive peptides in food systems. Beyond science, Gihan has a deep interest in philosophy, often reflecting on how ethics, equity, and human values intersect with food science and technology. He is an active member of professional organizations including International Association for Food Protection (IAFP), American Chemical Society (ACS), American Oil Chemists' Society (AOAC), Institute of Food Technologists (IFT), Canadian Institute of Food Science and Technology (CIFST), Cereals and Grains Association, Golden Key International Honour Society, Sri Lanka Association for the Advancement of Science (SLAAS) and Institute of Food Science and Technology, Sri Lanka (IFST Sri Lanka). A passionate science communicator, he has authored multiple articles for the NSSL Newsletter and other platforms, bridging scientific insight with social and philosophical perspectives on food.

This is Mr. Wijelath's third consecutive, successful entry in a row to the NSSL Newsletter



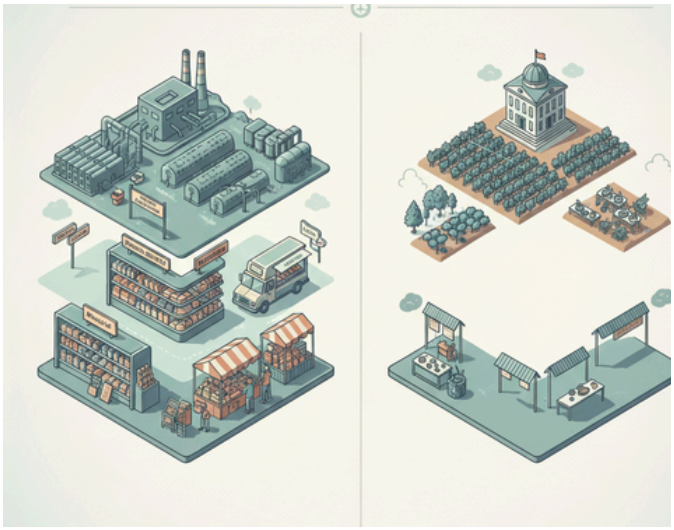
Food Security and Democratic Socialism: Nourishing Equality Beyond the Plate

Introduction

Food is the most democratic of all needs; however, it remains among the most unequally distributed. In a world where billions of people face hunger while others waste abundance, the idea of democratic socialism offers a compelling vision of food security rooted not in profit but in shared dignity and collective responsibility. This calls for a system in which governments ensure equitable access to nutritious food, communities participate in production and distribution, and sustainability replaces exploitation as the guiding principle of agriculture. Food security, in this sense, is not merely about feeding people but empowering them.

Defining the terms

Food security, as defined by the Food and Agriculture Organization (FAO), means that "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2025a). However, according to the FAO, between 638 and 720 million people were globally undernourished in 2024, and 2.4 billion endured moderate or severe food insecurity in 2022 (FAO, 2025a).



It is imperative to differentiate between the two political-economic paradigms of social democracy and democratic socialism. Social democracy refers to a political and economic philosophy that supports representative democracy, a mixed market economy, and strong welfare state institutions designed to reduce inequality and improve social justice while maintaining the private ownership of most production. In contrast, democratic socialism endorses democratic political systems and the systemic transformation of the economy, such that production, distribution, and exchange are organized in the public, cooperative, or social-ownership sphere, aiming ultimately to replace rather than merely regulate capitalism (Socialist International, n.d.).

While the two share elements (welfare, democracy, equality), democratic socialism goes further: it frames food security not just as a goal to be achieved under a capitalist framework but as a foundational right supported by a social economy organized for collective benefit.

Why this distinction matters for food security

Under social democracy, food systems remain embedded in a market economy logic: private producers, supply chains, commodity pricing, with regulation and redistribution to mitigate inequalities. This can improve food access and reduce hunger, and countries with strong social democracy show high food security indicators. The Global Food Security Index (GFSI) 2022 reported that the top ten performers were predominantly high-income nations, led by Finland (83.7), Ireland (81.7), Norway (80.5), France (80.2), The Netherlands (80.1), Japan (79.5), Canada (79.1), Sweden (79.1), Switzerland (78.8), and Austria (78.7) on a 0-100 scale, reflecting the strong correlation between comprehensive social welfare policies and food security outcomes (Economist Impact, 2022).

While empirical studies such as Berkowitz et al. (2024) examine social democratic, corporatist, and liberal welfare state regimes rather than explicitly discussing democratic socialism, their findings provide valuable insights. The study categorized countries following Esping-Andersen's framework: social democratic regimes such as Sweden, Denmark, Norway, and Finland; corporatist (conservative) regimes such as Germany, France, and the Netherlands; and liberal regimes such as the United States, the United Kingdom, and Australia. The results reveal that social democratic welfare states exhibit the lowest prevalence of food insecurity, reflecting their emphasis on universal social protection and redistributive welfare programs. Corporatist regimes, which rely heavily on employment-based benefits and occupational social insurance, demonstrate moderate levels of food insecurity because access to support is often contingent on labor market participation. In contrast, liberal regimes, characterized by market-oriented policies and limited public welfare, experience the highest risk of food insecurity.

Collectively, these findings suggest that the more a society embeds equity, universalism, and collective responsibility into its social policies, the more effectively it ensures food security, thereby aligning with the fundamental principles that democratic socialism seeks to advance through deeper structural reform and social ownership of essential resources such as food.

Nevertheless, significant global disparities persist; in 2022, around 2.4 billion individuals, accounting for 29.6% of the global population, experienced moderate to severe food insecurity (FAO, 2025a). Democratic socialism argues that merely regulating capital and relying on market logic are insufficient to guarantee universal access or address structural inequities in production, distribution, and consumption. It emphasizes that food should be treated as a public good and a fundamental right rather than primarily as a commodity subject to profit motives. It also underscores the importance of collective participation and ownership within food systems, encouraging models such as farmer cooperatives and community-owned processing and distribution networks that empower both producers and consumers. Furthermore, democratic socialism calls for aligning food production and distribution with the principles of social justice, sustainability, and resilience, ensuring that ecological integrity and equity take precedence over short-term efficiency and profit. Finally, it advocates for a strong sense of state and public responsibility in food provisioning, particularly for vulnerable groups, extending beyond temporary welfare or safety-net programs to establish food access as a permanent and guaranteed right for all citizens.

Thus, in the context of food security, democratic socialism offers a step forward because it addresses the root structural conditions (who owns, who decides, how wealth is distributed) rather than only symptoms (lack of access, hunger) under regulated capitalism.

The current global food system: structural challenges

Despite technological advances and global trade, the world remains far from achieving universal food security. Corporate consolidation in agribusiness, globalized supply chains, commodity price volatility, climate shocks, and unequal power relations all contribute to structural vulnerabilities. Mumah et al. (2025) revealed stark global inequalities in food security performance, with North America, East Asia, and Europe achieving the highest composite scores, while Sub-Saharan Africa and South Asia lag far behind across all pillars of availability, access, utilization, and stability. The study attributes these disparities less to the absence of policy than to weak implementation capacity and institutional fragility, which undermine even well-designed strategies. These findings underscore that achieving lasting food security requires systemic transformation, addressing power, governance, and equity, precisely the kind of structural reform advocated by democratic socialist approaches to food systems.

The FAO's flagship report, The State of Food Security and Nutrition in the World 2025 (SOFI 2025), shows that the surge in food price inflation since 2021 has significantly eroded real incomes and, in many countries, undermined purchasing power and access to healthy diets, especially among low-income populations. The report concludes that, while there has been some modest recovery in headline hunger indicators, the affordability of nutritious diets remains a major constraint, and inadequate policy responses to inflation have deepened existing inequalities in food and nutrition supply. Because food is largely traded, privately produced, subject to market shocks, and often controlled by large corporations, a purely market-based (even market-guided) system tends to leave many people behind. In contrast, a democratic socialist approach would strengthen public provisioning, cooperative production and distribution, and community governance.

Duncan (2018) shows that "participation" in global food-security governance is not automatically empowering; multi-stakeholder processes can depoliticise food security by masking power imbalances and sidelining conflict. By contrast, governance spaces like the reformed United Nations Committee on World Food Security become genuinely transformative only when they centre those most affected by hunger, allow open contestation, and create room for alternative visions such as food sovereignty (Duncan, 2018). This insistence on visible power relations, the meaningful participation of marginalized groups, and contestation over the purposes of food systems strongly resonates with democratic socialist arguments for democratizing control over production and distribution, rather than leaving food policy to technocratic or market-driven elites.

Lessons from Europe

The Nordic countries and much of Western Europe provide illustrative models of food security outcomes rooted in social democratic welfare states, with some policies reflecting elements of democratic socialist orientation. Within these welfare systems, citizens benefit from universal access to essential services, strong social safety nets, and consistently low food insecurity rates, reflecting a commitment to equity and social protection. In recent years, the idea of "ecosocial food policies" has gained traction in Europe, especially through proposals for an ecosocial EU food system that explicitly links ecological sustainability with social-democratic and ecosocialist principles. These policies call for the redesigning of agricultural subsidies to reward ecologically and socially sustainable practices, curbing the concentration of corporate market power, protecting agricultural land from financial speculation, tackling food poverty and overconsumption, and institutionalizing dialogue between farmers, workers, consumers, and policymakers (Foundation for European Progressive Studies (FEPS), 2024). Correspondingly, the Global Food Security Index (2022) shows that European nations dominate the top rankings, suggesting that well-regulated market economies complemented by robust welfare frameworks tend to have the most secure and equitable food systems (Economist Impact, 2022).

From these examples, several principles emerge that are applicable to various contexts. First, food security must ensure universal access, not merely to calories but also to safe, nutritious, and culturally appropriate food. Equally important is public provisioning and procurement, which can empower sustainable local producers and strengthen community-level food economies. Building shorter and more localized supply chains enhances resilience and fosters greater local ownership of food systems, thereby reducing dependence on global market fluctuations. True transformation also requires active participation, where farmers, producers, and consumers are directly involved in decision-making processes rather than remaining passive actors in market structures. Finally, sustainability must be embedded in the design of food systems, integrating agroecology, biodiversity conservation, and climate resilience as core principles to ensure long-term food security and ecological balance.

Changes needed globally and in the Sri Lankan context

Global context

Achieving sustainable food security requires a series of global shifts in society's perception and management of food systems. First, food must be recognized not as a commodity but as a fundamental human right guaranteed by public policy and protected from the volatility of private markets. Second, greater emphasis should be placed on localization and resilience by strengthening regional and community-based food systems and reducing dependence on lengthy global supply chains that are vulnerable to economic, climatic, and geopolitical shocks. Third, food system governance must become more democratic, enabling producers, consumers, and local communities to co-design and co-govern food production, distribution, and access. Fourth, redistribution and social protection mechanisms, such as public provisioning, subsidies, and safety nets, must ensure equitable access to nutritious food, even when market prices fluctuate. Finally, food systems should be firmly anchored in sustainability and regeneration, aligning agricultural practices with ecological boundaries, climate adaptation, agroecology, and principles of social justice to guarantee long-term food security.

Sri Lankan context

Sri Lanka has demonstrated the capacity to achieve self-sufficiency in key staples in the past; however, today, it faces significant vulnerabilities, as reflected in its 79th place ranking out of 113 countries in the GFSI (2022), with an overall score of 55.2 (Economist Impact, 2022). A joint FAO/WFP (World Food Program) Crop and Food Security Assessment Mission (CFSAM) in 2022 found that the macroeconomic crisis, shortages of fertilizer and fuel, and steep price surges led to a sharp drop in staple crop output (FAO, 2025b; WFP, 2025). Many households remain food insecure, particularly within the estate sector, plantation worker communities, and wage-laborer families, reflecting structural inequities in access and affordability (Groundviews, 2024).

According to the WFP Household Food Security Overview, approximately 16% of households were moderately food insecure in December 2024 and 26-27% consumed inadequate diets in early 2025, with acute food insecurity peaking amid sustained inflation and declining real income (WFP, 2025; International Water Management Institute (IWMI), 2025). Nearly one-third of children under five years of age remain malnourished, while over 40% of women aged 18–60 years are overweight or obese, which reflects Sri Lanka's growing double burden of malnutrition driven by poor dietary diversity and changing lifestyles (WFP, 2025; Nutrition Dialogues, 2024). The Family Health Bureau's 2022 survey similarly reported that 43.4% of children under five years of age experience stunting, underweight, or growth delays, with the highest rates recorded in the Ampara District (Groundviews, 2024).

The economic crisis of 2022–2023 triggered a significant rise in extreme poverty compared to 2019, leaving 26% of Sri Lankans below the poverty line by 2024 (Groundviews, 2024; IWMI, 2025). As a result, households increasingly rely on severe coping mechanisms such as skipping meals, reducing portion sizes, or substituting with less nutritious foods, with 42% of surveyed households reporting such practices in 2023 (WFP, 2025).

Sri Lanka's agricultural production remains highly vulnerable to climate variability, including floods and droughts, and is constrained by insufficient policy support and outdated cultivation practices (FAO, 2025b; Farmonaut, 2025). The 2025 paddy harvest fell significantly due to extensive flooding and increasing dependence on imported rice and wheat (FAO, 2025b). In 2024, the nation's food and beverage imports reached a record US $1.93 billion, underscoring long-standing weaknesses in domestic value chains and overreliance on crops that could be produced locally (FreshPlaza, 2025).

Persistent policy and infrastructure gaps further hinder progress, particularly in aligning domestic production with international standards, diversifying exports, and modernizing the food supply chain. Inadequate cold storage capacity, weak post-harvest management, and limited digital infrastructure continue to restrict market access and efficiency (Agriculture Sector Modernization Project [ASMP], 2025). Nevertheless, the government has implemented several nutrition-focused programs, including the school meal program, which currently supports over 1.4 million children with an allocated budget of 32 billion rupees for 2025 (Ministry of Education [MoE], 2025). Parallelly, model restaurants have been launched to provide affordable and nutritious meals to urban and low-income populations, promoting healthier dietary habits nationwide (President's Office of Sri Lanka, 2025). However, the effectiveness of these initiatives remains contested, as some observers argue that the allocated funds are insufficient to adequately support children in schools with the greatest need, while meal prices at model restaurants remain relatively high for low-income families, limiting their accessibility and overall impact.

Looking forward, Sri Lanka has tangible opportunities to rebuild a resilient and sustainable food system by investing in climate-smart agriculture, expanding value-added processing, improving post-harvest technologies, and fostering multisectoral partnerships that unite public institutions, private actors, and civil society organizations (SLYCAN Trust, 2024; UN Food Systems Hub, 2021). Strengthening nutrition education, promoting maternal and child health, modernizing agricultural infrastructure, and scaling up school feeding programs are urgent priorities to address both undernutrition and obesity, the country's most persistent nutrition paradox (Nutrition Dialogues, 2024).

Ultimately, Sri Lanka's greatest challenge lies not merely in resource scarcity but in constructing a dynamic model of food system governance grounded in social justice, democratic participation, and public provisioning. This transformative pathway, anchored in the ethics and practices of democratic socialism, offers the most promising route to overcoming the cyclical crises that have long constrained the nation's food security

Why democratic socialism offers a deeper foundation for food security

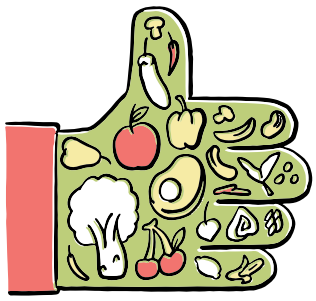
While social democracy has produced robust welfare states and relatively high food security outcomes in many high-income countries, it remains anchored in a market economy that largely accepts private ownership of production and distribution. In contrast, democratic socialism seeks a systemic transformation of food systems, shifting from private or monopolistic control and globalized supply chains toward socially owned, cooperative, and localized models. It goes beyond merely regulating markets to emphasize public responsibility, where the state or collectively owned institutions play a central role in safety nets, direct provisioning, and governance.

Moreover, democratic socialism places democracy at the heart of production and distribution, ensuring that farmers, consumers, and workers actively participate in decision-making, rather than being passive recipients of welfare or market outcomes. For food security, this distinction is critical: when food is recognized as a right and its production and distribution are socially owned, the logic of profit is replaced by the logic of human need, stability, sustainability and collective well-being. In essence, democratic socialism aligns the means of food production and distribution with the goals of equity, access, sustainability, and empowerment, moving beyond social democracy's mitigation of market failures to a fundamental redesign of the food system as a universal public benefit.

Conclusion: What this means for practitioners and researchers

Food security is currently at a crossroads. The interconnected crises of climate change, pandemic disruptions, economic inequality, global supply chain fragility, and wars have exposed the limitations of the traditional, market-led model of food systems. A democratic socialist approach offers a transformative roadmap that treats food as a public good, supports both producers and consumers equitably, embeds democratic governance into decision-making, and realigns agriculture with the principles of sustainability and social justice.

For Sri Lanka, this moment presents both an urgency and an opportunity. By re-anchoring the national food policy in equity, sustainability, and community participation, the country can transform systemic vulnerability into long-term resilience. For scholars, practitioners, and policymakers in food science, technology, public health, and nutrition, the challenge lies in merging the scientific knowledge of nutrition, production, and policy with the ethical values of justice and democracy.



Researchers, educators, policy advisers, and communicators can all play a vital role in this transition. This involves highlighting evidence of inequality in access and production while advocating for measures that protect small-scale producers and vulnerable consumers; designing research that connects community-based interventions, such as cooperative production, local procurement, or urban agriculture, to measurable gains in food security and social equity; communicating to broader audiences that food security is not merely a technical or economic concern but also a moral and governance issue; and actively engaging with policy platforms, such as the Nutrition Society of Sri Lanka (NSSL), to ensure that scientific voices inform the design of socially just and sustainable food systems.

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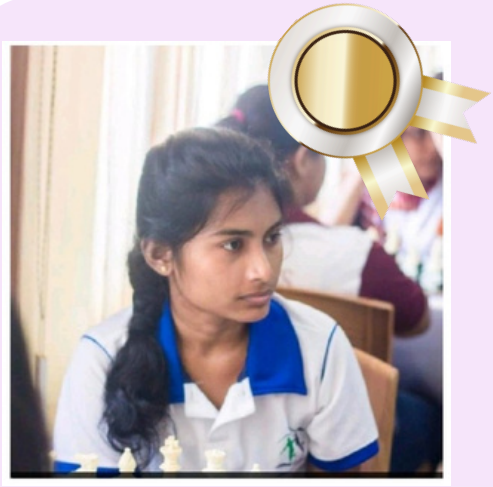

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This is her third consecutive, successful entry in a row to the NSSL Newsletter

The Potential of Algae in Cancer Prevention From a Food Science Perspective

In recent years, food science has moved beyond the question of "Does this food provide nutrients?" to a more meaningful one: "Can this food actively protect health?" This shift has brought functional foods, bioactive compounds, and preventive nutrition into the spotlight. Among the many emerging ingredients, algae stand out as one of the most promising, yet still underutilized resources for cancer prevention.
For food scientists and technologists, algae are particularly interesting because they combine nutritional value, functional properties, and biological activity, all within a highly sustainable raw material. This article explores algae from a food science and technology perspective, focusing on their composition, bioactive components, processing considerations, and potential role in cancer-preventive food systems.

Why Algae Matter in Food Science?
Algae include both microalgae (such as Spirulina and Chlorella) and macroalgae or seaweeds (brown, red, and green algae). While traditionally consumed in East Asian diets, algae are now being re-examined globally as functional ingredients rather than niche foods.

From a food science point of view, algae are valuable because they offer:

- High nutrient density in small quantities
- A wide range of bioactive compounds
- Useful techno-functional properties
- Compatibility with clean-label and plant-based product development
- Strong sustainability credentials

Table 01: Key Nutritional and Functional Components of Algae

Component	Food Science Relevance	Health Significance
Proteins	High-quality, balanced amino acids	Supports immune function
Dietary fiber & polysaccharides	Prebiotic and gelling properties	Gut health, colorectal cancer risk reduction
Pigments(carotenoids, phycobiliproteins)	Natural colorants, antioxidants	Protection against oxidative DNA damage
Omega-3 fatty acids (EPA, DHA)	Functional lipids	Anti-inflammatory effects
Minerals & trace elements	Fortification potential	Enzyme function, antioxidant defense

This multifunctionality makes algae particularly suitable for functional food formulation aimed at long-term disease prevention.

Bioactive Compounds in Algae and Their Anticancer Potential

1. Sulfated Polysaccharides: More Than Just Thickeners

From a technological standpoint, algal polysaccharides such as fucoidan, carrageenan, agar, and ulvan are already widely used as stabilizers and gelling agents. However, research over the last two decades has revealed their biological activity, particularly in cancer-related pathways.

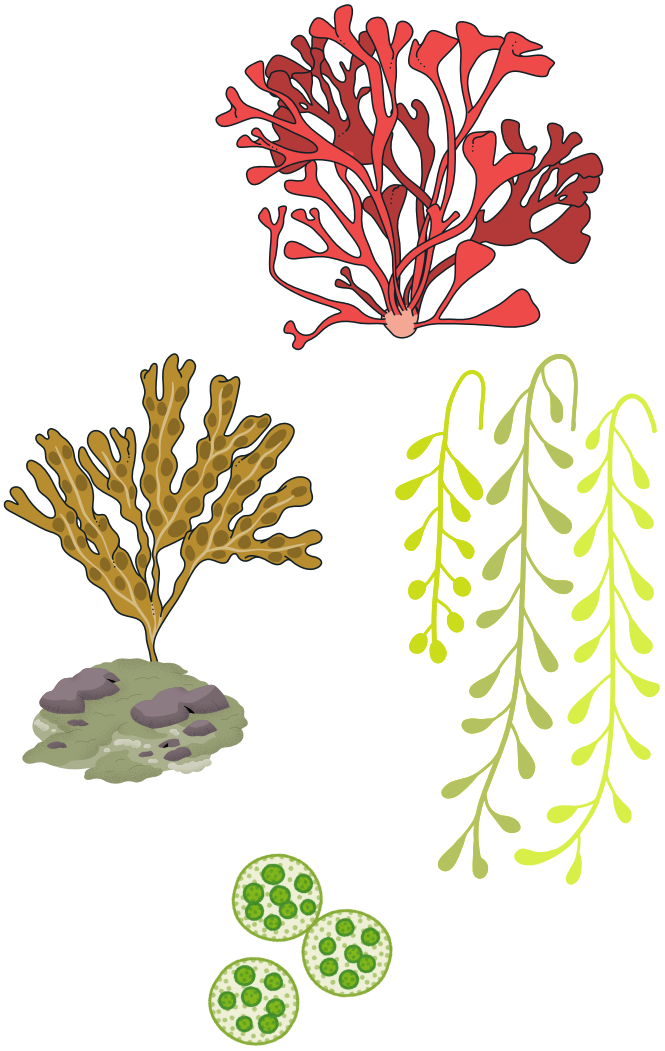
Studies suggest these compounds can:

- Suppress cancer cell proliferation
- Induce apoptosis (programmed cell death)
- Inhibit tumor angiogenesis
- Modulate immune responses

What is especially important for food scientists is that bioactivity depends heavily on processing. Molecular weight, degree of sulfation, and extraction method all influence functionality, meaning food processing decisions directly affect health outcomes.

2. Algal Pigments as Natural Antioxidants

Algal pigments are among the most exciting compounds from a food technology perspective because they combine visual appeal with health benefits. Key pigments include: Fucoxanthin (brown algae), Astaxanthin (Haematococcus), Phycocyanin (Spirulina), Chlorophylls. These pigments act as powerful antioxidants, reducing oxidative stress—a key driver of cancer initiation. Fucoxanthin, in particular, has shown the ability to regulate cell cycle arrest and apoptosis in experimental cancer models. For product developers, this opens the door to natural antioxidant systems that replace synthetic additives while adding functional value.



3. Omega-3 Fatty Acids from Microalgae

Microalgae are the original source of EPA and DHA in the marine food chain. From a food science perspective, algae-derived omega-3s offer several advantages over fish oil as they are identified as vegetarian and allergen-friendly, more sustainable and lower risk of marine contaminants. Further, Omega-3 fatty acids are well known for their anti-inflammatory properties, which is particularly relevant since chronic inflammation plays a major role in cancers such as colorectal, breast, and prostate cancer.

Processing, Bioaccessibility and Bioavailability

The presence of bioactive compounds alone does not guarantee health benefits. Their stability and bioavailability are strongly influenced by processing.

Table 2: Processing Techniques and Their Impact on Algal Bioactives

Processing Method	Advantage	Limitation
Hot water extraction	Simple, food-grade	May degrade heat-sensitiv compounds
Enzymatic extraction	Improved bioavailability	Higher cost
Ultrasound/microwave-assisted extraction	Higher yield, shorter time	Requires optimization
Encapsulation	Protects lipids and pigments	Increases formulatio complexity

Food matrix interactions also matter. For example:
Lipid-rich matrices improve carotenoid absorption
Fiber-rich systems enhance gut-level effects
This is especially relevant for colorectal cancer prevention, where algal fibers and polysaccharides may act locally in the gut.

Application in Functional Food Development

From a food technology standpoint, algae are already being incorporated into:

- Bakery products (bread, crackers, snack bars)
- Beverages and smoothies
- Plant-based meat and seafood alternatives
- Nutraceutical powders and capsules
- Edible films and biodegradable packaging

However, challenges remain:

- Strong color intensity
- Marine or earthy flavors
- Texture changes
- Consumer perception

Safety, Quality and Regulatory Considerations

Food scientists must also address safety issues:

- Variability in iodine content (especially brown algae)
- Heavy metal accumulation
- Microbial contamination

Controlled cultivation, standardized processing, and robust quality assurance systems are essential. Regulatory approval as novel foods in many regions further highlights the need for strong scientific evidence.

Conclusion

From a food science and technology perspective, algae are far more than a nutritional curiosity. They are a multifunctional, sustainable, and biologically active ingredient with strong potential in cancer-preventive diets. While they are not a cure, their strategic inclusion in functional foods can support long-term health by reducing oxidative stress, inflammation, and metabolic dysregulation. As research advances and processing technologies improve, algae are likely to play an increasingly important role in the development of next-generation functional foods aimed at chronic disease prevention, including cancer.

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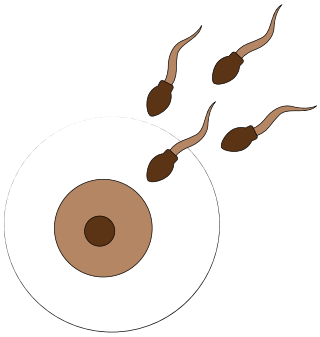
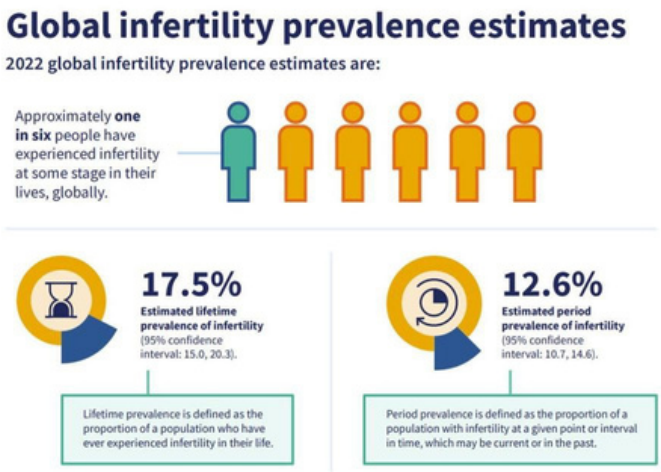
This is her third consecutive, successful entry in a row to the NSSL Newsletter

Rebuilding Hope: How Nutrition Can Support Subfertility Management

In Sri Lanka, many individuals are unwilling to openly discuss sexual and reproductive health related matters. As a result, conditions affecting the reproductive system are often difficult to identify, manage, or treat on time. Subfertility is one such condition that individuals are hesitant to discuss with relevant health professionals, leading to delayed consultation and management. Social stigma, cultural norms, and other related factors further contribute to this delay. Early identification of subfertility allows timely intervention, appropriate treatment, and better management of the condition.



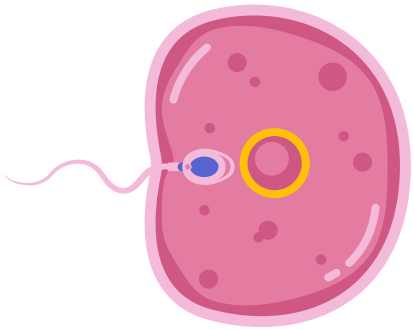
Infertility is defined by the World Health Organization (WHO) and the International Committee for Monitoring Assisted Reproductive Technologies (ICMART) as the inability to achieve pregnancy after 12 months of regular, unprotected sexual intercourse, while subfertility refers to reduced reproductive efficiency resulting in delayed conception. According to WHO data (1990–2021), infertility is a major public health concern, affecting approximately 17.5% of the adult population worldwide equivalent to about one in six individuals and impacting nearly 50 million couples globally.



Sri Lanka faces a significant burden of subfertility, with an estimated 270,000 to 400,000 subfertility couples nationwide. However, prevalence varies across regions. A study conducted in Jaffna reported an overall subfertility prevalence of 23.1%, comprising 18.8% primary and 4.4% secondary subfertility. In contrast, data from Colombo indicated lower prevalence rates, with approximately 6.08% primary and 8.40% secondary subfertility. These findings highlight regional disparities and suggest a rising trend in secondary subfertility in Sri Lanka.

What is meant by subfertility?

The WHO defined subfertility as a disease of the male or female reproductive system that fails to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse. It can be classified as primary and secondary subfertility. The clinical definition of primary subfertility is “when a woman has never conceived despite cohabitation and regular unprotected sexual intercourse for twelve months”. Secondary subfertility is defined as a “delay for a couple to conceive again, who have conceived previously, even if the pregnancy may not have been successful due to miscarriage, ectopic pregnancy, etc



What could be the causes and risk factors?

Two main categories of contributing factors have been identified.

1. Male factors: subfertility is a significant contributor to infertility, estimated to play a role in approximately 50% of couples experiencing subfertility. Major causes include,

- Issues with semen quality -low sperm count (oligospermia), reduced sperm motility (asthenospermia), and abnormal sperm morphology
- Hormonal imbalances
- Genetic factors
- Environmental -Exposure to toxins such as pesticides and heavy metals, high temperatures,
- Lifestyle factors -smoking, excessive alcohol consumption, obesity, and poor nutrition
- Some medical conditions (varicocele,infections, and chronic diseases)

2. Female factors: Female subfertility can arise from a variety of issues.

- Ovulation disorders(polycystic ovary syndrome - PCOS))
- Hormonal imbalances,
- Structural abnormalities(blocked fallopian tubes and endometriosis
- Age
- Endometriosis
- Lifestyle factors -obesity, smoking, poor diet and excessive alcohol intake

The figure summarizes all causes and risk factors of subfertility in both males and females.

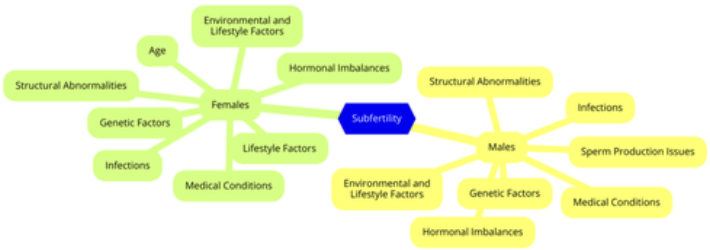


Figure 1: Causes and risk factors of subfertility in males and females (Shukla S, Shrivastava D, 2024)

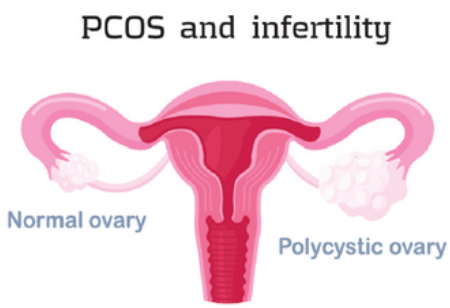
Does your body weight affect subfertility?

Body weight plays a crucial role in fertility in both women and men. Mai ntaining a healthy body weight supports normal hormonal balance and optimal reproductive function, while being either overweight or underweight can negatively affect fertility.

In women, overweight and obesity are associated with ovulatory infertility, menstrual irregularities, an increased risk of miscarriage, and reduced chances of conception. Evidence shows that even modest weight loss can restore ovulation and significantly improve fertility outcomes. Conversely, being underweight can disrupt hormonal regulation, leading to an ovulatory cycles and a higher risk of infertility. Fertility often improves once a healthy weight is regained. In men, both high and low body mass index (BMI) adversely affect reproductive hormones and semen quality, including sperm count, concentration, motility, and morphology. Severe under-nutrition may even suppress sperm production entirely.

Does PCOS affect subfertility?

Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders among women of reproductive age and a leading cause of subfertility. It affects approximately 6% to 13% of women globally, with reported prevalence ranging from 5% to 21% depending on diagnostic criteria and study populations. Nearly half of the affected women remain undiagnosed. PCOS is characterized by irregular menstrual cycles, elevated androgen levels (resulting in acne or excessive hair growth), and polycystic ovaries. Both genetic predisposition and excess body weight contribute to its development. Importantly, several symptoms of PCOS can be improved through lifestyle modifications, particularly weight management, healthy eating, and regular physical activity



For individuals planning a pregnancy, achieving and maintaining a healthy body weight is essential.

Do you know your diet can boost your fertility?

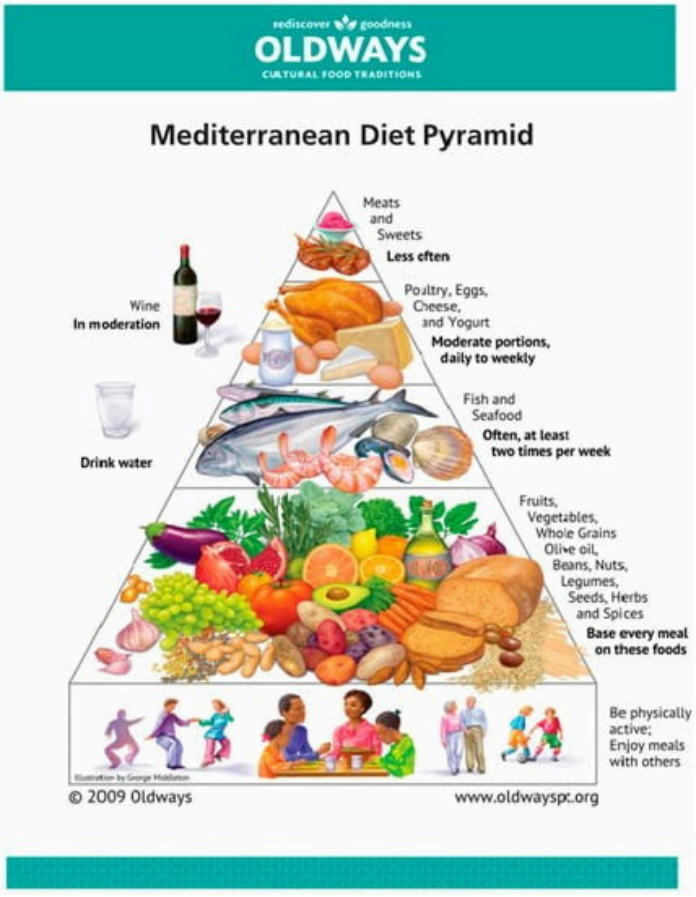
In recent years, there has been a growing interest in identifying modifiable risk factors that may affect couples' fertility and in personalized nutrition interventions for both members of the couple, intending to alter subfertility. Although there is growing acceptance that nutrition may be related to the reproductive performance of both sexes and a strong link exists between unhealthy eating habits and infertility.

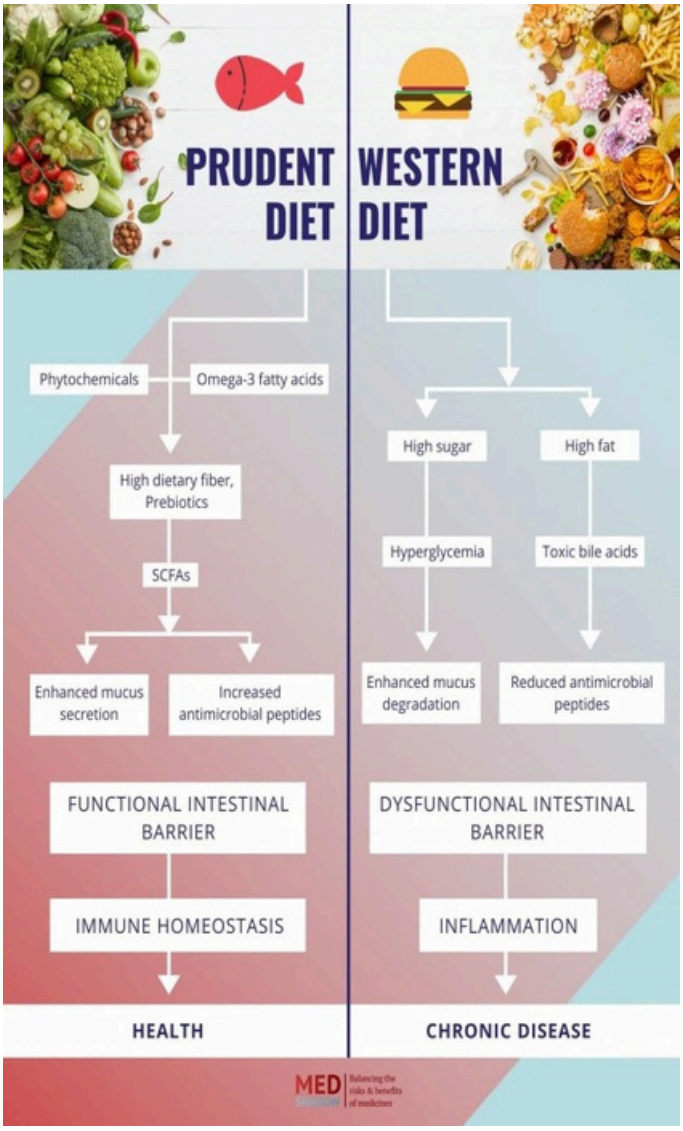
There is no single, widely adopted global "fertility diet guideline." However, experts agree that a healthy diet and lifestyle can improve fertility, and health professionals recommend following dietary management based on current research findings

Recent evidence on the role of diet in subfertility management

Recent research from North America, Europe, the Middle East, and Asia highlights the significant role of diet in managing subfertility in both men and women. Healthy dietary patterns particularly the Mediterranean Diet (MedDiet) and the Prudent Diet are consistently associated with improved reproductive outcomes.

In men, adherence to these diets, which are rich in fruits, vegetables, whole grains, legumes, nuts, fish, and lean poultry, is linked to better semen quality. Studies report higher sperm concentration and total sperm c ount, improved motility, increased testosterone levels, and reduced sperm DNA fragmentation, with the strongest benefits observed among men with poor baseline semen quality. In contrast, the Western Diet high in red and processed meats, refined grains, sugary beverages, and sweets has been associated with abnormal semen parameters and shows no fertility benefit.





In women, growing evidence indicates that the Mediterranean Diet supports female fertility, particularly among those undergoing fertility treatment. High adherence to the MedDiet has been associated with a substantially lower risk of fertility problems. Although some studies show no direct association with implantation rates, younger women (<35 years) following this dietary pattern demonstrate higher pregnancy and live-birth rates. Diets rich in plant-based foods, fish, and healthy fats appear to support hormonal balance, ovarian function, and overall reproductive health.

Key nutrients and foods to focus on

Based on these findings, health experts recommend dietary modifications as a key component of subfertility management. The following section summarizes the roles of major nutrients in subfertility, their physiological effects, and important dietary sources.

Macronutrients

Macronutrients - proteins, fats, and carbohydrates are fundamental components of our diet, each playing a critical role in overall health, including reproductive health.

Table 01: Role of different nutrients in reproductive health

Nutrients	Functions	Food sources
Carbohydrates	• Provide energy for all body functions, including reproductive processes • Complex carbohydrates help maintain stable blood sugar levels, crucial for hormonal balance and reproductive health. • High-fiber carbohydrates promote gut health and help regulate hormones.	Whole grains, fruits, vegetables, legumes, nuts, and seeds
Proteins	• Growth and repair of tissues, including reproductive organs. • Essential for hormone production (e.g., insulin, gonadotropins) • Improved sperm quality and motility	lean meats, fish, eggs, dairy products, and plant-based options such as beans, lentils, tofu, nuts, and seeds
Fats	• Essential for the production of sex hormones that regulate the menstrual cycle and fertility. • Facilitate the absorption of fat-soluble vitamins (A, D, E, and K), • Maintain cell membrane structure in reproductive cells Limiting trans fats and saturated fats can help maintain overall health.	Avocados, olive oil, nuts, seeds, and fatty fish.
Nutrients	Functions	Food sources
	Vitamins	
Vitamin D	• Regulating reproductive hormones, including estrogen and progesterone • Essential for ovulation and menstrual regularity in women. • Improved sperm motility and overall quality • Reduced risk of complications such as gestational diabetes and preeclampsia.	Sunlight is the primary source of vitamin D. dietary sources such as fatty fish (e.g., salmon and mackerel), fortified dairy products, egg yolks, and mushrooms
Vitamin E	• It is a powerful antioxidant that protects reproductive cells from oxidative stress. • Maintaining sperm membrane integrity and function contributes to overall sperm health. • Alleviate premenstrual syndrome (PMS) symptoms and support regular menstrual cycles.	Nuts and seeds (particularly almonds and sunflower seeds), vegetable oils (such as sunflower and olive oil), spinach, and avocados.
Vitamin C	• antioxidant, helps protect sperm and egg cells from oxidative damage • supports the synthesis of hormones, including estrogen, which is vital for female fertility. Vitamin C supplementation can enhance sperm motility and reduce DNA damage in sperm cells	Fruits and vegetables, particularly citrus fruits (such as oranges and lemons), strawberries, bell peppers, and broccoli.
Folate (vitamin B9)	• Essential for DNA synthesis and repair • Important in early pregnancy to prevent neural tube defects. • Supports ovulation and may enhance fertility in women.	Leafy greens, legumes, nuts, and fortified grains.
Vitamin B12	• Crucial for red blood cell production and DNA synthesis; deficiency can lead to anemia and affect fertility. • Involved in hormone regulation and maintaining a healthy menstrual cycle.	Animal products such as meat, fish, eggs, and dairy. Vegans may need to consider fortified foods or supplements to meet their vitamin B12 needs.
	Minerals	
Zinc	• Essential for male reproductive health • Development and function of male reproductive organs, as well as in sperm production and maturation. • Maintaining testosterone levels, which are crucial for sexual health and fertility Zinc deficiency can result in decreased sperm quality and count, potentially leading to fertility issues.	Oysters, red meat, poultry, beans, and nuts.
Iron	• Essential for producing hemoglobin, the protein in red blood cells that carries oxygen throughout the body. • important for women due to the risk of anemia from menstrual blood loss Iron deficiency can lead to fatigue, weakness, and impaired fertility, making it crucial for women of childbearing age to monitor their iron intake	Lean meats, beans, spinach, and iron-fortified cereals.
Selenium	• Act as an antioxidant, helping to protect the body's cells, including reproductive cells, from oxidative damage. • Critical for the proper functioning of the thyroid gland, which regulates hormones essential for fertility. Research suggests that selenium deficiency may be linked to reduced sperm motility in men and an increased risk of miscarriage in	seafood, Brazil nuts, and organic meats
Magnesium	• Involved in more than 300 enzymatic reactions • Crucial for hormone regulation. • The development and function of the ovaries and testes are vital for reproductive health. Magnesium deficiency has been associated with complications during pregnancy, such as an increased risk of preeclampsia and gestational diabetes.	Green leafy vegetables, whole grains, nuts, and seeds

Further antioxidants neutralize free radicals and reduce oxidative stress that can damage reproductive cells and tissues. Antioxidants such as vitamins C and E can enhance sperm quality and motility in men and support menstrual regularity and ovulation in women. Rich sources of antioxidants include fruits, vegetables, nuts, seeds, green tea, and dark chocolate.

Dietary Supplements and Subfertility Management

When dietary intake is insufficient to meet daily nutrient requirements, dietary supplements may be considered. The need for supplementation should be assessed by a qualified dietitian or nutritionist based on individual dietary intake, nutritional status, and heal th conditions.

Dietary supplements can help correct nutrient deficiencies that may influence fertility. However, they should be used cautiously and always alongside a balanced, healthy diet. In men, supplements such as zinc, selenium, folate, vitamins C and E, and omega-3 fatty acids have been associated with improvements in sperm count, motility, and morphology, although optimal dosages are not yet clearly established. In women, folic acid supplementation before conception is essential for preventing neural tube defects, and vitamin D may support fertility, particularly in those who are deficient. Other supplements, including antioxidants and probiotics, show potential benefits for reproductive health, but stronger scientific evidence is still required. As supplement quality varies and some products may interact with medications or cause adverse effects, supplementation should not replace healthy dietary and lifestyle practices and should only be undertaken under professional guidan

Further, limiting alcohol and caffeine, following a balanced diet, and engaging in regular physical activity can improve fertility by supporting hormonal balance, a healthy weight, and overall reproductive health.

By adhering to prescribed medical treatments and embracing healthy dietary and lifestyle habits, you can actively combat subfertility and take confident steps toward achieving parenthood

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Mind over Meal: Understanding and Shaping Healthy Food Choices

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Naturally, eating is an act driven by the physiological sense of hunger, which ensures the body receives the nourishment necessary for its biological processes. However, the choice of food to satisfy hunger is often influenced more by personal preference and availability than by nutritional value. From the days of hunter-gatherers to the contemporary era, the abundance of food has turned selection into a challenging task. The selection of food from this great variability is determined by many psychological factors such as appetite, personal taste preferences, food appearance, emotional status, social media influence, food habits of peers and cultural food practices. There are several theories and conceptual frame works that describe psychological behavior of food choices. Basically the main psychological aspects that guide the selection of food can be categorized into three main themes such as deliberate process, non-conscious method and indirect effects.

Most commonly the selection of food is based on non-conscious process. Such non conscious decisions are sudden and easy to make with almost no brain storming. When foods are chosen non-consciously the selection is mainly based on habits, emotional state and impulse. A habit is a repeated behavior that performed automatically to the similar situations over time. Examples for habitual food choices in Sri Lanka are having a cup of tea early in the morning, consuming kiribath as the breakfast on special days such as birth days, and drinking plain tea during work breaks. The long lasting emotional state or mood influence the food choices and according to literature positive moods often support healthier choices, whereas negative moods can lead to unhealthy choices

Mood based food consumption patterns can be observed when moments of excitement or celebration encouraging to choose festive foods such as sweets, fried snacks and special main dishes like fried rice. When people are bored they mindlessly choose on unhealthy snacking with whatever easily available. On calm emotional states people are more tend to choose healthy and nutritionally rich cooking or eating. Also negative moods often lead to comfort-seeking behaviors; a common example is reaching for sugary snacks, fried foods, and simple-to prepare foods or chocolate when feeling stressed or sad. A notable fact about food choices and mood is that stress has been shown to negatively affect healthy eating in numerous studies worldwide. Many people turn to food as a source of comfort or as a treat to improve their mood, which can lead to excessive consumption of unhealthy foods. Impulse food choices are spontaneous decisions mostly triggered by external cues or sudden cravings. This can be exemplified by ordering food which is trending on social media, buying street food like vadai and koththu when passing a roadside stall and purchasing discounts and bonus packs.

Deliberate process is when a choice of food is done thoughtfully considering all the available options related not only to the personal preferences but also related to the motives, goals and actual needs. For an instance a person may deliberately pick one among multiple available foods which complements the taste, ingredients, appearance and other personal preferences along with the nutritional values. It is believed that mainly one's attitudes motivation and capability guide the deliberate decision making on what, when and how much to eat. An attitude is an established way of feeling or thinking of a person towards a particular object or a situation which can range from positive to negative and based on belief, experience, learning and other social and cultural factors. One of the most common attitude guided food choice in Sri Lanka is pregnant mothers eating for two. The mind of them is set by the belief that large portions during pregnancy are necessary for the healthy development of the embryo.

Motivation is the driving force or the reason of a behavior that aligns with the perceived attitudes. For an example, although if an adolescent has a positive attitudes towards the healthy food he may reluctant to avoid junk foods or unhealthy snacks when he is with the peers. However, if he is motivated by a fit, same-age celebrity who refuses unhealthy food visibly, he is more likely to avoid unhealthy food without hesitation. Capability is the ability or the confidence of someone that they sense to which extent a task can be completed. When a person feels that a task can be completed successfully, he is more likely to take the actions. This is observed when a busy working woman in Sri Lanka may often rely on quick options like instant noodles, fried short eats, or takeaway rice and curry because she feels she does not have the time or skills to prepare a traditional, nutritious meal

In addition to the deliberate and non conscious decision making sometimes the choice of food is guided by other effects such as social norms and practices and environmental factors. Across Sri Lanka, people follow different food consumption patterns and social norms form an important part of these eating behaviors. One clear example is choosing to eat kiribath during the New Year celebration. The person may hold the attitude that kiribath is just energy-dense, and its odor or appearance does not trigger him to choose it automatically, still that person choose to eat kiribath because everyone in the community practise that eating behavior. The cultural practice of restricting non-vegetarian food consumption among adolescent girls at the onset of menstruation is another example. Even when parents know that animal protein is beneficial during menstruation, and have positive attitudes toward healthy eating, they still follow the traditional restriction. Other than the cultural practices the environmental factors also drive the food selection. Food availability and accessibility play a major role in shaping food choices, even without deliberate planning or unconscious triggers. For example, office workers living in boarding houses with no cooking facilities are compelled to outside and if their vicinity of workplace is full of bakeries and fast food outlets they often choose nutritionally poor foods, due to the low availability and limited accessibility of nutritious options.

Considering the psychological processes involved in food selection, it is crucial fostering the ability to make healthy selections in all ages especially from an early age. It is important to strengthen the healthy deliberate food selection which is easier when a person develops positive attitudes, the motivation to eat well, and the skills needed to make informed choices. The deliberate food selection process can be reinforced through interventions such as provision of nutrition knowledge and information about food such as accurate product labeling, endorsement of healthy food choices and persuasion to choose healthier, behavioral support for self regulation, demonstration of success stories of people that shifted from unhealthy to healthy food consumption, gradual changes from unhealthy consumption patterns to healthy consumption patterns and providing confidence and respective skills to select healthy foods.

These actions should be executed not only at the individual level but also should be disseminated to family, community and societal level.

Not only deliberate food selection but also unconscious food choices can be positively influenced towards healthier eating. However, embedding these drivers should begin in childhood and be consistently practiced within the family environment. Healthy food eating habits, for example choosing fruits over sweets, careful purchasing habits and self regulation practices such as avoiding over eating due to impulsions are such determinants of healthy food selection even unconsciously. Indirect effects that disrupt healthy eating should be given attention and actions should be taken to mitigate the effect. Long-standing social norms lacking scientific evidence should be reconsidered and discontinued or appropriately adapted to promote healthier practices. Availability and accessibility to healthy foods should promote in both individual and community level. Maintaining a home garden of less available fruits and vegetables is an example of individual-level promotion, while increasing the availability of healthy food options in the workplace represents a community-level approach. Moreover policies should be developed at the national level to support widespread access to healthy foods

It is also a responsibility of nutrition professionals to address the relevant aspects that can support the psychological aspects of healthy food choices during nutrition counseling. In Sri Lanka there is a limitation of laws and rules that prevent people from promoting unhealthy foods especially via mass media and social media. Since the means of media holds a huge impact on influencing food selection psychology such rules and regulation should be established promptly. By understanding the psychological drivers of food choices and implementing targeted strategies at the individual, community, and national levels, people can be empowered to make healthier eating decisions and long-term well-being is promoted.

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Fruits and Vegetables Canning in the Food Industry

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Introduction

A method of preserving food in which the food is processed and sealed in an airtight container. The process was first developed as a French military discovery by Nicolas Appert in 1810. The packaging prevents microorganisms from entering and proliferating inside.

Canning provides a shelf life typically ranging from one to five years, although under specific circumstances it can be much longer. A freeze-dried canned product, such as canned dried lentils. Although appearance, smell and vitamin content had deteriorated, there was no trace of microbial growth and determined to be still safe to eat.

The canning of fruits and vegetables is a growing, competitive industry, especially the international export portion. The industry is made up of establishments primarily engaged in canning fruits, vegetables, fruit and vegetable juices; processing ketchup and other tomato sauces; and producing natural and imitation preserves, jams, and jellies.

The primary objective of food processing is the preservation of perishable foods in a stable form that can be stored and transported to distant markets during all months of the year. Processing also can change foods into new or more usable forms and make foods more convenient to prepare.

Method of Canning

The original fragile and heavy glass containers presented challenges for transportation, and glass jars were largely replaced in commercial canneries with cylindrical tin or wrought-iron canisters. Cans are cheaper and quicker to make, and much less fragile than glass jars. Glass jars have remained popular for some high-value products and in home canning. Can openers were not invented for another thirty year. soldiers had to cut the cans open with bayonets or smash them open with rocks. Today, tin-coated steel is the material most commonly used. Laminate vacuum pouches are also used for canning, such as used in drinks.

To prevent the food from being spoiled before and during containment, a number of methods are used: pasteurization, boiling (and other applications of high temperature over a period of time), refrigeration, freezing, drying, vacuum treatment, antimicrobial agents that are natural to the recipe of the foods being preserved, a sufficient dose of ionizing radiation, submersion in a strong saline solution, acid, base, osmotically extreme (for example very sugary) or other microbial-challenging environments.

Other than sterilization, no method is perfectly dependable as a preservative. For example, the microorganism Clostridium botulinum (which causes botulism) can only be eliminated at temperatures above the boiling point of water.

From a public safety point of view, foods with low acidity (a pH more than 4.6) need sterilization under high temperature (116-130 °C). To achieve temperatures above the boiling point requires the use of a pressure canner. Foods that must be pressure canned include most vegetables, meat, seafood, poultry, and dairy products. The only foods that may be safely canned in an ordinary boiling water bath are highly acidic ones with a pH below 4.6,[8] such as fruits, pickled vegetables, or other foods to which acidic additives have been added.

The Canning Process

The canning process dates back to the late 18th century in France when the Emperor Napoleon Bonaparte, concerned about keeping his armies fed, offered a cash prize to whomever could develop a reliable method of food preservation.

Nicholas Appert conceived the idea of preserving food in bottles, like wine. After 15 years of experimentation, he realized if food is sufficiently heated and sealed in an airtight container, it will not spoil. No preservatives are necessary.
An Englishman, Peter Durand, took the process one step farther and developed a method of sealing food into unbreakable tin containers, which was perfected by Bryan Dorkin and John Hall, who set up the first commercial canning factory in England in 1813.
As more and more of the world was explored, and as pro

visioning armies took on greater importance, the demand for canned foods grew. Thomas Kensett, who emigrated to the United States, established the first U.S. canning facility for oysters, meats, fruits and vegetables in New York in 1812.

More than 50 years later, Louis Pasteur provided the explanation for canning's effectiveness when he was able to demonstrate that the growth of microorganisms is the cause of food spoilage

The goal of the canning process is to destroy any microorganisms in the food and prevent recontamination by microorganisms. Heat is the most common agent used to destroy microorganisms. Removal of oxygen can be used in conjunction with other methods to prevent the growth of oxygen needing microorganisms.

In the conventional canning of fruits and vegetables, there are basic process steps that are similar for both types of products. However, there is a great diversity among all plants and even those plants processing the same commodity. The differences include the inclusion of certain operations for some fruits or vegetables, the sequence of the process steps used in the operations, and the cooking or blanching steps.

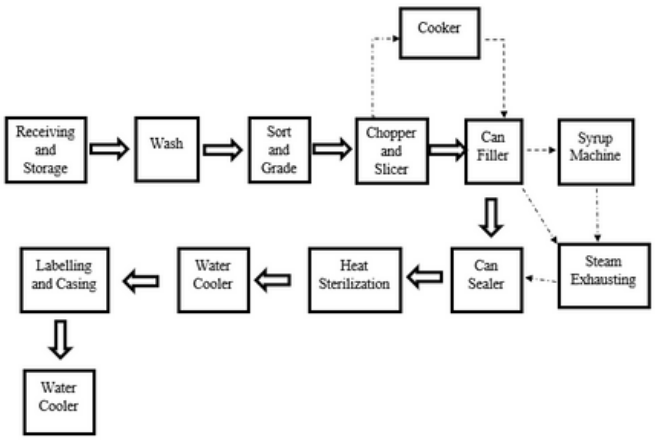
Production of fruit or vegetable juices occurs by a different sequence of operations and there is a wide diversity among these plants. Typical canned products include beans (cut and whole), beets, carrots, corn, peas, spinach, tomatoes, apples, peaches, pineapple, pears, apricots, and cranberries. Typical juices are orange, pineapple, grapefruit, tomato, and cranberry.

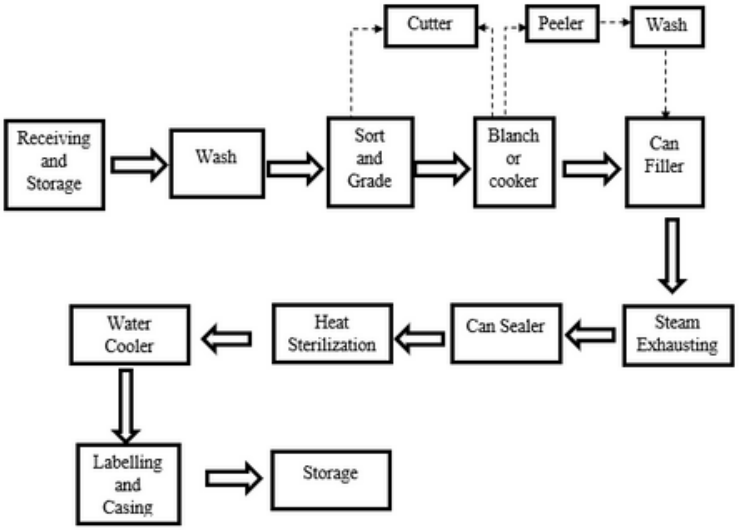
Generic process flow diagrams for the canning of fruits, vegetables, and fruit juices are shown in Figures 2.1, 2.2 and 2.3. The steps outlined in these figures are intended to the basic processes in production. A typical commercial canning operation may employ the following general processes: washing, sorting/grading, preparation, container filling, exhausting, container sealing, heat sterilization, cooling, labeling/casing, and storage for shipment. In these diagrams, no attempt has been made to be product specific and include all process steps that would be used for all products. Figures 3.1and 3.2 show optional operations that are often used but are not used for all products.

One of the major differences in the sequence of operations between fruit and vegetable canning is the blanching operation. Most of the fruits are not blanched prior to can filling whereas many of the vegetables undergo this step. Canned vegetables generally require more severe processing than do fruits because the vegetables have much lower acidity and contain more heat-resistant soil organisms. Many vegetables also require more cooking than fruits to develop their most desirable flavor and texture. The methods used in the cooking step vary widely among facilities. With many fruits, preliminary treatment steps (e. g., peeling, coring, halving, pitting) occur prior to any heating or cooking step but with vegetables, these treatment steps often occur after the vegetable has been blanched. For both fruits and vegetables, peeling is done either by a mechanical peeler, steam peeling, or lye peeling. The choice depends upon the type of fruit or vegetable or the choice of the company.

Some citrus fruit processors produce dry citrus peel, citrus molasses and D-limonene from the peels and pulp residue collected from the canning and juice operations. Other juice processing facilities use concentrates and raw commodity processing does not occur at the facility. The peels and residue are collected and ground in a hammer mill, lime is added to neutralize the acids, and the product pressed to remove excess moisture. The liquid from the press is screened to remove large particles, which are recycled back to the press, and the liquid is concentrated to molasses in an evaporator. The pressed peel is sent to a direct-fired hot-air drier. After passing through a condenser to remove the D-limonene, the exhaust gases from the drier are used as the heat source for the molasses evaporator.

Equipment for conventional canning has been converting from batch to continuous units. In continuous retorts, the cans are fed through an air lock, then rotated through the pressurized heating chamber, and subsequently cooled through a second section of the retort in a separate cold-water cooler. Commercial methods for sterilization of canned foods with a pH of 4.5 or lower include use of static retorts, which are similar to large pressure cookers. A newer unit is the agitating retort, which mechanically moves the can and the food, providing quicker heat penetration. In the aseptic packaging process, the problem with slow heat penetration in the in-container process are avoided by sterilizing and cooling the food separate from the container. Presterilized containers are then filled with the sterilized and cooled product and are sealed in a sterile atmosphere. To provide a closer insight into the actual processes that occur during a canning operation.





Process Steps of Canning

Preparation – The principal preparation steps are washing and sorting. Mechanically harvested tomatoes are usually thoroughly washed by high-pressure sprays or by strong-flowing streams of water while being passed along a moving belt or on agitating or revolving screens. The raw produce may need to be sorted for size and maturity. Sorting for size is accomplished by passing the raw tomatoes through a series of moving screens with different mesh sizes or over differently spaced rollers. Separation into groups according to degree of ripeness or perfection of shape is done by hand; trimming is also done by hand.

Peeling and Coring – Formerly, tomatoes were initially scalded followed by hand peeling, but steam peeling and lye peeling have also become widely used. With steam peeling, the tomatoes are treated with steam to loosen the skin, which is then removed by mechanical means. In lye peeling, the fruit is immersed in a hot lye bath or sprayed with a boiling solution of 10 to 20 percent lye. The excess lye is then drained and any lye that adheres to the tomatoes is removed with the peel by thorough washing.

Coring is done by a water-powered device with a small turbine wheel. A special blade mounted on the turbine wheel spins and removes the tomato cores.

Filling – After peeling and coring, the tomatoes are conveyed by automatic runways, through washers, to the point of filling. Before being filled, the can or glass containers are cleaned by hot water, steam, or air blast. Most filling is done by machine. The containers are filled with the solid product and then usually topped with a light puree of tomato juice. Acidification of canned whole tomatoes with 0.1 to 0.2 percent citric acid has been suggested as a means of increasing acidity to a safer and more desirable level. Because of the increased sourness of the acidified product, the addition of 2 to 3 percent sucrose is used to balance the taste. The addition of salt is important for palatability.

Exhausting – The objective of exhausting containers is to remove air so that the pressure inside the container following heat treatment and cooling will be less than atmospheric. The reduced internal pressure (vacuum) helps to keep the can ends drawn in, reduces strain on the containers during processing, and minimizes the level of oxygen remaining in the headspace. It also helps to extend the shelf life of food products and prevents bulging of the container at high altitudes.

Vacuum in the can may be obtained by the use of heat or by mechanical means. The tomatoes may be preheated before filling and sealed hot. For products that cannot be preheated before filling, it may be necessary to pass the filled containers through a steam chamber or tunnel prior to the sealing machine to expel gases from the food and raise the temperature. Vacuum also may be produced mechanically by sealing containers in a chamber under a high vacuum.

Sealing – In sealing lids on metal cans, a double seam is created by interlocking the curl of the lid and flange of the can. Many closing machines are equipped to create vacuum in the headspace either mechanically or by steam-flow before lids are sealed.

Heat Sterilization – During processing, microorganisms that can cause spoilage are destroyed by heat. The temperature and processing time vary with the nature of the product and the size of the container.

Acidic products, such as tomatoes, are readily preserved at 100°C (212°F). The containers holding these products are processed in atmospheric steam or hot-water cookers. The rotary continuous cookers, which operate at 100°C (212°F), have largely replaced retorts and open-still cookers for processing canned tomatoes. Some plants use hydrostatic cookers and others use continuous-pressure cookers.

Cooling – After heat sterilization, containers are quickly cooled to prevent overcooking. Containers may be quick cooled by adding water to the cooker under air pressure or by conveying the containers from the cooker to a rotary cooler equipped with a cold-water spray.

Labeling and Casing – After the heat sterilization, cooling, and drying operations, the containers are ready for labeling. Labeling machines apply glue and labels in one high-speed operation. The labeled cans or jars are the packed into shipping cartons.

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