

**Avinashilingam Institute for Home Science and Higher Education for Women
Coimbatore - 641 043**

PhD (Full Time) Food Science and Nutrition

Name of the Scholar : Anongshangba. Geetarani Devi

Name of the Guide : Dr. A. Thirumani Devi

Register Number : 21PHFNF008

21PHFN03J Nutritional Status of Adolescents

(Applicable for Ph.D full time scholar admitted in January 2022)

Hrs of Instruction /Week: 7

No. of Credits: 5

Course Objectives:

1. Understanding the nutritional challenges and health concerns of tribal adolescents.
2. Assessing of nutritional knowledge and nutritional status.
3. Analyzing the dietary and lifestyle pattern of adolescents.
4. Promoting nutritional status using appropriate strategies.
5. Developing nutrition and health education program to promote healthy dietary and lifestyle pattern.

Unit 1: Tribal Nutrition is the Health Concern in India

Demographic distribution of tribes in India, nutrition and health status of tribal adolescents' population, food and nutritional requirements, health and nutritional problem, dietary and lifestyle pattern of tribal adolescents.

Unit 2: Food and Nutritional Requirement during Adolescence

Growth spurt, foods and nutritional requirements, fluid intake and food habits of adolescents, eating disorder, nutritional and health problems including triple burden of malnutrition.

Unit 3: Nutritional Challenges and Strategies to Promote Health Status Of Tribal Adolescents (13 – 18 Years)

Prevalence of nutritional challenges and health issues at international, national and regional level. Preventive strategies – nutritional supplementation, health and nutrition education using different methods, promotion of kitchen garden, nutritional importance and health benefits of traditional foods and functional foods.

Unit 4: Assessment of Nutritional Status of Adolescents

Definition, meaning, purposes, factor influencing nutritional status, Direct and indirect methods used to assess the nutritional status, various standards and norms used for comparison, food fortification and diversification, policies and pro-physio and other services related to tribal adolescent, modification of dietary and lifestyle pattern to promote their health status.

Unit 5: Research Design

Farming of objectives, hypothesis, methodology – i) Selection area / subject's tools to conduct study, ii) Screening and identification of subjects for the present study. Assessment of nutritional status, Imparting, implementing and evaluating nutritional intervention to enhance their knowledge, attitude and practices (KAP), health status and statistical analysis and data interpretation for conclusion and recommendation.

Course Outcomes

1. To gain nutritional knowledge and promote nutritional status of the selected tribal adolescents.
2. To identify the food habits and lifestyle pattern of tribal adolescents.
3. To understand the nutritional importance and health benefits of traditional foods and functional foods
4. To inculcate the potential of health care practices for enhancing their health status.
5. Creating awareness programmes at community levels to promote healthy lifestyle and dietary pattern of tribal adolescents.

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Books:

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- Nutrition: Science and Application, 4th edition by Lori A. Smolin, Mary B. Grosvenor (2019).
- Nutrition and Health Status of Tribal Children (Anthropology of Health and Nutrition) by Jai Prabhakar S C, Gangadhar M R.
- Human Nutrition by M. Revilla, A. Titchenal and J. Draper (2020).
- Advanced Nutrition and Dietetics in Nutrition Support by M. Hickson, S. Smith and K. Whelan (2018)
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- Singh, M. S., & Devi, R. K. (2013). Nutritional status among the urban Meitei children and adolescents of Manipur, Northeast India. *Journal of Anthropology*, 2013.
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- Woodruff, B. A., & Duffield, A. (2002). Anthropometric assessment of nutritional status in adolescent populations in humanitarian emergencies. *European journal of clinical nutrition*, 56(11), 1108-1118.
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PhD (Full Time) Food Science and Nutrition

Name of the Guide : Dr. K. Devi
Name of the Student : Sonika Thoudam
Register Number : 21PHFNF010

**21PHFN03K Development of Probiotic Foods
(Applicable for Ph.D full time scholar admitted in January 2022)**

Hrs of Instruction /Week: 7

No. of Credits: 5

Course objectives:

1. To gain knowledge on prebiotic, probiotic, symbiotic foods and its health benefits.
2. To understand the functional value of *Crassocephalum Crepidioides*.
3. To explore the encapsulation techniques for bioactive compounds in dairy products.
4. To formulate and evaluate functional dairy processing with *Crassocephalum Crepidioides*.
5. To develop research design and appropriate statistical analysis in the development of herbal dairy products.

Unit 1: Introduction to probiotic, prebiotic and synbiotic

Concepts of probiotic, prebiotic and synbiotic, gut micro flora, probiotic micro organisms in foods, health benefits of probiotic antimicrobial property, anti-carcinogenic, immunologic enhancement etc, role of probiotic in human diet, ICMR guidelines for probiotic foods.

Unit 2: Introduction to *Crassocephalum Crepidioides*

Nutritional and phytochemical composition of *crassocephalum crepidioides*, Nutraceutical potential of *crassocephalum crepidioides*: hepatoprotective activity, Anti caugulant activity, antidiabetic activity, antioxidant, anti inflammatory, anti cancer activity, anti bacterial activity, anti hyperlepedemic activity, diuretic activity.

Unit 3: Encapsulation techniques for bioactivity of milk products

Concept, types of encapsulation – Micro and Nano encapsulation, Requirements of encapsulation, Applications of encapsulation in Food and Nutritional sciences, Nano encapsulation for bioactive compounds in dairy products – antioxidants, antimicrobial compounds and probiotics, dairy components as encapsulating material.

Unit 4 : Fuctional dairy processing with *Crassocephalum crepidioides*

Processing of herbs, application of herbs in dairy products through encapsulation and drying: ghee, yoghurt, dahi, ice cream, paneer, cheese, sandesh - Sensory Quality Parameters - Appearance, Texture, Aroma, Taste and Colour - Sensory Evaluation Test- Paired Comparison Test, Multiple Sample Test, Hedonic Rating Test, Descriptive Flavour Profile Test, Consumer - Physiochemical Analysis - carbohydrate, protein, fat, calcium, ash, zinc, iron and vitamin C-

Water Holding Capacity, Syneresis, Titration, Acidity- Microbial Analysis- Total Colony Forming Unit (CFU), Shelf life of food.

Unit 5: Statistical analysis

All the data of the chemical analysis will be statistically analyzed: Design Of Experiment- Randomization, Replication, Local Control - Types- Simple Random Design, Treatment X Level Design, Subject X Treatment Design, Random Replication Design, Group Within Treatment Design, Factorial Design. Statistical analysis- Descriptive Statistical Analysis, Distributional analysis – Measures of Central Tendency and deviation, Inferential Analysis – Test of Hypothesis, ‘t’ Test and Analysis of variance (ANOVA)

Course Outcomes:

1. Gaining of knowledge about probiotic, prebiotic and synbiotic and its health benefits.
2. Understanding of functional potential of *Crassocephalum Crepidioides*
3. Exploration of encapsulation techniques for bioactive compounds in dairy products.
4. Enabled to formulate and evaluate the herbal based functional dairy products with *Crassocephalum crepidioides*
5. Designing of research methodology with statistical analysis in functional dairy products with *Crassocephalum crepidioides*

Reference:

1. Dairo, F. A. S., & Adanlawo, I. G. (2007). Nutritional quality of *Crassocephalum crepidioides* and *Senecio biafrae*. *Pakistan Journal of Nutrition*, 6(1), 35-39.
2. Vijaya Kumar, B., Vijayendra, S. V. N., & Reddy, O. V. S. (2015). Trends in dairy and non-dairy probiotic products-a review. *Journal of food science and technology*, 52(10), 6112-6124.
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**Avinashilingam Institute for Home Science and Higher Education for Women
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Ph. D (Full Time) in Food Science and Nutrition

Name of the Guide : Dr. S. Kowsalya
Name of the Student : S. Sruthikavya
Register No. : 21PHFNF011

**21PHFN03L Nutritional Status of Preschool Children including ICDS Beneficiaries
(Applicable for Ph.D full time scholar admitted in January 2022)**

Hrs of Instruction /Week: 7

No. of Credits: 5

Course Objectives:

1. Situational analysis of the socio economic profile and dietary pattern of the pre-schoolers including ICDS beneficiaries.
2. Assess the nutritional and health status of the selected ICDS children
3. Identify the Anthropometric measurements and psychological factors of pre-schoolers including ICDS beneficiaries.
4. Gain knowledge on Nutritional status of the pre-schoolers including ICDS beneficiaries.

Unit 1: Nutritional and Food Requirements for Preschool Children

a) Nutritional importance during preschool childhood, ICMR-RDA for Pre-school children, Factors affecting the Nutritional status of children, Dietary guidelines and nutritional related health issues.

b) Nutrition related problems of pre-schoolers

Protein Energy Malnutrition, Symptoms, Types of PEM, Nutritional Requirements, Dietary Management, Prevention, Deficiency of Vitamin-A, Epidemiology, Symptoms and clinical signs, Treatment and prevention, Diarrhoea, Morbidity, Treatment and Prevention.

Unit 2: Assessment of Nutritional Status of Pre School Children

Concept and objectives of nutritional assessments, Methods used to assessments of nutritional status, Anthropometric Measurements needed to assess PEM, Bio chemical and Dietary, Assessment of Vitamin-A status.

Unit 3: Situation Analysis and Diagnosis Of Health Status

Situation Analysis: Concepts and importance, Methodology used for situation analysis, Complications of ICDS children at COVID situation, Factors affecting the health status of the ICDS children, Socio economic, Demographic, Dietary and Lifestyle pattern.

Unit 4: Prevention Measures to Promote Health Status and to Minimize The Consequences Of Health Problems

Comprehensive mode of treatment to promote health status, Nutritional requirements and management of PEM children, Health promotion, Specific protection, Early diagnosis and Treatment, Nutrient supplementation, Prevention of infection, Selective fortification and

feeding programmes to alleviate malnutrition. Introduction and history of ICDS, Objectives and services of ICDS, to target growth chart, Referral services, supplementary nutrition, Feeding norms in Tamil Nadu.

Unit 5: Research Design

Identification of Research problems, Framing of objectives and Hypothesis, Methodology, Selection of Area and subjects based on the sample size, Formation of tools to conduct study, Evaluate the nutritional status of the beneficiaries and non-beneficiaries of ICDS and lifestyle pattern.

Course Outcomes:

1. Gain knowledge related to health behaviour of ICDS children
2. Acquire skills on situation analysis of socio-economic status, dietary and lifestyle pattern in the healthcare management.
3. Acquire the skill to manage the different mode of COVID situation.

References

1. Dietetics, 8th Edition, Srilakshmi, 2019
2. Paediatric Nutrition, 2nd Edition, Suraj Gupte, 2018
3. Paediatric Nutrition, 7th Edition, AAP Committee Nutrition, October 2017
4. Integrated Child Development Scheme, Manual for District Level Functionaries (2019)
5. National Institute of public co-operative and child development Research on ICDS. An overview.
6. Functions of Integrated Child Development Service: An Assessment of Existing Policy and Practice on Odisha, Jagatabandhu Mohapatra, June 2021

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PhD (Part Time) Food Science and Nutrition

Name of the Guide : Dr. M. Sylvia Subapriya

Name of the Student : Mrs. V. Bushaira

Register Number : 21PHFNP003

**21PHFN03M Nutritional and Athletic Profile of Sport Persons
(Applicable for Ph. D Part Time scholar admitted in January 2022)**

Hrs of Instruction /Week: 7

No. of Credits: 5

Course Objectives:

To use different tools for assessing health and performance related fitness among athletes

To understand the nutritional requirements and considerations for athletes

To gain understanding of the various supplements and drugs used in sports

Unit 1: Introduction to Sports Nutrition and Body Composition

Definition, History, Goals and Importance of sports participation, Sports and Games in India
Body Composition for Health and Sports, Body composition- Fat mass and Fat free mass,
Importance of body composition assessment in athletes, Various techniques to measure body
composition- Total Body Potassium, Air Displacement Plethysmography (ADP), Under Water
weighing method, Dual Energy X-Ray Absorptiometry (DEXA), Anthropometric measurements,
Bioelectrical Impedance Analysis (BIA), Total Body Water measurements (TBW).

Unit 2 : Work Capacity and Physical Fitness

Work Capacity, Physical Activity-Aerobic, Anaerobic and lifestyle activity. Exercise, Type of
Exercise, Energy systems- Aerobic and Anaerobic Energy systems.

Physical Fitness: Definition, Components of fitness: Health related fitness - Cardiovascular
endurance, muscular strength, muscular endurance and Flexibility, Skill related fitness- Agility,
Balance, Coordination, Speed, Power, Assessment of physical fitness- Harvard step tests,
Treadmill test, Cooper's run test, Queens college step test, Push-ups, Pull-ups, Flexed-arm hang,
Sit-ups, Sit and Reach Flexibility, Hand-grip strength test.

Unit 3: Nutrition in Sports

Exercise Performance and Nutrition – Energy metabolism and factors affecting energy
requirements in sports, Nutrients and Metabolism - Carbohydrates, Protein, Fats, Vitamins,
Minerals, Fluid- Hydration Strategies, Dehydration effects and Electrolytes- loss and
replacement in Sports Performance.

Nutritional requirements in sports events, Dietary guidelines, Carbohydrate loading, Pregame
and post-game regime, Role of Water and Electrolytes in sports. Common nutritional problems
of athletes.

Ergogenic aids and supplements, types of ergogenic aids, benefits and risks.

Unit 4: Assessment of Nutritional Status

Assessment of nutritional status of an individual, Importance, Purpose and Objectives, Methods: Direct- Sports Anthropometry: Height dimensions: height, shoulder height, elbow height, wrist height, finger height, hip height, knee height, ankle height, seat height; Width dimensions: shoulder width, delta width, chest width, basin width, elbow width, wrist width, knee width, ankle width; Depth dimensions: chest depth; Circumference: chest circumference, waist circumference, waist area, forearm, hinge area, handcuff, thigh, leg area, ankle; Thickness dimensions: front and back of upper arm, shoulder, abdomen, hips, thigh on frontal leg.

Nutritional Anthropometry- Height, Weight, BMI, Waist Hip Ratio, Body fat Percentage. Biochemical estimation, Clinical examination and Dietary survey- Food Frequency Questionnaire, Recall method, Diet history, Food balance sheet method.

Indirect methods- Ecological factors assessment and Vital health statistics –measures of mortality and measures of morbidity.

Unit 5 : Nutrition Education and Supplementation

Meaning, nature, importance and methods of nutrition education, Implementation of nutrition and health education programmes, Principles of planning, executing and evaluating nutrition education programmes, advantages and disadvantages of nutrition education programmes.

Dietary supplements and sports drinks, Development of new food product, need for developing new product, Stages. Types of new food product, Product life cycle-stages, Sensory Evaluation, Sensory tests, Types of tests, Objective evaluation, Shelf-life testing, Procedures for determining and monitoring shelf life. Microbial analysis of food, Packaging.

Course Outcomes:

1. Develop competency to become sports nutritionist and monitor the nutrition and health of sports persons
2. Develop methods to assess the performance capabilities of athletes in relation to their nutrition practices
3. Formulate, administer and evaluate customized nutrition education modules for the enhancement of nutritional status of sports persons
4. Sensitize coaches, parents, stake holders and policy makers on issues related to health and nutritional status of sports persons

References

1. Mahan.L.K and Stump SE, Krause's Food, Nutrition and Diet Therapy, WB Saunders Company, 10th edition, 2001.
2. Bamji S.M.,Rao NP and Reddy V(2009).Text book of Human Nutrition. Oxford and IBH Publishing C. New Delhi.
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1. Sangeetha, K. M., Ramaswamy, L., and Jisna, P.K. (2012). Assessment of Nutritional Status, Nutritional Knowledge and Impact of Nutrition Education among Selected Sports Persons of Coimbatore District. *International Journal of Science and Research*, 3 (11), 970-978.
2. Sarkar, S., Debnath, M., Chatterjee, S., and Dey, S.K. (2018). Assessment of Nutritional Status, Body Composition Parameters, & Physiological Profiles of Young Male Taekwondo and Wushu Players. *International Journal of Sports Science & Medicine*, 2(1), 1-7.
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6. Sharma, R. (2015). Assessment of dietary practices among university male sportsmen. *International Journal of Law, Education, Social and Sports Studies (IJLESS)*,2(2), 15-19.

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Ph.D. (Part Time) Food Science and Nutrition

Name of the Guide : Dr. K.Sujatha

Name of the Student : D. Selvarani

Register Number : 21PHFNP004

**21PHFN03N Assessment of Nutritional Status of Saltpan Workers
(Applicable for Ph. D Part time scholar admitted in January 2022)**

Hrs of Instruction /Week: 7

No. of Credits: 5

Course Objectives:

- Understand the importance of nutrition and health of saltpan workers.
- Obtain knowledge on the nutritional needs pertaining to working conditions.
- Gain insight into the pathology of health hazards and chronic degenerative diseases
- To impart nutrition education and dietary intervention.

Unit 1: Introduction and Adult Nutrition

- a) Saltpan - Introduction, history, Indian salt industry, salt production in Tamil Nadu; Salt processing - Procedure, temperature, weather conditions, equipments in processing, packaging materials, transportation, polishing, iodization, storage, local market supply and export of salt.
- b) Adult Nutrition - Reference man and reference women, body composition, nutrient and food requirements of adults; nutritional problems in adulthood.

Unit 2: Socio Economic and Occupational Health Problems of Saltpan Workers

- a) Socio Economic Status - Socio economic groups, poverty, population explosion, unemployment, under employment and illiteracy; Effects on nutritional status- health and psychological; Cultural factors - food habits, attitudes, taboos, food fads and fallacies; Welfare schemes - Namak Mazdoor Awaas Yojana (NMAY), Children Reward Scheme (CRS), State Government policies.
- b) Occupational Health Problems - Health hazards - Definition, types; underweight, anaemia, hypertension, dehydration, kidney stones, arthritis, spinal and stomach problems, foot ulcers, fungal infection in feet; Skin diseases - photo dermatitis, toxin melanosis; Eye - Poor night vision, cataract, glare from salt crystals; Respiratory tract - breathing issues; Other health problems - Thickness of palm & sole, clubbing, varicose

veins, joint pains, icterus, caries teeth, physical stress and hair loss.

Unit 3: Assessment of Nutritional Status

- a) Importance and objectives of assessing nutritional status of saltpan workers.
- b) Methods - Direct methods: i) Anthropometric assessment - Height, weight, BMI, skinfold thickness - biceps, triceps, Waist and hip circumference and waist hip ratio; ii) Clinical examination iii) Biochemical assessment - laboratory and biochemical tests; iv) Dietary assessment - 24 hours recall method, three day food weighing method, food frequency and hydration status - fluid intake; Energy expenditure - Estimation.

Unit4: Nutrition Intervention

- a) Health based interventions - Safe drinking water, sanitation; Food based interventions - Public distribution system, food fortification and enrichment, dietary diversification.
- b) Nutritional Supplementation - Product development, nutrient analysis, sensory evaluation - colour, appearance, texture, flavour and taste; Evaluation of acceptability of the product.

Unit 5: Nutrition Education and Evaluate its Impact

- a. Definition, need, objectives, implementation, importance of nutrition education.
- b. Nutrition education programme - planning, execution and evaluation of its impacts by pre and post KAP assessment; Concepts and purpose of KAP study;
- c. Use of computers to impart nutrition education - power point presentation, preparation of e-learning module.

Course Outcomes:

- Recognise the environment of the salt pan workers and their nutritional status.
- Relate their socioeconomic status and occupational health hazards.
- Discuss the methods of nutritional assessment.
- Appraise the need for nutrition intervention and formulation of food product.
- Plan and develop skills in organizing and evaluating nutrition education programme.

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2. National Institute of Health and Family Welfare. National programme for control and treatment of occupational diseases. NIHFW, 2009.
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4. Berdanier, Carolyn D., Johanna T. Dwyer, and David Heber (2014), *Handbook of Nutrition and Food*, Boca Raton: CRC Press, Taylor & Francis Group, 3rd edn.
5. Srilakshmi, B., (2008), *Nutrition Science*, New Age International publishers (P) Ltd, Chennai.
6. Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab,L., M.J., (2005), *Public Health Nutrition*, Blackwell Publishing Company, UK.

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PhD (Part Time) Food Science and Nutrition**

Name of the Guide : Dr.S.Thilakavathy
Name of the Student : Shahla Karuthedath
Register Number : 21PHFNP005

**21PHFN030 Beta Carotene Bioavailability and Shelf Life of Microgreens
(Applicable for Ph.D part time scholar admitted in January 2022)**

**Hrs of Instruction /Week: 7
No. of Credits: 5**

Course Objectives:

1. To understand the cultivation of microgreens.
2. To understand the quality changes of microgreens in different cooking methods.
3. To study the bioavailability of micronutrients in microgreens.
4. To study the shelf life of microgreens by edible coating mixtures.
5. To understand the effect of dehydration on microgreens.

Unit 1 : Cultivation of microgreens by following different techniques

Introduction to microgreens, selection of crops for microgreen production, production techniques-Growing media, Seed sowing, Growing condition, Harvesting and post harvest operations.

Unit 2: Evaluation of Microgreens and quality

Nutritional and phytochemical analysis, comparison of nutrients of microgreens with mature baby greens, other nutritional facts, Physiological Loss in Weight , Respiration Rate , microbial evaluation , physical properties - bulk density and water solubility index of dehydrated green leafy vegetables powder.

Unit 3 : Microgreen Packaging and Edible coating

Microgreen packaging and labeling -materials used for packaging, functions, Edible food wraps-History of edible films and coatings, uses and role of edible films and coatings, Method of coating applications, Advantages and Disadvantages of edible coating.

Unit 4: Shelf Life and Preservation Methods

Preservation of microgreens -Refrigerated temperature, canning, preservation by dehydration – hot air oven, freeze drying-advantages and disadvantages, shelf life and storage-problems related to storage of microgreens, temperature control, Harvesting at optimal maturity, Minimizing injury, Sanitation and handling, Relative humidity, light treatments and Washing treatments.

Unit 5: Nutrients in Microgreens and its Bioavailability

Factors influencing bioavailability of micronutrients in microgreens - Enhancers and inhibitors, Bioavailability of specific nutrients- Vitamin A, Retinol (preformed vitamin A), Vitamin C, Calcium, Carotenoids and Iron.

Course Outcomes:

1. To acquire skills on microgreen cultivation.
2. To understand the impact of processing and post harvest conditions of microgreens.
3. To identify suitable techniques to prolong shelf life and preservation methods in microgreens.
4. To analyse the bioavailability of nutrients in microgreens through edible coating.
5. To increase the market value of microgreens by dehydrated microgreen powder as dietary supplements.

References**Books**

- 1) Yikmis, S. 2020. Technological developments in food preservation, processing, and storage. Hershey Publishers.5-6.
- 2) Koley, T. K., 2016. Microgreen from vegetables: more nutrition for better health. Hand Book -*Adv. in genetic enhancement of underutilized vegetables*. 1-2.

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- 1) Kalal, D., Verma , s. and Solanki, H. 2021. Microgreen as a potential food source: A Review. *International journal of creative research thoughts*. 9(3):1-7.
- 2) Turner, E. R., Luo, Y. and Buchanan, R.L. 2020. Microgreen nutrition, food safety, and shelf life: A review. *Journal of Food Science*. 85(4):-2-3.
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- 5) Zhang, Y., Xiao, Z., Ager, E., Kong, L., and Tan, Libo.2021. Nutritional quality and health benefits of microgreens, a crop of modern agriculture. *Journal of Future Foods*. 1(1):56-58.