SPECIMEN FORMAT FOR THESES OF MONTH

Faculty	**:**	Dr. PL. Sridevi Sivakami, Associate Professor
Department	**:**	Food Service Management and Dietetics
Branch/ Area:	**:**	Food Service Management and Dietetics
Sub Subject Heading:	**:**	Food Safety and Quality
Candidate's Name	**:**	J. Yoshia Leela
Candidate's Address with email	**:**	No. 85A, Shri PRK Avenue, Muthaladampatty, Thanthoni, Karur-639005. Yoshialeela98@gmail.com
Title of the thesis	**:**	Physiochemical Analysis, *In vivo* Study of Natural Food Colours and Development of Food Colour Sensor
(i) In Roman Script (ii) In roman Script		
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Name of Supervisor	**:**	Dr.PL. Sridevi Sivakami
Designation of Supervisor	**:**	Associate Professor
Centre/department/school in which research was conducted	**:**	Food Service Management and Dietetics, School of Home Science

University's Name & Address : Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore-641043.

Abstract within 300 words:

This study has focused on the impacts of synthetic food colourants stratified through a survey conducted among the selected food vendors and home makers in Coimbatore city, along with which, supermarkets and shops were surveyed for popular brands of synthetic food colourants. The equivalent natural sources were selected, subjected to the processes of aqueous extraction and powdering. The shelf life of the natural colourants were monitored in room temperature and refrigeration, where at the bottom of the glass bottles in the aqueous extracts were confirmed to have microbial growth. Microbial assay for fungal and bacteria identification of species were done through Rose Bengal Chloramphenicol Agar Medium and Nutrient Agar Medium. Then, primary toxicity study was done with brine shrimp assay for the selected natural food colourants. Chemical analysis for antioxidants and phytochemicals were analysed in the samples of annatto seeds, eucalyptus bark and madder roots. The aqueous extracts were unstable and started to degenerate the colours, thus further processing was done with powdered substances. ICPMS analysis was done to detect the heavy metals toxins, in which madder root powder had high amount of lead, cadmium and chromium, and it was not further analysed. During characterization, annatto seeds powder was amorphous in nature, whereas eucalyptus bark powder was crystalline in nature and had loss of mass whenever there was increase in temperature. The characterized powders were optimized to determine the level of consumption through an eight weeks in vivo study, which revealed that annatto seeds powder can be consumed 3mg/kg of body weight and eucalyptus bark powder of 6mg/kg of body weight. The animals were sacrificed, the vital organs were harvested and no significant changes were found in histology and hematological parameters, when compared with the reference ranges. Then to analyse their safety in foods, the optimized natural food colourants were incorporated into selected recipes of sweets, snacks and fruit preservatives. Then the natural colour incorporated recipes were checked for discolouring and were evaluated organoleptically which showed an overall of good acceptability rating, rated by the selected panel members. A sensor that detects the toxicity in the food colours was developed.

i) Objectives :

Primary Objective

Toalternate synthetic and artificial food colours as the non-natural colours cause illness to human beings.

Secondary Objectives

- To select natural food colourants from plant sources and to analyse their physical, chemical and characterization properties.
- To measure the shelf-life, analyse the microbial growth, to test the toxicity of the natural food colourants using primary, secondary and *in vivo* model through histopathological and haematological parameters.
- To incorporate and evaluate the developed natural food colourants in selected recipes through organoleptic evaluation.
- To develop a sensor detecting the toxicity in the foods colourants in selected recipes incorporated with commercially available synthetic food colourants in consideration with the guidelines of FSSAI.

ii) Methodology :

Phase – I: Market Survey, Survey among food vendors and home makers to know the usage level of synthetic food colourants

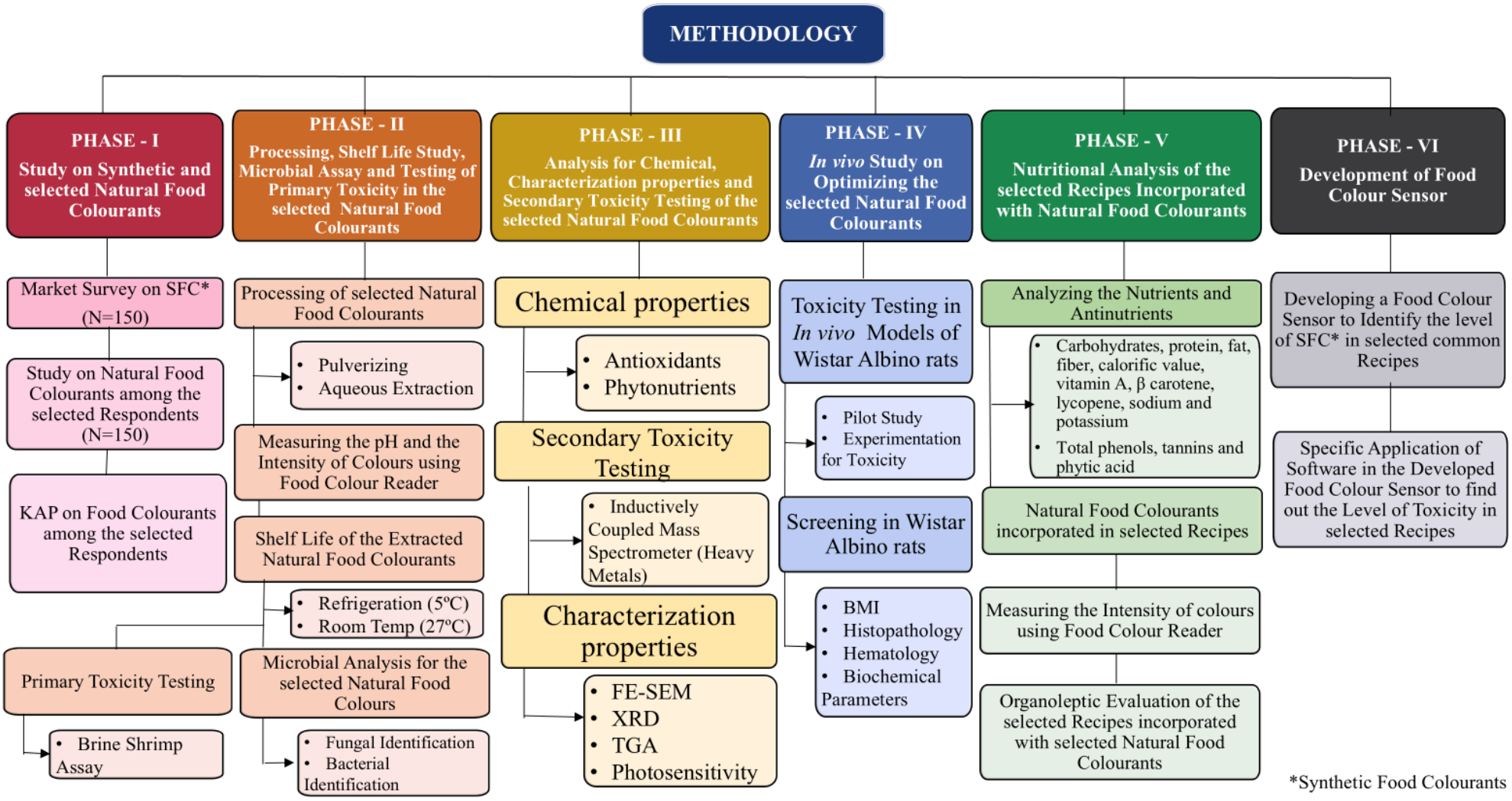
Phase – II: Processing, Shelf Life Study, Microbial Assay in fungal and bacterial assay with Rose Bengal Chloramphenicol Agar, Nutrient Agar as medium, and Testing of Primary Toxicity in the brine shrimp assay the selected Natural Food Colourants

Phase – III: Analysing the Chemical, Characterization properties and secondary toxicity testing in the Inductively Coupled Plasma Mass Spectrometer (ICPMS) for the selected Natural Food Colourants.

Phase – IV: Optimization, experimentation with histopathological analysis in *in vivo* models

Phase – V: Nutrient and Organoleptic Analysis of the Selected Recipes Incorporated with Natural Food Colourants

Phase – VI: Development of a Food Colour Sensor



Methodology of the Study on Physiochemical Analysis, *In vivo* Study and Development of Food Colour Sensor

iii) Findings:

Phase – I: The availability and frequency in usage of synthetic food colourants in local market were checked, along with the consumers who purchase them. The widely used colours were considered and their equivalent colours from natural forest sources (i.e., not highly recognized) were studied.

Phase – II, III and IV: The shelf-life, microbial property, physicochemical characteristics, toxicity (primary and *in vivo*), thermogravitivity and photosensitivity, along with the nutrients present in them were analysed.

Phase – V: The analysed colours were incorporated into various recipes of sweets, snacks, preservatives and organoleptically evaluated for their rate of acceptability with hedonic scale rating.

Phase – VI: In consideration with the limitations for synthetic food colourants from FSSAI, a device was developed and trained to detect the level of toxicity in widely consumed foods. Thus, this study focus on the enhancement of food safety and quality, which is becoming a global looming crisis that preys on human health.

Examiners

Internal Examiner : Dr. Alka Joshi, Senior Scientist,
Dept. of Food Science and Post Harvest Technology,
ICAR-IARI, New Delhi, India

External Examiner : Dr. Christofera Hway Wijaya
IPB University
Bogor, Indonesia