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PROCESSING AND VALUE ADDITION TO MILLETS FOR BETTER NUTRITIONAL SECURITY

Debabandya Mohapatra[*,a], Sumedha Deshpande[b], M. K. Tripathi[a], Sadvatha R H[c]
[a]Agro Produce Processing Division, ICAR-Central Institute of Agricultural Engineering, Nabibagh, Berasia Road, Bhopal, India-462038
[b]Centre of Excellence in Soybean Processing and Utilization, ICAR-Central Institute of Agricultural Engineering, Nabibagh, Berasia Road, Bhopal, India-462038
[c]Regional Centre,ICAR-Central Institute of Agricultural Engineering, Coimbatore, Tamil nadu

***Corresponding author** – debabandya@gmail.com

Millets are one of the oldest foods known to humans and possibly the first cereal grains to be used for domestic purposes. Millets such as sorghum, kodo are highly nutritious, non-glutinous and are not acid forming foods; so are soothing and easy to digest. They have nearly 10-15% protein, contain high amounts of fiber, the essential amino acid methionine, lecithin, As the modern life required a more fibre and nutrient rich grains, people started opting for these grains and focus is now back on these millets for their apparent health benefits. The grain millets also contain some anti-nutritional content such as tannins and phytic acids which affects the protein digestibility and mineral bioavailability when consumed in wet cooked form. The millet flours also have limited shelf life due to the lipase enzyme activity. The present study aimed at developing process protocols for improving the nutritional value of the processed sorghum and improving the shelf life and ready mixes prepared from kodo grains. Fermentation and steam flaking of whole grain sorghum was found to improve the protein efficiency by almost 3 times. By dehulling, fermentation and packaging in 100 micron thick low density polyethylene pouches, the kodo based ready mixes were found to have enhanced shelf life of about 3 to 6 months. Therefore, it is recommended to adopt processes like fermentation and steam flaking processes which has the potential to improve the nutritional bioavailability of millets. The shelf like of the millet flour can also be improved through fermentation and suitable packaging.

Key words**:** sorghum, kodo, fermentation, flaking, packaging

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SUSTAINABLE BIORESOURCE MANAGEMENT FOR MAXIMISING AGRICULTURAL PRODUCTIVITY IN ECO-FRIENDLY AND COST-EFFECTIVE MANNER

Niteen V. Phirke
Department of Microbiology, Sant Gadge Baba Amravati University, Amravati-444 602

E-mail: phirkenv@gmail.com

The agro-climatic change in *Tapi* basin has been correlated with the regional anthropogenic activities like chemical fertilization, excessive flood irrigation, burning of agro-residue etc. and its environmental and health hazards has been visualized as altered climate, decreased fertility, stagnated crop yield and occurrences of pollution related disorders etc. To alleviate these pollution effects from the region, it has been suggested to rely more upon sustainable production practices through implementation of eco-friendly and integrated microbial technologies. These must include the individual or combined application of a) soil conditioner after its production from voluminous agricultural waste; b) consortium of efficient biofertilisers specially dedicated to crop's mycorrhizosphere; c) coal-combustion ash as a source of micronutrients and d) judiciously applied doses and frequencies of chemical fertilizers and irrigation. Adoption of these sustainable production practices would help *Khandeshi* farmers to conserve and recycle the available natural resources, protect their environment, develop profitable farming systems and enhance quality of their livelihood. Overall possibilities for improving sustainability and alleviate pollution in the crop production system in the region using microbial and interdisciplinary technologies are suggested.

Key words: Soil conditioner, Biofertilisers, PGRs, fly ash, IPNM, Bioresource management practice

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CONTRIBUTION OF FISHERWOMEN TOWARDS AQUATIC RESOURCE AS LIVELIHOOD FOR NUTRITIONAL SECURITY BY TRADITIONAL FISH PROCESSING

Sushant Punekar
* Deputy Controller/ Assitt. Prof. (Zoology, Spl:- Fisheries), MPPSC, Indore (M.P.) INDIA
E-mail:- spunekar_ivri@yahoo.com

Rural women role is important in freshwater aquaculture for development of fisheries because India vast and varied inland fisheries resources potentially one of the richest in the world. Women are equally endowed with motivation and managerial capabilities in starting and running. The participation of fisherwoman in fisheries is well established and highlighted by several workers. Madhya Pradesh has rich and varied inland fisheries resources. It has got 1.19 lakhs hectare of water area in the form of pond, reservoirs, rivers, lake etc. agriculture, forest & craft was the only source of livelhood, but fisheries being and allied activities could not be development much. Now tribals have shown interest in fish culture by acquiring Panchayat tanks on lease or by constructing ponds on there own land. Fisherwomen of this area are mostly involved various technologies in fisheries over a period of time by trial and error, continuous observations, experiences and evaluation to use the traditional practices in this field. Women from rural area may an important role in establishing smoked fish and demand of dried prawn in market and also holding strong traditional marketing system for wet and dried prawn and do sell it round the year. The specific objectives of this study were to the availability, consumption and landing pattern of fishes, to find the available setting place and using their fish dressing equipments, carrier bags reasons for adopting traditional practices by fish traders, fishermen & fisherwomen in local fish market of Chhindwara district. The present study deals with the status of fisherwomen of Chhindwara district in fisheries development. Fisherwomen may an important role in establishing and form in food habits of the families, proper nutrition is for good health of any one. On Survey it was found that the women have more practical knowledge and active participation in fish culture practices for using Indigenous Technical knowledge (ITK) alongwith their spouses. Therefore, keeping in view certain unique factors of the state like associate to her work for composite fish culture had positively and significantly related to the Indigenous Technical knowledge (ITK) level towards freshwater smoked fishes. The need of the hour is to utilize various development schemes for rural youths under co-operative marketing and processing of fish farming by Self Help Group. If they are made aware of improved Post Harvest Technology (PHT) methods and techniques towards freshwater smoked fishes, lot more gains can be derived which will help to sustain their livelihood.

Key words: Fisheries, fisherwomen, Indigenous Technical Knowledge (ITK), Fish culture practices, Socio-economic status.

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GREEN HOUSE GAS (GHG) EMISSIONS: DRIVERS AND IMPACT

Vandana Rathore*
School of Engineering and Technology, Jagran Lakecity University, Bhopal, (M.P.)

Corresponding Author: drvandana@jlu.edu.in

Most greenhouse gases (GHGs) can be emitted by both natural processes and human activities. According to the Intergovernmental Panel on Climate Change, human-driven releases of GHG emissions disrupt the natural processes occurring in the atmosphere and are extremely likely to be the dominant cause of the observed warming that has occurred since the mid-20th century. Globally, almost 80% of GHG emissions from human sources come from the burning of fossil fuels and industrial processes. Specific activities include: driving vehicles, electricity production, heating and cooling of buildings, operation of appliances and equipment, production and transportation of goods, and provision of services and transportation for communities. In 2015, about 26% of Canada's total GHG emissions came from the oil and gas sector, 24% from transportation, 11% from electricity generation and 12% from buildings.Global GHG emissions grew by approximately 51% between 1990 and 2012, with the bulk of the growth occurring in developing countries.

GHGs have different global warming potentials and different life spans in the atmosphere. Short-lived climate pollutants, such as methane and hydrofluorocarbons, are GHGs known to be very potent with relatively short life spans. As such, emission reductions of short-lived climate pollutants can reduce atmospheric levels of these GHGs at a much quicker pace than comparable reductions from longer-lived GHGs. Therefore, immediate action to reduce these particular GHGs can have significant benefits for curbing near-term climate warming. The *gases* that contribute to the *greenhouse effect* include water vapor, carbon dioxide (CO2), methane, nitrous oxides, and chlorofluorocarbons (CFCs). The effects of global warming are the environmental and social changes caused by human emissions of greenhouse gases. There is a scientific consensus that climate change is occurring and that human activities are the primary driver. Many impacts of climate changes have already been observed, including glacier retreat, changes in the timing of seasonal events and changes in agricultural productivity. Rising temperatures will likely lead to increased air pollution, a longer and more intense allergy season, the spread of insect-borne diseases, more frequent and dangerous heat waves, and heavier rainstorms and flooding. In the present content, we will discuss five major GHGs, their scientific consequences and various impacts.

Key Words: Global Warming, Climate Change, Green House Gases.

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PREVENTION OF CANCER-ROLE OF DIET, LIFESTYLE, MODIFICATION & YOGA

R.H. Lata
SVYASA, University Bangalore

Email- latavk123@gmail.com

Cancer is the second highest prevalent disease today. According to the statistics around 90% is result of modern lifestyle, diet and sedentary habits.

Diet is what we eat, including the quantity, selection of food, mode of preparation, time of having food. Life style includes our working pattern involving sleep, habits, addictions, exposure to occupational and environmental toxins. Changes in diet and lifestyle initiate accumulation of toxins in the body laying foundation to many diseases one among which is cancer. Lack of sleep tends to cause impairment in normal physiological functions resulting in overweight, increasing stress levels which in turn causes impaired immunity. Habits like drink, smoking, chewing tobacco have direct effect on related organs and systems creating low immunity. Change in diet and lifestyle modifications along with changes in the above mentioned factors can prevent the manifestation of cancer in an individual.Mental health is also important, as it directly depends on positive attitude, Yoga and Physical exercise boosts the production of microphages, cells that attack infections. It also increases the circulation of many cells in our body that help removal or viruses & harmful bacteria. A healthy diet, lifestyle modification are the key factors which help to lower cancer risk.

Key words**:** Diet, Exercise, Stress, Awareness.

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GREEN TECHNOLOGY: NEED OF A DAY

Praveen Tamot & Sadhna Tamot*
Post Graduate Department of Zoology, Government Maharani Laxmi Bai (Autonomous) Girls College, Bhopal
**Department of Zoology, Sadhu Vaswani College,Bairagarh, Bhopal*

E-mail: tamot03@yahoo.co.in

In last 50 years dependency on natural resources has almost doubled. If this continues, two earths will be required to fulfill our requirements. This is an alarming situation. We are losing our natural resources rapidly including fuels, minerals, water, etc. Whole world is facing the serious problem of climate change and global warming As a result it creates a negative impact on agriculture production, increase in sea level, increase global mean temperature, more impact of green house gases, more intense tropical cyclone, more hot days and hot nights and heat waves, loss of biodiversity are the major related issues.

Environmental Management is an attempt to control human impact and interaction with the environment in order to preserve natural resources and also focuses on the improvement of human welfare for present and future generations. For sustainable environmental development it is necessary to adopt eco-friendly technology such as green technology, which is a system that uses innovative methods to create an environmental friendly products, uses renewable natural resources that never depletes, can effectively change waste pattern and production in a way that it won't harm the planet. For maintaining sustainable environment it is necessary to change our life style by accepting 6-R formula which is Reduce, Recycle, Refuse, Renew, Responsibility and Rethink.

For maintaining urban environment it is necessary to increase green technology practice such as development of green campus by the use of green chemistry (sustainable chemistry), green energy, green building and also green purchasing.

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AUTOPHAGY, CONFLICTING BALANCE BETWEEN CELL SURVIVAL AND DEATH

[1,2]Anita Tilwari,[1]Prabha Balaram
[2] Centre of Excellence in Biotechnology, M.P.Council of Science and Technology, Science Hills, Bhopal, M.P., India
[1]Institute for Research in Molecular Medicine (INFORMM), USM Health Campus 16150 Kubang Kerian, Kota Bharu, Kelantan, Malaysia

Autophagy, a type II Programmed cell death (PCD-II), is an important terminal pathway for cells of multicellular organisms, and is involved in a variety of biological events that include morphogenesis, maintenance of tissue homeostasis, and elimination of harmful cells. Its dysfunction leads to various diseases in humans, especially various cancers and in other way it is also an emerging attractive therapeutic approach for treating cancers. Cell death by autophagy is very existing matter of debate in different scientific communities and it is a question that whether autophagy is a causative demise for cell death or is it part of rescue mechanism activated during cellular distress. It also ensure minimal housekeeping function (nutrient recycling).However, the role of autophagy in cell death is controversial and still not defined clearly. Autophagy occurs through 3 different pathways viz. Macroautophagy, microautophagy and chaperon mediated Autophagy. Some researcher has sub classified the Autophagy as "induced autophagy" and "basal autophagy". Many recent researcher studies that autophagy has a greater variety of physiological and pathophysiological roles than expected, such as starvation adaptation, intracellular protein and organelles clearance, development, antiageing, elimination of micro-organism, cell death tumor suppression and antigen presentation .The role of autophagy in cancer and cell death is still complicated and in question.
In this article, we discussed the role of autophagy in cell survival as well as cell death, its mechanism, features, functions and regulation.

Key words: Macroautophagy, Microautophagy,programmed cell death,Lysosomes, Autophagosomes

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PROCESSING OF UNDERUTILIZED FRUITS AND VEGETABLES FOR FOOD SECURITY AND LIVELIHOOD MAINTENANCE

Aparana Sharma [a*] and I.M. Khan [a]
JNKVV- College of Agriculture, Ganj Basoda, Distt- Vidisha, Madhya Pradesh; 464221
E mail- sharmappi@gmail.com

Madhya Pradesh being situated in the centre of India is like the heart of the country. It is being blessed with varied agro-climatic conditions and thus the availability of a variety of fruits and vegetables throughout the year. The cultural richness of the state is clearly visible in its cuisine which includes a wide range of preparations from the locally available food items. However, with the advancement in technology and changing lifestyles of the population some of the fruits and vegetables of the state are becoming rare and are underutilized. Also, surviving the changing climatic conditions some of these fruits and vegetables are promising towards food security with respect to their availability. In addition their seasonal availability still gives them more consumers and thus the economic status of the seller is enhanced. Further, the nutritional composition of these fruits and vegetables make its a better option to consume it in regular diets to fight nutritional deficiencies. Some of such nutritionally rich but underutilized food items of Madhya Pradesh includes, *kathal* (*Artocarpus heteroplyllus*), *kheksa* (*Momordica dioica*), *seetaphal* (*Annona squamosa*) and *ber* (*Ziziphus mauritiana*). The list is long and varied. Hence Processing plays a vital role in conserving the nutritional components of these fruits and vegetables. Proper processing techniques will help to make these fruits and vegetables available for ready consumption in one form or other to a large population. In the present investigation various processing techniques were assessed for processing these selected underutilized fruits and vegetables to search for a better option to provide food security and livelihood maintenance of the population thereof.

Key words: Underutilized, nutritional composition, Food security, Livelihood maintenance

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CHALLENGES, UTILIZATION AND MANAGEMENT AGRICULTURAL WASTE IN MADHYA PARSEDH

Bhupendra Thakre[1], Uttam Soni[2]

[1] Subject Matter Specialist (Plant Pathology) Zonal Agricultural Research Station, JNKVV, Chhindwara, MP 480001
[2]Technical Assistant (Agronomy) Zonal Agricultural Research Station, JNKVV, Chhindwara, MP 480001

Corresponding author - bhupendra_thakrejnkvv@rediffmail.com

There has not been much research into the management of agricultural waste in Madhya Pradesh. The most common solution is the utilizations of agricultural waste for compositing, as animal fodder and most often as a source of energy. The implementation of most of the solutions to agricultural waste management does not meet the basic elements of sustainability like environmental protection and social progression, technical and technological improvement as well as economic improvements. Agricultural wastes are non-product outputs of production and processing of agricultural products that may contain material that can benefit man but whose economic values are less than the cost of collection, transportation, and processing for beneficial use. Estimates of agricultural waste arising are rare, but they are generally thought of as contributing a significant proportion of the total waste matter in the developed world. Agricultural development is usually accompanied by wastes from the irrational application of intensive farming methods and the abuse of chemicals used in cultivation, remarkably affecting rural environments in particular and the global environment in general. Generally, agricultural wastes are generated from a number of sources notably from cultivation, livestock and aquaculture. Agricultural waste has a toxicity potential to plant, animals and human through many direct and indirect channels. The effects of these toxic agricultural wastes on the environment were discussed as well as their management.

Keywords: Agricultural waste, management, utilization, Values, Environment, Global

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DNA BARCODING OF *RITA GOGRA* (SYKES, 1839) OF NARMADA RIVER INFERRED THROUGH CONSERVED REGION OF MITOCHONDRIAL COI GENE SEQUENCES: A NOVEL FINDING TOWARDS IDENTIFICATION OF A CRYPTIC SPECIES

R.K. Garg, Pooja Pandey,MeghaVishwakarma and SurbhiDohre
Centre of Excellence in Biotechnology, M.P. Council of Science and Technology (MPCST), VigyanBhawan, Nehru Nagar, Bhopal-462003 (M.P.), India

Conserve regions of a DNA sequence from a standardized region of the genome provide a DNA barcode for identifying species. Latestresearches suggests that sequence of the mitochondrial gene, cytochrome c oxidase I (COI), might serve as a DNA barcode for the identification of animal species. Hence, in the present investigation, we performed DNA sequencing of theCOI gene usingFishF1: TCAACCAACCACAAAGACATTGGCAC and FishR1:TAGACTTCTGGGTGGCCAAAGAATCA then developed DNA barcodes for the *Rita gogra* of the Narmada River ofBarwaha(22.254^{0}N 76.037^0 E) and Maheshwarghat(22.11^{0}N 75.35^0 E) of Madhya Pradeshwhich are available on BARCODE LIFE as novel sequence regions. The data were also submitted on NCBI, USA as public domain repositories with the length of 615 bp gene and obtained accessions MF687949 with GI:1269806203and MF687950 withGI:1269806201. Our Barcodedand NCBI created data showing the highest conserved regions because it gave more than 99% hits similarities with*Rita gogra*and it differentiated with neighbor species like *Rita rita*. So, that, this study tested the effectiveness of a COI barcode in discriminating fish speciesidentification and supports an international exercise that has recently begun to assemble a comprehensive library of COI sequences linked to named specimens.

Keywords: Narmada River, COI gene sequence, DNA Barcoding, molecular hits, neighbor-joining, cryptic pecies identification.