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On

Applied Zoology, Profitable Animal Production, and Health: Current Status and Future
Progress (NSAZ-2022) 23rd & 24th September- 2022

Recent Trends in Applied Zoology

Dr.D.S.Rathod
Editor

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Dr. K.S.Raut
Mr.Datta Nalle

National Edited Book

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Recent Trends in Applied Zoology

Edited by: Dr.D.S.Rathod

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Index

Chapter	Chapter/Article Title – Name of Authors	Page Number
Chapter 1	Process Upgradation of Indian Dairy Products Khojare A. S.	1-6
Chapter 02	Review on Important role of Danio rerio in Animal and human vaccination research Datta Ashok Nalle, Dnyaneshwar S. Rathod	7-13
Chapter 03	Effect of Dimethote On Biochemical Changes In Lipid Content During Lethal And Sub Lethal Exposure To The Freshwater Fish, <i>Rasbora Daniconius</i> Lokhande, M.V.¹ and Rathod, D.S.²	14-20
Chapter 04	Analysis of chromosome by Karyotyping, banding, and cryopreservation of gametes in fishes Datta Ashok Nalle, Madhuri Y. Bhande	21-28
Chapter 05	Biological Activities of DHA Schiff Base Ligands Dr. Dhananjay Palke	29-34
Chapter 06	Study of phytoplankton Diversity from Papvinash Lake Latur, in relation to Physico-Chemical Parameters Datta Ashok .Nalle	35-41
Chapter 07	A Review on Importance of DNA Bar-coding in Genomic diversity of Freshwater fish Dhanshree M. Jagtap, Dnyaneshwar S. Rathod	42-47
Chapter 08	Review-based Study on Dandelion (<i>Taraxacum Officinale</i>) biologically Effective Molecules for Animal Health with Special Reference to Diabetes Datta Ashok Nalle	48-58
Chapter 09	Study of Adulteration in common Food Items Dnyaneshwar S. Rathod, Manali Aglave , Jabeen Bagwan, and Vaishnavi bhimale	59-63
Chapter 10	Impact of Detergent Pollution on the Oxygen Consumption Capacity of the Fish <i>Cyprinus carpio</i> P. S. Shete	64-68
Chapter 11	A review of the Nutritional advantages of feeding farm animals <i>Cichorium intybus</i> as a supplement Datta A.Nalle, Abhaysinh R. Deshmukh	69-80
Chapter 12	Correlation of nutritional status of college girl students with hemoglobin level and BMI in Latur, Dist. Latur. Raut K.S., Jamale P.B1, Inamdar A.P.	81-86
Chapter-13	Importance of Mulberry plant in Sericulture Dnyanoba R. Awad	87-94
Chapter 14	Influence of four plant based carotenoids on the coloration of two ornamental fishes, Koi carp (<i>Cyprinus carpio</i>) and Molly fish (<i>Poecilia sphenops</i>). Yadav S.G.	95-100
Chapter-15	Omega -3 fatty acid and its use in fish feed formulation Madhuri Y. Bhande	101-106
Chapter 16	Potential use of <i>Spirulina platensis</i> in combating Malnutrition in India Rajkumar D.Kamble , Pratiksha Patil ,Komal Sawase , Vaishnavi U.Phulari , Aishwarya Samarth , Pranita Rathod	107-110
Chapter-17	Morphological diversity of freshwater fishes in Manjarariver, Bori, Latur, Maharashtra, India Vishal K. Moholkar, Amol S. Patil, Dhanshree M. Jagtap	111-115

Chapter 18	Ethanobotanical Studies OnPiper betle L. among the folk peoples of Vidul, Taluka Umardhed, District Yavatmal ,Maharashtra, India. Eanguwar Srinivas Reddy, Shivraj Kashinath Bembekar Rameshwar Ramchandra Bichewar and Saiprabha Shirsat	116-120
Chapter-19	Preservation of ancestral DNA of salmon and other aquatic species with the aid of biotechnology. Datta Ashok Nalle, Swati Ganesh Swami*	121-124
Chapter -20	Bioinformatics Tools for DNA Barcoding Dnyaneshwar S. Rathod, Dhanshree M. Jagtap	125-129
Chapter -21	Analysis of Seasonal Variation in Water Quality Parameters of Manjara River (Nagzari Dam), Latur city. Waghamare Shailaja, Mushtakh Hashmi	130-139
Chapter -22	Study on Zooplankton Diversity in Manjara River (Nagzari Dam), Latur city. Shaikh Hina, Mushtakh Hashmi	140-147
Chapter -23	Use of Indian natural therapies for animals, affordable, and Eco- friendly Datta Ashok Nalle	148-151
Chapter -24	Survey of Latur fish market present status and marketing strategies. Marathwada region [M.S]. India Kakasaheb .S. Raut	152-155
Chapter -25	Phytochemical analysis of Adhatoda vasica L. Dnyanoba R. Awad, Ankita S. Suryawanshi	156-158
Chapter -26	Animal welfare Laws in India provision for use of animals in experiments and product testing in science Datta A.Nalle	159-162
Chapter -27	Effective Medicinal Plant in Cancer Treatment Dnyaneshwar S. Rathod	163-167
Chapter -28	Effective Medication for Varicella and Herpes Zoster Infection. Swati Ganesh Swami	168-171
Chapter -29	Applications of Biophysics in Animal Research Dayanand V. Raje*, Kakasaheb S. Raut**	172-173
Chapter -30	Survey of bee species, life cycle and Honey purification process at Chakur Dist. Latur Kakasaheb .S. Raut	174-177
Chapter -31	Use of Nanotechnology in fish health and aquaculture management Datta A. Nalle, Divya D.Nagapure	178-183
Chapter -32	Organic Aquaculture- the Sustainable Practice toward aquaculture development and Ecofriendly approaches Jadhav Amit, Dnyaneshwar S.Rathod	184-191
Chapter -33	Freshwater Integrated Multi-Trophic Aquaculture (FIMTA) - An Innovative Approach Jadhav Amit, Tekam Ashvini	192-206

Chapter -27

Effective Medicinal Plant in Cancer Treatment

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Abstract:

Considering the rapid developments in the study of plants' phytochemicals, which it is no wonder that their anticancer properties have gained popularity. This chapter's study of cancer-fighting plants and analysis of their mechanism of action are its primary objectives. Therefore obtained information across numerous databases. The most efficient ways that herbal plants can stop cell cycle and proliferation are by lowering the level of acid phosphatase and lipid peroxidation. Complications might arise from common therapies like radiation and chemotherapy. The findings of this study indicate that antioxidant chemicals present in herbal extracts can cause apoptosis and prevent cell growth through the methods examined.

Keywords: Cancer, Medicinal Plant.

Introduction

The second biggest cause of death globally, after heart disease, is cancer, one of the major death causing disease . A natural cell becomes malformed when its DNA undergoes genetic mutations, which is the initial stage of cancer. This abnormal cell grows again in an inappropriate manner by asexual reproduction, which entails that it ignores signals that control the proliferation of cells around it, acquires invasion characteristics, and alters the tissues it surrounds.(1)

Cancer is a difficult disease. Years may elapse when you have cancer without showing any signs of it. Occasionally, cancer can exhibit obvious signs that deteriorate rapidly. Many cancer symptoms are similar to those of other, less dangerous conditions. Certain symptoms do not necessarily indicate malignancy. Generally, any alteration in your body that lasts longer than two weeks should be discussed with a healthcare professional

Chemotherapy is one of the many ways used today to treat cancer, however because to the nonselectivity of the drugs used, a significant portion of healthy cells will also be lost during treatment. The biggest challenge in treating cancer is eliminating tumour cells while leaving healthy cells alone without causing harm to healthy cells. Testing cytotoxic substances and screening raw plant extracts are required in order to create anticancer medications from natural resources like plants.(2)

Thus, it is desirable to have a choice of natural products which are more effective and have fewer detrimental effects. (3) Because they contain a variety of chemical compounds, medicinal herbs are crucial for the development of new cancer-fighting agents. (4)

plant produces many useful compounds Such compounds are commonly referred to as secondary metabolites. Important elements in these chemicals include tannins, alkaloids, terpenoids, flavonoids, pigments, and phenols. Secondary metabolites have biological impacts on hematopoietic cells, (5) lipids, and cardiovascular systems, as well as anti-inflammatory, anticancer, and contraceptive properties. (6)

By identifying secondary components of natural goods and medicinal plants, various advancements in conventional cancer treatments have been recorded. It is thought that plants' anticancer properties arise from their ability to inhibit cancer-stimulating enzymes, repair DNA, promote the creation of antitumor enzymes in cells, boost body immunity, and provide antioxidant effects. (7)

Cancer is an unpleasant illness, thus eradicating it is crucial for maintaining the public's health. Plants are becoming well-known anticancer sources as the study of the phytochemistry of herbal items advances quickly. Surgery or chemical supplement therapy will be used to treat the early tumours in cancer. However, malignancies that have spread will fight treatment. (8)

A significant portion of healthy cells are killed with malignant cells during chemotherapy. Over sixty percent of the anticancer substances used today by cancer patients come from microbial, marine, and herbal sources. (9)

Numerous studies on the beneficial effects of plants in the treatment of cancer have shown encouraging findings. (10). additionally, numerous investigations and studies have demonstrated the effectiveness of plants in treating psychological illnesses, thyroid disorders, anaemia, and diabetes, as well as infertility and sterility. Finding plants having cytotoxic properties is required to replace chemotherapy and other cancer treatments. (11)

Anticancer medicinal plants: Common Yarrow (*Achillea wilhelmsii*)

Achillea wilhelmsii, the scientific name for the common yarrow plant, is a member of the Compositae genus in the Asteraceae order. There are multiple species of *Achillea*, but *Achillea wilhelmsii* is more common and grows in more places in Iran. A gramineous, perennial, and small (15–40 cm) plant, *Achillea wilhelmsii*.

On colon cancer cells (HT-29), methanol extracts and the leaf essence of this plant exert cytotoxic effects, with the essence having a higher level of cytotoxicity. In additional investigations, the effects of methanol extracts of plant leaves against the cell lineage of breast, stomach, and colon cancer are demonstrated. Plant phenol components, particularly flavonoids, are present in the methanol extract, which inhibits the growth of cancer cells by triggering

apoptosis. 1,8-cineole and -piene are two of the most significant monoterpene components of this plant that induce apoptosis in human melanoma cells.(12)

Anticancer medicinal plants : Garlic (*Allium sativum* L)

A plant belonging to the Aparagales order, Amaryllidaceae family, Allianceae subfamily, and Allium genus is Allium sativum. The garrulous, perennial Allium sativum has a stem diameter of 40 cm. Its underground portion is inflated and made up of 5 to 12 pieces that are encased in thin, gray-white membranes. Its flowers, which are tiny and pink and shaped like an umbrella at the stem's end, are thin and filet-shaped and are dark green.

Allium sativum and organo sulfuric chemicals have been linked to a lower risk of cancer in the breast, throat, colon, skin, womb, gullet, bladder, and lung, according to numerous studies. In additional studies, we discuss the function of Allicin, the most significant Allium sativum component, and demonstrate its antitumor properties against breast and prostate cancer. This substance has anticancer properties and causes the deliberate death of cells. Allicin 1, which is produced when *Allium sativum* is crushed and cracked, transforms into Allicin 2, thanks to the action of an enzyme. Human cancer cells are inhibited from proliferating by allicin. Another substance that inhibits leukaemia cell multiplication and induces programmed cell death.

Anticancer medicinal plants Queen Anne's lace: (*Ammi majus*)

A white flower with the scientific name *Ammi majus* is an annual, dicotyledonous plant with fall germination that is a member of the Apiaceae family. In wet and soft plains, saline grassland, and coastal areas, it is a long, thin plant that can reach a height of 100 cm under normal circumstances. This plant is grown throughout western Asia, India, Europe, and the Mediterranean region. (13)

This plant's ethanol extract was tested on HeLa and MCF7 cells, and the results indicated that it has a harmful effect on these cells. Comorian compounds, which are key constituents of phenol compounds, are responsible for the majority of this plant's biological functions. According to research, coumarin chemicals are harmful to cell lineages and have been shown to cause apoptosis when ingested. The most significant coumarins in this plant, known as psoralens, are capable of blocking cytochrome p450 activity and acting as an anticancer agent. (14)

Mediterranean regions are home to the garrulous perennial plant known as mmi visnaga. The three parts of this species are flavonoids, furanochromones, and alegrian.³⁶ At an altitude of 800 metres, it may be seen in the north of Iran at Geilan, Roudbar, and Manjil and in the south of Iran in Bushehr and Shahbazan. Its blooms are white and umbellate, and its leaves have many cuts. The antibacterial, antifungal, and medicinal benefits of this fragrant plant, which belongs to the Apiaceae family, have been documented. (15) Different extracts from this plant's above-ground portion have been tested for their ability to kill T47D cancer cells. (16) In addition, it has been demonstrated that this plant inhibits two human cell lineages,

pelvic rhabdomyosarcoma and L20B of mice.³⁹ The most significant components of this plant include khellol, visnadine, cimitugin, and beta-sitosterol. This plant's aqueous extract contains flavonoids like quercetin and kaempferol, which help to explain why it has anticancer properties. (17)

Anticancer medicinal plants: Common worm wood (*Artemisia absinthium*)

The Asteraceae family includes the plant *Artemisia*. There are two hundred to four hundred species of bitter, clustered blooms in the genus *Artemisia*. One species, *Artemisia absinthium* L, is indigenous to huge regions of America, northern Africa, and moderately populated sections of Asia. This plant ranges in size from 80 to 120 cm. This shrub has clusters of yellow flowers. (18)

MCF-7 breast cancer cell research has been published. Similar effects of this plant's anticancer properties on the three cancer cells HeLa, HT-29, and MCF7 (19) have also been documented. According to a study on the impact of this plant's artemisinin on breast cancer cells, the plethoric response in cancer cells entails limiting angiogenesis, preventing cell migration, suppressing cell growth, and death. It also involves reducing responses of core receptors. (20) The additional components of this plant include quercetin, isorhamnetin, kamfrolinalol, alphapinin, limonene, and myrcene.

Many cancer cells, including MCF-7, are inhibited by quercetin, while many cancer cells, including MB-435, SKMEL-5, Du-145, MCF-7, and DLD, are inhibited by isorhamnetin. (21) In addition, artesunate, one of the most significant artemisinins with angiogenic effects, suppresses the development of the angiogenic factor VEGF in addition to having anticancer effects on K569 (leukaemia cancer). (22) According to other studies, the presence of the plant's alpha-, beta-, limonene-, and myrcin compounds may serve as a growth inhibitor for melanoma, hepatic, and breast cancer in humans. HT-29 cells (colon cancer) are inhibited by the alpha-pinene, beta-pinene, and limonene present in methanol and ethanol extracts of this plant. (23)

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