IRDCP
REMOVING BARRIERS IN THE RESEARCH

2020

Souvenir

**International Conference on
Rural Development and Health Research
(RDHR-2020)**

Sept 15-16, 2020

ISBN: 978-81-947261-3-5

International research & development Center
for publication (IRDCP)

www.irdcp.org

International Conference on Rural Development and Health Research (RDHR-2020)

Sept 15-16, 2020

Copyright © 2020 International Research and Development Center for Publication

DOI: [10.22161/conf.rdhr.2020](https://doi.org/10.22161/conf.rdhr.2020)

Publisher

IRDCP

Email: irdcp.publication@gmail.com / conference.irdcp@gmail.com

Web: <https://irdcp.org/>

About IRDCP

International Research and Development Center for Publication (IRDCP) is a non-profit organization for promoting research and development around the world. IRDCP is the bridge between the quality publisher and researchers. It provides the platform to researchers and academicians for publication in the Scopus Indexed Journals, SCI Journals, Web of Science Journals, UGC Approved Journals, NAAS Rated Journals, Google Scholar Indexed Journals and other good quality DOI journals.

IRDCP is also a partner organization for publication in conference proceedings. We organize the International conferences for publication in SCOPUS indexed and other refereed journals as per the requirement of the authors of the manuscripts. The manuscripts submitted to IRDCP should be plagiarism free and well coherent in all sense.

The scope of publication with the IRDCP covers all type of review and research manuscripts including the Exploratory & Explanatory Research, Descriptive & Theoretical Research, Applied Research & Action Research, Cross-Sectional Research, Quantitative & Qualitative Research in the field of engineering & technology, agriculture & environmental, Social science & Humanities, Literature & Education development, Medical & Health Science.

The vision of IRDCP :

IRDCP endeavors to promote global excellence in the field of research & development through diligent applications of advanced technology for the holistic development of society. Also, IRDCP is committed to motivate and persuade the researchers to take up the projects for the continuous development of human society and make this world a better place to live in. The IRDCP has a steadfast commitment be the fulcrum of the ocean of knowledge around which efforts of researchers move about.

About Conference

International Conference on Rural Development and Health Research (RDHR-2020)

During the worldwide lockdown due to COVID 19 pandemic, a lot of important activities have come to a halt. However, when we look at the brighter side, all of us have more time for adding to our knowledge and insights.

With this aim, to keep contributing to learning and motivation International research and development Center for publication is going to organize a two-day International Conference with the title “**International Conference on Rural Development and Health Research (RDHR-2020)**” on Sept 15-16, 2020 through online mode.

We hope, this online mode of the conference in COVID-19 pandemic will be an appreciable step in promoting the research activities and new information between researchers, developers, students, academicians and practitioners working in and around the world by keeping the social distance in view to stop the spread of COVID-19 disease. This conference aims is to present the current researches being carried out in the field of social science and education development around the globe.

Prospective authors from academia as well as industry are invited to submit their abstracts that illustrate original/unpublished works and industrial applications describing advances and significant innovations in the field.

International Advisory Committee

- **Muvunyi Ronaldo**, Taiyuan University of Technology, China
- **Sahar Mirzaei**, Horticultural Science Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Mahallat, Iran.
- **Professor Tamuno-Omi Godwin Dappa**, Federal University Wukari, Nigeria
- **Dr. Etim Nse Akpan**, Federal University Wukari, Nigeria
- **Dr. Elechi Felix Aja**, Ebonyi State University, Abakaliki, Nigeria
- **Dr. Mehmet Fırat Baran**, Associate Prof. , Faculty of Technology, Department of Energy Systems Engineering, Altınşehir, Adıyaman, Turkey
- **Dr. Alexandra D. Solomou**, Agricultural Engineer, Hellenic Agricultural Organization "DEMETER", Institute of Mediterranean and Forest Ecosystems, Terma Alkmanos, Ilisia, 11528, Athens, Greece.
- **Dr. A. Heidari**, Faculty of Chemistry, California South University (CSU), Irvine, California, USA
- **Dr. Abd El-Aleem Saad Soliman Desoky**, Faculty of Agriculture, Sohag University, Egypt
- **Dr. Ekrem BÖLÜKBAŞI**, Molecular biology and Biotechnology, Amasya University, Turkey
- **Assoc. Prof Dr. Mehmet Karakaş**, General biology and zoology, Physiology, Ankara University, Turkey

Message

I am extremely pleased to share that International Research and Development Center for Publication (IRDCP) is organizing a two days **International Conference on Rural Development and Health Research (RDHR-2020)** on Sept 15-16, 2020.

I am sure the state of art lectures from the invited experts and the research findings of researchers, academicians, utility engineers will enrich the knowledge of all the participants. It will provide an excellent opportunity for students to learn new ideas.

I offer my best wishes to the whole team of the organizing committee, the participants, and volunteers for the grand success of the conference.

Dr. Kiran
Convenor RDHR-2020

Message

I am happy to know that International Research and Development Center for Publication (IRDCP) is organizing a two days **International Conference on Rural Development and Health Research (RDHR-2020)** on Sept 15-16, 2020.

I am sure that, this conference would provide an ideal platform for the academicians, scholars and experts to present and exchange their research findings and Ideas.

I wish the conference a great success.

Dr. Tilak Arora
Senior Homoeopathic Medical officer
Govt. of Rajasthan, India

INDEX

Digital literacy and the fostering of development in the ultra-peripheral regions

Sandro Serpa

02

COVID-19 as a booster of the Digital Society

Sandro Serpa

04

The COVID-19 pandemic prevalence and severity status: local national and global scenario

Saumendra Nath Das, Manisha Mandal, Shyamapada Mandal

06

Rural Buffalo Male Calf Production System for Meat – An Approach for Rural Nutritional Security and Employment Generation

M. Anna Anandh

08

Isolation of plumbagin and its effect on the MDR heavy metal tolerant sewage canal bacteria

Ripan Chandra Das, Shyamapada Mandal

10

Propagation and Adoption of Value Added Milk Products Processing Technologies for Rural Entrepreneurship Development

M. Anna Anandh

12

Abstract of RDHR-2020

Digital literacy and the fostering of development in the ultra-peripheral regions

Sandro Serpa

Faculty of Social and Human Sciences, Department of Sociology, University of the Azores;

Interdisciplinary Centre of Social Sciences – CICS.UAc/CICS.NOVA.UAc;

Interdisciplinary Centre for Childhood and Adolescence – NICA – UAc, the Azores, Portugal

Email Id: sandro.nf.serpa@uac.pt

Abstract— At a time of deep economic crisis, in this presentation, we argue that the promotion of Digital Literacy is one of the keys factors for the economic and social development of the ultraperipheral regions. However, and contrary to some common sense, digital literacy cannot be considered an "innate" competence of the younger generation - the digital generation. This transversal competence, indispensable for social and economic development, needs to be developed through the implementation of formal and non-formal learning processes. Only with digital literacy will we have complete development.

Keywords— digital literacy, ultraperipheral regions, social development, economic growth, digital economy.

References:

- [1] Ferreira, C. M., & Serpa, S. (2018). Society 5.0 and Social Development: Contributions to a Discussion. *Management and Organizational Studies*, 5(4), 26-31. <https://doi.org/10.5430/mos.v5n4p26>
- [2] Sá, M. J., & Serpa, S. (2018). Transversal Competences: Their Importance and Learning Processes by Higher Education Students. *Education Sciences*, 8(3), 126. 1-12. <https://doi.org/10.3390/educsci8030126>

- [3] Santos, A. I., & Serpa, S. (2020). Literacy: Promoting Sustainability in a Digital Society. *Journal of Education, Teaching and Social Studies*, 2(1), 1-9. doi:10.22158/jetss.v2n1p1
- [4] Serpa, S. (2019). Alienation on Social Media. *Studies in Media and Communication*, 7(1), 17-20. <https://doi.org/10.11114/smc.v7i1.4286>
- [5] Serpa, S., & Ferreira, C. M. (2019). Society 5.0 and sustainability digital innovations: a social process. *Journal of Organizational Culture, Communications and Conflicts*, 23(1), 1-14. <https://www.abacademies.org/articles/Society-5.0-and-Sustainability-Digital-Innovations-A-Social-Process-1939-4691-23-1-129.pdf>
- [6] Serpa, S., Ferreira, C. M., Sá, M. J., & Santos, A. I. (2020). *Digital Society and Social Dynamics*. United Kingdom, Birmingham: Servicer for Science and Education. doi: 10.14738/eb.17.2020
- [7] Serpa, S., & Santos, A. I. (2020). Critical Literacy and Literacies. *Journal of Education, Teaching and Social Studies*, 2(1), 18-23. doi:10.22158/jetss.v2n1p18
- [8] Serpa, S. (Ed.), Santos, A. I., Ferreira, C- M., & Sá, M. J. (2020). *Educational Processes and Social Analysis*. Hyderabad, Telangana, India: Avid Science.

COVID-19 as a booster of the Digital Society

Sandro Serpa

Faculty of Social and Human Sciences, Department of Sociology, University of the Azores;

Interdisciplinary Centre of Social Sciences – CICS.UAc/CICS.NOVA.UAc;

Interdisciplinary Centre for Childhood and Adolescence – NICA – UAc, the Azores, Portugal

Email Id: sandro.nf.serpa@uac.pt

Abstract— COVID-19 has brought about profound changes in the social and economic life of most individuals. From the myriad of challenges brought by this pandemic of the daily life, this presentation focuses on COVID-19 as a booster for a greater, deeper and faster role of the digital in economic or social everyday activities. In order to fulfill this wish, we will articulate in a critical reflection, the relationship between the COVID-19 pandemic and the Society 5.0 concept as one of the possible ways to realize a digital society - smart society.

Keywords— digital society, society 5.0, COVID-19, digital access, digital literacy.

References:

- [1] Ferreira, C. M., & Serpa, S. (2018). Society 5.0 and Social Development: Contributions to a Discussion. *Management and Organizational Studies*, 5(4), 26-31. <https://doi.org/10.5430/mos.v5n4p26>
- [2] Ferreira, C. M., & Serpa, S. (2020). Contagions: Domains, Challenges and Health Devices. *Academic Journal of Interdisciplinary Studies*, 9(4), 1-14. <https://doi.org/10.36941/ajis-2020-0056>
- [3] Sá, M. J., Ferreira, C. M., & Serpa, S. (2020). Scholar's Online Organizational Engagement and its Consequences for Higher Education Sustainability. *Journal of Education and e-Learning Research*. 7(2), 153-158. doi: 10.20448/journal.509.2020.72.153.1581

- [4] Sá, M. J., & Serpa, S. (2020). The Global Crisis Brought about by SARS-CoV-2 and Its Impacts on Education: An Overview of the Portuguese Panorama. *Science Insights Education Frontiers*, 5(2), 525–530. doi:10.15354/sief.20.ar039
- [5] Santos, A. I., & Serpa, S. (2020). Literacy: Promoting Sustainability in a Digital Society. *Journal of Education, Teaching and Social Studies*, 2(1), 1-9. doi:10.22158/jetss.v2n1p1
- [6] Serpa, S., & Ferreira, C. M. (2020). Sustainability and Digital as Challenges of Sociology. *Journal of Educational and Social Research*.10(2), 15-23. <https://doi.org/10.36941/jesr-2020-0023>
- [7] Serpa, S., Santos, A. I., & Ferreira, C. M. (2020). Contributions of Ivan Illich to Education in a Digital Society. *Academic Journal of Interdisciplinary Studies*, 9(2), 23-30. <https://doi.org/10.36941/ajis-2020-0019>
- [8] Serpa, S., Ferreira, C. M., Sá, M. J., & Santos, A. I. (2020). *Digital Society and Social Dynamics*. United Kingdom, Birmingham: Servicer for Science and Education. doi: 10.14738/eb.17.2020

The COVID-19 pandemic prevalence and severity status: local national and global scenario

Saumendra Nath Das^{1,#}, Manisha Mandal², Shyamapada Mandal^{1,*}

¹Laboratory of Microbiology and Experimental Medicine, Department of Zoology, University of Gour Banga, Malda-732103, West Bengal, India

²Department of Physiology, MGM Medical College, Kishanganj-855107, Bihar, India

*Correspondence: E-mail: samtropmed@gmail.com; sam.micro11@ugb.ac.in

Abstract— The COVID-19 is an ongoing pandemic that was first reported in China, in December 2019, because of the emergence and swift spread of SARS-CoV-2, a novel coronavirus causing COVID-19. This study assesses the prevalence and severity of COVID-19 pandemic at four levels: local (West Bengal state, India), national (Indian), the WHO (World Health Organization) region based, and the global. The publicly accessible data on COVID-19 were retrieved electronically from different sources (as per the applicability): the WHO (global as well as India) websites, and covid19india.org. The data were processed and analyzed in terms of confirmed cases, recovery and death, during July 28, 2020-August 10, 2020, for top three severely affected WHO regions, three countries (the United States, Brazil and India), three Indian states (Maharashtra, Tamil Nadu and Andhrapradesh), and three districts of West Bengal (Kolkata, North 24 Parganas and Howrah). The COVID-19 CFR (case fatality rate), following two different methods (naïve and regression model analysis), for the geographical regions as mentioned above were estimated. As of August 10, 2020, the global COVID-19 cases as reported to the WHO was 19,729,117, and CFR ranged from 3.982% (July 28, 2020) to 3.691% (August 10, 2020), during the study period. Among the 6 WHO regions, the majorly affected top three includes: Americas>Europe>South-East Asia, on the basis of COVID-19 case numbers, with top CFR in Europe (6.465-6.04%), while SEA (CFR: 2.248-2.038%) ranked third. Considering the COVID-19 cases the USA is on the top of the list, Brazil second and India on the third (case: 2,215,074), while CFR was higher for Brazil (3.335%) compared to the USA and India. Top three states: Maharashtra (case: 524513), Tamil Nadu (case: 302815) and Andhra Pradesh (case:

235525), account nearly half of the total COVID-19 cases in India. The CFR changing ranged 3.618-3.441% for Maharashtra, 1.6-1.664% for Tamil Nadu, and 1.04-0.898% for Andhra Pradesh, during the study period. The three severely affected districts in West Bengal (case: 98,459; death: 2,100, as of August 10, 2020) include the capital city Kolkata (case: 28474), North 24 Parganas (case: 21047) and Howrah (case: 9944), with the change in CFR of 3.614-3.378%, 2.289-2.328% and 2.6-2.544%, respectively. Considering the current study findings, it can be suggested that safe and protective vaccines are required in the mitigation of ongoing COVID-19 global pandemic.

Keywords— COVID-19 global pandemic; SARS-CoV-2; case fatality rate; WHO regions, India

References:

- [1] World Health Organization. WHO coronavirus disease (COVID-19) dashboard. WHO 2020. Available at: <https://covid19.who.int/> (Accessed August 12, 2020).
- [2] Mandal M, Mandal S. Phasic containment of COVID-19 in substantially affected states of India. medRxiv 2020. DOI: 10.1101/2020.05.05.20092130
- [3] Mandal M, Mandal S. COVID-19 pandemic scenario in India compared to China and rest of the world: a data driven and model analysis. medRxiv 2020. DOI: 10.1101/2020.04.20.20072744
- [4] Mandal M, Mandal S. Estimating global case fatality rate of coronavirus disease 2019 (COVID-19) pandemic. Int J ClinMicrobiolBiochemTechnol 2020; 3: 36-39.
- [5] COVID19India. Available at: <https://www.covid19india.org/> (Accessed: August 12, 2020).
- [6] Mandal M, Mandal S. Exploring the effectiveness of lockdown in COVID-19 pandemic containment in India. Am J Med Public Health. 2020; 1(1): 1005.

Rural Buffalo Male Calf Production System for Meat – An Approach for Rural Nutritional Security and Employment Generation

M. Anna Anandh

Tamil Nadu Veterinary and Animal Sciences University (TANUVAS),

Department of Livestock Products Technology,

Veterinary College and Research Institute, Tirunelveli – 627 358, Tamil Nadu, India.

Email Id: drannaanandh@gmail.com

Abstract: India ranks first with 59% of the world buffalo population. Since there is a ban in cow slaughter in most of the states in India, buffalo meat is the major item of Indian meat export and domestic consumption. It is almost 2 -3 fold times cost advantage over mutton and chevon and also has good scope for processed meats production. In value terms, the share of buffalo meat in total meat exports from India is more than 90%. The livestock economy of the country could be substantially increased by producing meat as the principal commodity from male cattle and buffaloes. Rearing male buffalo calves exclusively for meat purpose will improve the quality of meat production and thus the livestock economy of the country. The absence of religious taboos for meat consumption in India unlike cow meat is a boon to augment male buffalo calves for meat production. Such a system should be in tune with the current and emerging market trends. The required technologies for prime quality meat production through male buffalo calves to the farmers will be transferred through training programmes. To start with, the required male buffalo calves procured from local shandies / farmers. The procured animals are maintained by the farmers in housed condition until marketing age of 12 - 15 months or on attaining a slaughter weight of more than 150 kg. On reaching a marketable age or desirable slaughter weight, the reared buffalo male calves from farmers taken by farmer's co-operative society, slaughtered following humane methods and processed modern scientific way for public consumption and export. Besides quality buffalo meat production, value added meat and meat products also

produced. This will improve the nutritional standards of rural masses and augment more income to the animal producers. Thus, rural buffalo male calf's production system could generate employment at village level (production place) to district, village, town and metros (consumption place). Further, rural buffalo male calf production system is good opportunity for better utilization of rural human resources and in turn to improve their nutritional and socio-economic status through employment generation.

Keywords: Buffalo, Calf, Employment, Male, Meat, Rural

References:

- [1] Anjaneyulu, A.S.R., Sengar, S.S., Lakshmanan, V. & Joshi, B.C. (1985). Meat quality of male buffalo calves maintained in different levels of protein. *Buffalo Bulletin*, 4: 44 – 47.
- [2] Anjaneyulu, A.S.R., Lakshmanan, V., Sharma, N. & Kondaiah, N. (1990). **Buffalo meat production and meat quality: a review.** *Indian Food Packer*, 44: 21 - 31
- [3] Arganosa, F.C. (1973). **Evaluation of carabeef as a potential substitute for beef.** *Philippines Journal of Nutrition*, 26: 128 – 143.
- [4] Baruah, K.K., Ranjan, S.K. & Pathak, N.N. (1990). **Effect of dietary protein and energy levels on the carcass characteristics of male buffalo calves.** *Buffalo*, 6: 11 – 16.
- [5] Maltin, C.A., Sinclair, K.D., Warriss, P.D., Grant, C.M., Porter, A.D., Delday, M.I. & Warkup, C.C. (1998). The effects of age at slaughter, genotype and finishing system on the biochemical properties, muscle fibre type characteristics and eating quality of bull beef from suckled calves. *Animal Science*, 66: 341 - 348.
- [6] Pathak, N.N & Ranjhan, S.K. (1976). A preliminary study on the effect of ad lib urea molasses liquid feeding with restricted oat forage and fish meal on the performance of buffalo calves (*Bubalus bubalis*). *Indian Journal of Animal Science*, 46: 773 – 775.
- [7] Robertson, J., Ratctiff, D., Bouton, P.E., Harris, P.V. & Shorthose, W.R (1986). A comparison of some properties of meat from young buffalo (*Bubalus bubalis*) and cattle. *Journal of Food Science*, 56: 47 – 50.
- [8] Singh, P.K., Singh, S. Ahlawat, Sharma, D.P. & Pathera, A. (2018). Carcass characteristics of male buffalo calf and meat quality of its veal. *Buffalo Bulletin*, 37: 129 – 144.

Isolation of plumbagin and its effect on the MDR heavy metal tolerant sewage canal bacteria

Ripan Chandra Das[#], Shyamapada Mandal^{*}

Laboratory of Microbiology and Experimental Medicine, Department of Zoology, University of Gour Banga, Malda-732103, West Bengal, India

*Email: sam.micro11@ugb.ac.in

Abstract— Natural plant products have an important role in drug development programme in the pharmaceutical industry. There is an urgent need to identify novel active substances towards multiple drug resistant pathogens. *Plumbagozeylanica* Linn. is one of the well-known natural crude drug of the traditional ayurvedic medicine. Plumbagin, a naphthoquinone derived from *Plumbagozeylanica* shows excellent antibacterial activity against a variety of pathogenic bacteria. The inhibitory effects of isolated and purified phytochemicals in *Plumbagozeylanica* against the MDR and heavy metal tolerant natural isolates is an important aspect of this research. A screening of 82 bacteria collected from industrial sewage canal of Kolkata, India have been done to select 5 isolates on the basis of their highest antibiotic resistance and toxic heavy metal tolerance properties by using standard protocols. 10% methanolic extract of *Plumbagozeylanica* leaves have been done and purified to isolate the active compounds to test their efficacy against the said bacterial isolates. About 65% of isolates were multiple drug resistant and about 76% were found to have tolerance against toxic heavy metals. 39% were resistant to both multiple antibiotics as well as toxic heavy metals. Isolated active compounds from *Plumbagozeylanica* showed remarkable inhibitory effect against all 5 selected bacteria. Plumbagin may play an important role against such antibiotic resistant potentially pathogenic bacteria and may open up a new vista in the field of naturopathy.

Keywords— MDR, Metal tolerant, Natural isolates, Plumbagin, *Plumbago*, Sewage bacteria

#Presenting author: Email: rcdpdm@gmail.com; Mobile: +91-9007818145

***Corresponding author:** Email: sam.micro11@ugb.ac.in; Mobile: +91-9831279239

References:

- [1] Das PN, Purohit SS, Sharma AK, Kumar T.A hand book of medicinal plants, agrobios(India), Agrihouse, behind nasrani cinema, Chopasani road, Jodhpur, 2003.
- [2] Baker JT, Borris RP, Carte B. Natural products drug discovery and development. New perspective on international collaborations. Nat prod 1995; 58:1325- 1357.
- [3] Nadkarni KM. Indian MateriaMedica. Edn. 3, Vol. I, Popular Prakashan, Bombay. 1982, 990-991.
- [4] Kirtikar KR, Basu BD. Indian Medicinal Plants. Vol.VII, Sri Satguru Publications, New Delhi. 2000, 1466-1468.
- [5] Silver LL, Bostian KA, Discovery and development of new antibiotics: the problem of antibiotic resistance. Antimicrobial Agents and Chemotherapy 1993; 37: 377–383.
- [6] Ibrahim M, Baura J, Ahasan Q, Islam T, Homa Z, et al. Preliminary phytochemical and pharmacological investigations of *Alpinia conchigera* Griff. and *Plumbago indica* L. Bangladesh Pharmaceutical Journal 2012;15(2): 153-157.

Propagation and Adoption of Value Added Milk Products Processing Technologies for Rural Entrepreneurship Development

M. Anna Anandh

Tamil Nadu Veterinary and Animal Sciences University (TANUVAS),

Department of Livestock Products Technology,

Veterinary College and Research Institute, Tirunelveli – 627 358, Tamil Nadu, India.

Email Id: drannaanandh@gmail.com

Abstract— In India, dairying is recognized as a catalyst for social and economic development and source of a stable income bringing in cash on a daily basis and providing livelihoods security. Milk production is growing at 4% while consumption is growing at 5%, leaving a gap between demand and supply. This gap can be filled by planning for the profitable dairy farming and processing. There is potential for the processing and value addition of milk. Sustainable profit can be earned through value addition and marketing instead of sale of raw milk. The transfer of the proven technologies in milk production, milk processing and marketing through facilitation of infrastructure a farmer can be tailored into dairy entrepreneur. Entrepreneurship development will make the dairying sustainable business. The profitability in liquid milk ranges from 4 - 5%, whereas the profitability in value added dairy products ranges from 16 to 20%. In this perspective, skill oriented hands - on training on processing of value added milk products will be given to beneficiaries and beneficiaries will be motivated to produce five or more value added milk products or collectively they can establish a milk products processing unit with limited investment and manual operation. These value added milk products can be marketed in nearby cities. If beneficiaries invested Rs. 1240/- for production of value added milk products, they could get Rs. 1820/- from the sale of milk products. Hence, if beneficiary will start the production of value added milk products with limited investment and manual operation, it will be viable and marketing of value added milk products will enhance their economic status through employment generation.

Keywords— Income, Employment, Entrepreneurship, Milk, Value addition

References:

- [1] Chauhan, P. & Sharma, G. (2013). Cooperatives intervention and social empowerment of Indian women: An empirical study. *Journal of Research in Commerce and Management*, 1: 7 -12.
- [2] Dinani, O.P., Tyagi, P.K., Giri, A.K. & Popat, D.S. (2018). Role of livestock in doubling the farmers income–national perspective and the way forward. *International Journal of Science, Environment and Technology*, 7: 496 – 504.
- [3] Kumar, A., Joshi, P.K., Kumar, P.& Parappurathu, S. (2014). Trends in the consumption of milk and milk products in India: implications for self-sufficiency in milk production. *Food security*, 6: 719 - 726.
- [4] Saxena, R., Singh, N. P., Balaji, S.J., Ahuja, U.R. & Joshi, D. (2017) Strategy for Doubling Income of Farmers in India. Policy Paper - 31. ICAR-National Institute of Agricultural Economics and Policy Research (NIAP), New Delhi.
- [5] Saxena, R., Singh, N.P., Balaji, S.J., Ahuja U.R.K. & Joshi, D. (2017). Doubling Farmers' Income in India by 2022-23: Sources of Growth and Approaches. *Agricultural Economics Research Review*, 30: 265 – 277.
- [6] Singh, P. & Kumari, B. (2017). [Importance of livestock sector in doubling farmers Income by 2022](#). *Indian Journal of Economics and Development*, 13: 136 -140.
- [7] Sheela, K.S., & Ramegowda, A. (2013). Dairy cooperatives and empowerment of women. *International Journal of Advanced Social Science and Humanities*, 2: 34 - 42.
- [8] Singh, D.N., Sirohi, R., Singh, Y., Kumar, A. & Shukla, P.K. (2018), Role of Animal By-Products Utilization in Doubling the Farmer's Income. *Indian Journal of Agriculture Business*, 4: 23.