WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 20, 513-517. Review Article ISSN 2277– 7105

LATEST INNOVATIONS IN AYURVEDIC MEDICINE MANUFACTURING

Dr. Pankaj Kumar*[1] and Dr. (Prof.) Prabhat Kumar Dwivedi[2]

[1]PG Scholar, Govt. Ayurvedic College, Patna, Bihar.

[2]Professor Department of RSBK, Govt. Ayurvedic College, Patna, Bihar.

Article Received on
24 Sept. 2023,

Revised on 15 Oct. 2023,
Accepted on 06 Nov. 2023

DOI: 10. 20959/wjpr202320-30281

***Corresponding Author**
Dr. Pankaj Kumar
PG Scholar, Govt. Ayurvedic College, Patna, Bihar.

ABSTRACT

Ayurveda is a holistic science which comprises of both practical and scientific information on various subjects beneficial to mankind. The increasing interest for traditional systems of medicine has increased the demand for their medicinal products. This draw attention regarding perspectives and priorities of innovation in AYUSH system of medicine. There is also a need to develop such innovative systems which bridge gaps in our knowledge and establish our ayurvedic pharmaceutical industries on global parameters. Now a day's *New dosages forms*, New drug delivery systems, Uses of modern machinery and equipment for both manufacturing and standardization of ayurvedic medicine, Implementation of GMP, use of *Artificial intelligence* to accelerate *drug discovery* and *drug development* process. Establishment of cost Effective and high performing R&D units is possible by using digital tools for gathering information about analysis of raw drugs and ready product as well as Statistical data to know effect of drugs on large population uses in pharmaceutical industries for improving production and marketing strategies. Another important step's is to regulate drug safety and reduce ill effect of herbo-mineral drugs by implementation of *Pharmacovigilance* in *Ayurvedic* pharmaceutics.

KEYWORD: *Ayurveda, New dosages forms, Artificial intelligence, Pharmacovigilance.*

INTRODUCTION

Innovation is defined as a new products, process and business models that deliver commercial value and catalyze growth opportunities. Manufacturing innovation promise to impact every aspect of the manufacturing businesses, from design, research and development, production, supply chain and logistics management through to sales and marketing. These innovations

will create highly intelligent, information-driven factories and distributed business models that can respond rapidly to change and deliver entirely new customized smart products and services.[1] After declaration of *Covid-19* pandemic as a global emergencies and non availability of *covid-19* specific drugs for disease management is results in increasing awareness around the people regarding *preventive* and pro-motive aspects of health. So, meeting the demand and supply chain new innovative business ideas and new technologies offers various opportunities to elevate their value on global market platform.

METHODOLOGY

Latest innovation in ASU's medicines manufacturing comprises following methods: New dosages form, New drug delivery systems, New tools and technology like artificial intelligence and modern machine and equipments, Big data and Analytics, Good manufacturing practices (GMP) certification and *pharmacovigilance*.

New dosages forms – The importance of various dosage forms in ayurveda is to make it compatible and palatable to the patient. In order to do this the potency of a drug can also be increased or decreased. It is also used to increase the shelf life of the particular preparation. In accordance with the roga, bala, prakruti and satmya of the patient dosage can be fixed. It is a method, process or a kind of modification, transformation or plan of preparation of medicines by using either a single drug or a combination of several drugs. It can also be known as a science which explains about the various methods of processing of drugs.[2]

New drug delivery systems - Novel drug delivery system is a novel approach to drug delivery that addresses the limitations of the traditional drug delivery systems. Our country has a vast knowledge base of Ayurveda whose potential is only being realized in the recent years. The ayurvedic medicines in the form of Bhasma is best example of Nano-medicines which may be developed in the form of New drug delivery systems. However, the drug delivery system used for administering the herbal medicine to the patient is traditional and out-of-date, resulting in reduced efficacy of the drug. If the novel drug delivery technology is applied in herbal medicine, it may help in increasing the efficacy and reducing the side effects of various herbal compounds and herbs. This is the basic idea behind incorporating novel method of drug delivery in herbal medicines.[3]

Digital tools and technology- Quality Ayurvedic herbal medicines are potential, low-cost solutions for addressing contemporary healthcare needs of both Indian and global

community. Correlating Ayurvedic herbal preparations with modern processing principles (MPPs) can help develop new and use appropriate technology for scaling up production of the medicines, which is necessary to meet the growing demand. The uses of new equipments, tools, and techniques like mechanical pounding, hot solvent extraction, maceration, pressurized liquid extraction, microwave-assisted extraction, ultrasound-assisted extraction, supercritical fluid extraction, solid phase extraction, reflux and fermentation. Modern separation techniques considered for this study follow size-exclusion, affinity, charge, partition-coefficient/solubility, chromatography, adsorption, and volatility principles.[4]

Artificial Intelligence- The use of Artificial Intelligence in Ayurvedic product manufacturing can be highly beneficial for identifying herbs due to its ability to analyze large amounts of data and recognize intricate patterns. Here are a few important ways in which AI can make a valuable contribution like: 1. Image Recognition, 2. Spectroscopy and chemical analysis, 3. Natural language Processing (NLP), 4.Disease-specific Herb recommendation, 5. Improves Herb Agriculture efficiency, 6. Herb Transparency Enhancement.[5]

The use of artificial intelligence is accelerating research and development process .These technology help in automation of manufacturing process as well as effective marketing and post-launch strategies.

Big Data and Analytics: The pharmaceutical industries requires high-performance systems to analyze the large volumes of data generated during the drug discovery and development process. Pharmaceutical companies use third parties to share data with collaborators, making data management a crucial area of focus.

The advancement in analytical techniques is also turning historical and real-time data available with pharmaceutical companies into valuable assets for predictive, diagnostic, prescriptive, and descriptive analytics. Moreover, these pharmaceutical analytics techniques are used on almost all types of medical data from patient records, medical imaging, and hospital data, to name a few.[6]

Quality Control and Standardization-Consumer when purchasing something wants his money back in terms of certain demands like quality, safety, useful for a long period durability/shelf life, with desirable efficacy, economical, defect free and with consistent results. If these demands have to be meet manufacturer should produce a standard quality

material, for which the manufacturer has to submit the product produce to several stringent tests to prove that the material is a quality product. Standardization facilitates drug safety and can be used to rationalize operations. Standardization ensures that products, services and methods are appropriate for their intended use. It ensures that products and systems are compatible, safer, repeatable and interoperable. The standardization can help in reducing the manufacturing costs by 50% through purchasing leverage manufacturers can reduce their purchasing costs considerably.

Good Manufacturing Practices (GMP)- The GMP (Good Manufacturing Practices) is a set of legal guidelines that have been regulated by WHO (World Health Organization) since 1975. These guidelines aim to ensure that drugs and other pharmaceutical products are safe and effective. Since then, GMP has been considered a seal of quality for pharmaceutical products. Good Manufacturing Practices have been adopted by many countries worldwide and that includes India which is now the second largest producer of pharmaceutical products in the world. A good manufacturing practice (GMP) is a production and testing practices that helps to ensure a quality products.[7]

Pharmacovigilance- The quality issues and safety concerns of Ayurveda, Siddha, Unani and Homoeopathy Drugs have been raised from various sources.

Ministry of AYUSH felt it necessary in the interest of Public Health to oversee the impact of ASU&H drugs consumed by the people from the perspective of their safety profile.

Similarly, publishing improper drug information in the form advertisements is a matter of concern that needs to be addressed to safeguard the interest of AYUSH drug consumers. Pharmacovigilance initiative will facilitate detection of potentially unsafe ASU&H medicines and misleading advertisements for taking regulatory action against them.[8]

DISCUSSION AND CONCLUSION

The Ayurvedic pharmaceutical industry is witnessing a massive reformation. Traditionally slow in the adoption of technology, the industry is now undergoing rapid changes due to development of several technologies. Now adopting new innovative tool and technique the pharmaceutical supply chain, production processes, distribution and inventory frameworks could see significant improvements and challenges which is further improve and solved by continuous effort through research and development. Around the world many countries uses

ayurvedic products only as a food and nutritive supplements and not a therapeutic drugs and the reason behind that lack of standardization and presence of heavy metals above the optimum level these challenges act as hurdles in acceptance of ayurvedic products. So, through evidence based research and new innovation in pharmaceutical industries, we can compete the other industries as well as making our Indian medicine and industries for global recognition and acceptance.

REFERENCES

1. https://www.imcrc.org/manufacturing-innovation/
2. Arun et al. UJAHM 2014, Unique Journal of Ayurvedic and Herbal Medicines, July-Aug, 2014; 20-23.
3. V. Kusum Devi et al, Importance of novel drug delivery systems in herbal medicines pharmacogn Rev., 2010 Jan-Jun available from ncbi.nlm.nih.gov.
4. Rahi J. et al, Proposed correlation of modern processing principles for Ayurvedic herbal drug manufacturing: Anc Sci Life., Jul-Sep, 2014; 34(1): 8–15, available from ncbi.nlm.nih.gov.
5. Dr Paramesh R., Director- Intellectual Property, Himalaya Wellness Company, The Power of AI in Ayurveda: Enhancing Herb Identification for Safe and Effective Products By Express Computer on July 28, 2023, Available on expresscomputer.in.
6. https://www.startus-insights.com/innovators-guide/top-10-pharma-industry-trends-innovations-in-2021/
7. Suresh P. A text book of Rasa shastra 1st edition 13 july 2021, chaukhamba prakashak Varanasi, 706.
8. Umrethia B. & Kalsariya B. A text book of Rasa shastra 3rd edition 2021, chaukhamba prakashak Varanasi, 340.