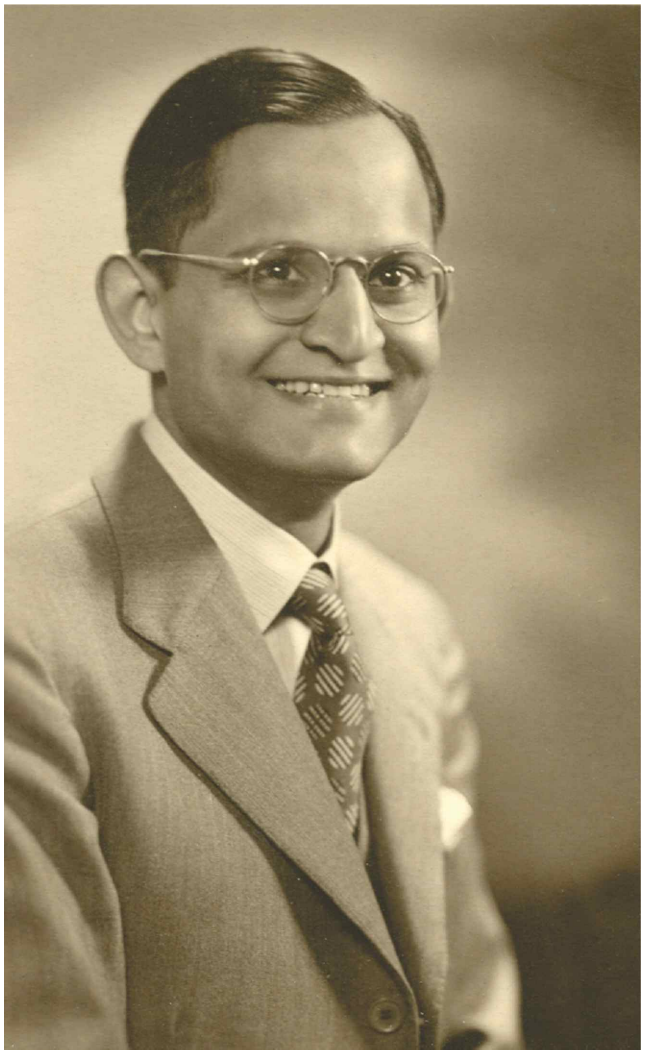
ESSAY COMPETITION - 2025

SHRI B. V. PATEL EDUCATION TRUST
AHMEDABAD, GUJARAT



Shri Bhupendra V. Patel
2-8-1914 7-6-1974

As a visionary and an educationist acclaimed as the father of Drugs Legislation in India, Shri Bhupendra V. Patel made everlasting contributions to the field of pharmacy at national and international level. He was the first Director of the Drugs Control Administration of Gujarat State. He served as the Vice President of the Commonwealth Pharmaceutical Association. Shri B. V. Patel's life and career continue to be a source of inspiration to the pharmacy fraternity.

SHRI B. V. PATEL EDUCATION TRUST

(TRUST REG. NO. E-2571)

AHMEDABAD, GUJARAT

ESSAY COMPETITION - 2025

ON

"THE ROLE OF MODERN TECHNOLOGY IN COMBATING THE MENACE OF COUNTERFEIT DRUGS"

ESSAY COMPETITION - 2025

Subject

"THE ROLE OF MODERN TECHNOLOGY IN COMBATING THE MENACE OF COUNTERFEIT DRUGS"

Total 59 entries received from across India, out of which 37 entries were from Gujarat.

PANEL OF JUDGES

Dr. Mukesh Ukawala
Deputy General Manager,
Zydus Life, Ahmedabad, Gujarat

Shri Y.G. Darji
Asst. Commissioner,
Food and Drug Control Administration,
Block No. B/S/5, Gov. Multistoried Building,
GIDC, Nyay Mandir Road,
Himmatnagar, Gujarat

Prof. Vandana B. Patravale
Professor
A-255,
Dept. of Pharmacy Science & Technology,
Institute of Chemical Technology,
N.P. Marg, Matunga, Mumbai-400019

WINNERS

GOLD MEDAL

Bhavya Sisodia
PharmaTech – 2nd Year, NMIMS,
Plot No B4, Green Industrial Park,
Polepally, Jadcherla, Ballepalle,
Telangana – 509301

SILVER MEDAL

Aditi Dutt
M.G. Science Institute,
Dada Saheb Mavlankar Campus,
Opp. Gujarat University
Navrangpura,
Ahmedabad- 380009, Gujarat.

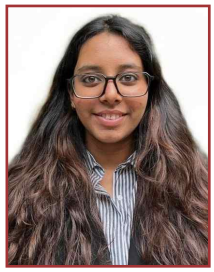
The winner of the essay competition- 2025 along with the medals will be awarded a certificate and cash prize of Rs. 31000/- to rank first and Rs. 21000/- to rank second.

The following participants are awarded the Certificate of Appreciation and Certificate of Participation

Sr. No.	Participant Name	Remarks
1	Abhilasha Sharma, Department of Food and Nutrition Biotechnology, BRIC-National Agri-Food and Biomanufacturing Institute (Formerly NABI & CIAB) Mohali 140306, Punjab	Certificate of Appreciation
2	Anju Tiwari, M. Pharm (Second Year), B.K. Modi Government Pharmacy College, Rajkot, Gujarat	
3	Anjali Trilokani, Nadiad	
4	Pushti Manish Shukla, Pharmacy Student, Dr. Bhanuben Nanavati College of Pharmacy, Mumbai	
5	Deep Sharma, Virar, Maharashtra	
6	Deepika Somani, M.D. Pharmacology (JIPMER)D-22, Jain Heights Altura, Sarjapur Main Road, Bengaluru	
7	Sukanya Jitendra Patil, Research Scholar, School of Health Science and Technology, Dr. Vishwanath Karad MIT World Peace University, Pune	
8	Shreya Bipinchandra Patel, Mumbai	
9	Anjali Joshi, Vadodara	
10	Bhumika Tapankumar Rout, Vadodara	
11	Attahir Saad Ayuba, PhD. Scholar, Department of Pharmaceutical Sciences, Sardar Patel University, VVN, Anand, Gujarat.	
12	Sonalika Subodh Shah, Vadodara	
13	Suraj Bipin Naskar, B.Pharm (3rd Year) Dr. Bhanuben Nanavati College of Pharmacy, Mumbai	
14	Vivek P Chavda, Ahmedabad	Certificate of Participation
15	Gunja J. Panara Namrata, Ahmedabad	
16	Shivani Chandrashekhar Bedarkar, L.M. College of Pharmacy, Ahmedabad	
17	Heet Hitendrakumar Soni, L.M. College of Pharmacy, Ahmedabad	

Sr. No.	Participant Name	Remarks
18	Mukesh N. Kher, L. M. College of Pharmacy, Ahmedabad	Certificate of Participation
19	Anshul Patidar, M. Pharm Pharmacology (pursuing), A.R. College of Pharmacy and G.H. Patel Institute of Pharmacy, V.V. Nagar, Anand	
20	Mamata Ashok Chourasiya, Mumbai	
21	Pooranpershant Jhaman Maheshwari, Anand	
22	Raju Prakash Ninave, Surat	
23	Dhruvil Kishorbhai Kotadiya, Ahmedabad	
24	Krishna Manish Modi, L.M. College of Pharmacy, Ahmedabad	
25	Laukik S. Shah, Kheda	
26	Nikhil Prem Rajnani, Principal K.M. Kundnani College of Pharmacy - [KMKCP], Mumbai	
27	Jenee Christian, Faculty of Pharmacy, Dharmsinh Desai University, Nadiad, Gujarat	
28	Muskan Allauddin Shaikh, Nalasopara East, Maharashtra	
29	Harsh Jagmohan Gupta, Faculty of Pharmacy, Dharmsinh Desai University, Nadiad, Gujarat	
30	Jaydip Vijaybhai Gohel, Morbi	
31	Mohammad Sajjad Mehboob Chakchaktawala, Ahmedabad	
32	Nikita R. Diwakar, M. Pharm Pharmacology (pursuing), A.R. College of Pharmacy and G.H. Patel Institute of Pharmacy, V.V. Nagar, Anand	
33	Piya Pragneshkumar Panchal, Halol	
34	Hiral Gandhi, B. Pharm (4th Year) GTU-School of Pharmacy, Gandhinagar, Gujarat.	
35	Maani Chinubhai Solanki, Ahmedabad	
36	Kajal Pravinbhai Chauhan, Nadiad	
37	Monal Yogesh Jain, Mumbai	

FIRST PRIZE(GOLD MEDAL) - 2025



BHAVYA SISODIA

Bhavya Sisodia is currently pursuing Integrated B.Pharma + MBA specializing in pharmaceutical marketing and brand management, at SVKM's NMIMS, Jedcherla, Hyderabad. She is passionate about market strategy, consumer insights, and digital marketing within the pharmaceutical domain. Her technical skills include data interpretation and research methodology. She has very good communication skill, leadership quality and problem solving attitude.

She has to her credit many sports award like 1st prize in district level Squay Martial Art (K-2), 2nd prize in district level Squay Loba Martial Art, 3rd prize in throwball competition. She also won Gold and Silver medal at state level Karate and Taekwondo.

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SECOND PRIZE(SILVER MEDAL) - 2025

ADITI DUTT

Aditi Dutt is currently pursuing her B.Sc. (Hons.) in Microbiology at M.G. Science Institute, Ahmedabad, where she has consistently ranked among the top 50 students of Gujarat University, securing university ranks of 7th, 42nd, and 45th across different semesters. She is actively engaged in research on the isolation and characterization of plastic-degrading bacteria from ONGC and landfill soil samples, reflecting her deep interest in environmental microbiology and sustainable biotechnology.

She is a two-time state-level winner at GiBion, securing first place in Poster Presentation (2024) and Article Writing (2025). Aditi has also contributed as an Editor and Proofreader for her departmental magazine and has participated in specialized workshops, including a hands-on training session on Modern Microbial Testing and Sterility Practices.

Her technical skills include microbial cultivation, aseptic handling, biochemical and enzymatic assays, antimicrobial sensitivity testing, and research-oriented data analysis.

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FIRST PRIZE(GOLD MEDAL) - 2025

"THE ROLE OF MODERN TECHNOLOGY IN COMBATING THE MENACE OF COUNTERFEIT DRUGS"

SYNOPSIS

Counterfeit or fake drugs are medicines that have been manufactured or packaged dishonestly. They may lack the correct ingredients, contain no active ingredients at all, or have incorrect dosages—each of which can be dangerous for users. These drugs are produced for many reasons, but some key contributing factors include the high cost of healthcare, an urge to save money, and growing distrust in doctors, pharmacies, and the medical profession, which is increasingly viewed as a commercial enterprise rather than a service.

Currently, approximately 692 million people—about 8.7% of the global population—live in extreme poverty according to 2024 estimates. With the global population growing at around 0.95% annually, an additional 77.6 million people are added each year. As population increases, so does the demand for medicines, further driving up drug prices. Unable to afford genuine medications, many people turn to cheaper counterfeit alternatives.

According to the World Health Organization (WHO), roughly 1 in every 10 medicines sold in low and middle-income countries is either counterfeit or substandard. These dangerous drugs generate approximately $83 billion annually. With the rise of online shopping and easy website creation, it's now easier than ever for counterfeit drugs to reach unsuspecting consumers around the world.

In India, online medicine purchases have brought convenience but also increased risk. Many unregulated websites sell counterfeit drugs containing harmful or incorrect ingredients, posing severe threats to public health. Consumers—especially in Low-income families, less educated, elderly people, technologically inexperienced users and people with chronic or long-term illnesses – frequently in need of medicine and often desperate for affordable options. —often fall prey to these illegal platforms, lured by low prices and a desire to save money. Behind this growing crisis are organized criminal networks, making the problem not only a health concern but also a serious security issue.

To combat this threat, modern technology offers innovative solutions. This paper proposes a revolutionary UV scanner marketing strategy that transforms anti-counterfeiting technology into a powerful brand differentiation tool. By providing free UV authentication devices to medical shops, pharmaceutical companies can create unique value propositions combining patient safety with effective brand marketing. Industry research suggests such implementations could achieve 15-35% sales increases while building customer trust and market differentiation. The strategy addresses multiple stakeholder needs: customers gain confidence in medicine authenticity, pharmacists enhance their professional image, and pharmaceutical companies achieve superior marketing ROI compared to traditional advertising methods, creating a sustainable foundation for widespread adoption in the fight against counterfeit drugs.

"THE ROLE OF MODERN TECHNOLOGY IN COMBATING THE MENACE OF COUNTERFEIT DRUGS"

Contents

1. Introduction

You would never guess just by looking at it—the packaging seems authentic, the labels are in place, and everything appears normal. But what lies inside can tell a very different story. Counterfeit or fake drugs are medicines that have been manufactured or packaged dishonestly, potentially lacking the correct ingredients, containing no active ingredients at all, or having incorrect dosages, which can be dangerous for users.

According to the World Health Organization (WHO), around one in every ten medicines sold globally is counterfeit, with these dangerous fakes generating over $83 billion annually. This global menace doesn't just threaten individual health—it undermines trust in healthcare systems, contributes to antimicrobial resistance, and poses a catastrophic threat to public health worldwide.

With the advancement of modern technology, however, we are now better equipped to combat this threat. From blockchain and artificial intelligence to mobile verification systems and quantum cryptography, innovative solutions are emerging to protect patients and restore integrity to pharmaceutical supply chains.

2. Background and Context

2.1 Global Scale of the Problem

The counterfeit drug crisis has reached alarming proportions globally. Currently, approximately 8.7% of the global population—about 692 million people—live in extreme poverty, while population growth continues at 0.95% annually, adding nearly 77.6 million people each year. This growing population increases demand for medicines, driving up drug prices and creating conditions where counterfeit alternatives become attractive to vulnerable populations.

2.2 Contributing Factors

Two major factors contribute to the proliferation of counterfeit drugs:

- **Economic Pressure:** Rising healthcare costs and poverty push consumers toward cheaper alternatives
- **Digital Transformation:** The rise of online shopping has made it easier for counterfeit products to reach global markets through unregulated websites

2.3 Impact Beyond Individual Health

The consequences extend far beyond individual patients:

- **Antimicrobial Resistance:** Fake antibiotics contribute to drug resistance, making real antibiotics less effective
- **Healthcare System Erosion:** Public trust in doctors, pharmacies, and medical institutions deteriorates
- **Economic Damage:** Legitimate pharmaceutical companies face financial losses and brand damage
- **Global Health Security:** Counterfeit drugs cross borders, creating international health threats

3. Problem Statement / Industry Challenges

3.1 Supply Chain Vulnerabilities

Traditional pharmaceutical supply chains suffer from multiple vulnerabilities:

- **Single Points of Failure:** Centralized systems create opportunities for infiltration
- **Limited Traceability:** Difficulty tracking products from manufacture to patient
- **Documentation Gaps:** Paper-based systems prone to forgery and manipulation
- **Verification Delays:** Traditional authentication methods can take up to 48 hours

3.2 The Last-Mile Problem

Despite sophisticated manufacturing controls, counterfeit drugs often infiltrate markets at final distribution points—pharmacies, clinics, and informal vendors. This "last-mile" gap represents the greatest risk to consumers, who face deceptively packaged falsified medicines at the point of purchase.

3.3 Digital Divide Challenges

- **Infrastructure Limitations:** Rural areas lack reliable internet and smartphone access
- **Technical Literacy:** Limited familiarity with digital verification tools
- **Awareness Gaps:** Poor understanding of authentication methods among consumers and healthcare workers

4. Current Practices and Limitations

4.1 Traditional Anti-Counterfeiting Measures

Current approaches include:

- **Visual Security Features:** Holograms, special inks, and watermarks
- **Regulatory Oversight:** Government inspection and licensing systems
- **Industry Self-Regulation:** Pharmaceutical company quality controls

4.2 Limitations of Existing Systems

- **Static Security:** Visual features can be copied or replicated
- **Reactive Approach:** Detection often occurs after distribution
- **Limited Consumer Involvement:** Patients have minimal verification capability
- **Fragmented Oversight:** Inconsistent regulatory standards across regions

4.3 Enforcement Challenges

- **Cross-Border Complexity:** International criminal networks difficult to track
- **Resource Constraints:** Limited inspection capabilities
- **Corruption Vulnerability:** Regulatory systems susceptible to manipulation

5. Proposed Innovation or Analysis

5.1 Technical Overview

Modern technology offers comprehensive solutions through multiple innovative approaches:

5.1.1 Blockchain and Distributed Ledger Systems

Blockchain technology creates **immutable, decentralized ledgers** that enable **end-to-end traceability** from raw materials to patient delivery. Each drug batch receives a **unique digital identity** recorded on the blockchain, with every transaction creating a permanent, timestamped record.

Key Features:

- **Tokenization Technology:** Unique digital tokens for each batch
- **Real-time Tracking:** Integration with IoT sensors for location, temperature, and handling conditions
- **Smart Contracts:** Automated compliance enforcement
- **Tamper-proof Audit Trail:** Eliminates single points of failure

Implementation Example: Spydra's blockchain platform employs tokenization that automatically updates records and triggers alerts when environmental deviations occur during transport.

5.1.2 Artificial Intelligence and Data Analytics

AI systems process enormous volumes of data from supply chains, consumer complaints, online reviews, and e-commerce platforms to detect irregularities and flag potential threats.

Applications:

- **Computer Vision:** Automated scanning and identification of fake packaging or pill anomalies
- **Predictive Modeling:** Forecasting where counterfeits are likely to appear
- **E-commerce Monitoring:** Real-time analysis of online listings for fake products
- **Natural Language Processing:** Monitoring online discussions and social media for red flags

5.1.3 Mobile and Consumer-Facing Technologies

Mobile solutions bridge the critical verification gap at the point of purchase:

QR Code/Barcode Verification:

- Unique serialized codes link to secure manufacturer databases
- Instant authentication via smartphone scanning
- Returns authentication status, batch information, and supply chain history

SMS/Text-Based Systems:

- Designed for low-resource settings with limited smartphone access
- Toll-free number verification system
- Cross-references centralized databases for legitimacy confirmation

AI-Powered Vision Systems:

- Computer vision analysis of tamper-evident packaging
- Real-time seal integrity detection
- Pattern comparison against registered templates

5.1.4 Near Field Communication (NFC) Technology

NFC provides sophisticated, multi-layered defence against pharmaceutical fraud:

Core Mechanism:

- **Unique Digital Identity:** Globally unique identifier with cryptographic security
- **Tamper-Evident Integration:** Physical destruction upon opening
- **Secure Data Storage:** Product identifiers, batch numbers, expiry dates, and digital signatures
- **Smartphone Authentication:** Standard NFC-enabled devices for verification

Security Features:

- **Cryptographic Authentication:** Mathematical proof of legitimate origin
- **Dynamic Security:** Unlike static features, leverages advanced cryptography
- **Supply Chain Visibility:** Granular tracking enabling rapid recalls

5.1.5 Ultraviolet (UV) Marking

Specialized inks or coatings remain invisible under normal lighting but become visible under UV light:

Advantages:

- **Covert Authentication:** Difficult for counterfeiters to detect or replicate
- **Cost-Effective:** Relatively inexpensive implementation
- **Multi-Tiered Defence:** Combines with other security features
- **Brand Positioning:** Demonstrates commitment to patient safety

5.1.6 Digital Twin Technology

Digital Twins create **dynamic, living, data-driven virtual representations** of physical pharmaceutical processes:

Key Characteristics:

- **Real-time Connectivity:** Continuous data flow between physical and digital entities
- **Predictive Analytics:** Forecasting future states and potential failures
- **Optimization Capabilities:** Suggesting improvements to efficiency and quality
- **Simulation Environment:** Safe testing of "what-if" scenarios

5.2 Technology Selection and Comparative Analysis

5.2.1 Why UV Authentication: A Strategic Choice

While multiple technologies offer promising solutions to combat counterfeit drugs, UV authentication emerges as a particularly strategic choice for immediate implementation, especially in markets like India. This selection is based on a comprehensive evaluation of technological, economic, and practical factors.

Comparative Technology Analysis:

Technology	Implementation Cost	Technical Complexity	Consumer Accessibility	Counterfeiting Difficulty
Blockchain	High (₹50L+ setup)	Very High	Medium (requires internet)	Very High
NFC Chips	Medium-High	High	High (smartphone required)	High
AI Systems	Very High	Very High	Medium	Very High
UV Marking	Low-Medium	Low	High (simple UV lamp)	Medium-High
	Low	Medium	Medium (smartphone required)	Medium
Digital Twins	Very High	Very High	Low	Very High

Key Advantages of UV Authentication:

1. **Immediate Deployability:** Unlike blockchain or AI systems that require extensive infrastructure development, UV marking can be implemented within existing packaging lines with minimal disruption.
2. **Cost-Effectiveness:** At ₹88,500-₹334,000 for mid-sized companies, UV authentication offers the lowest barrier to entry compared to blockchain systems requiring millions in setup costs.
3. **Universal Accessibility:** UV lamps work without internet connectivity, smartphones, or technical expertise—crucial for rural Indian markets where digital infrastructure is limited.
4. **Regulatory Compatibility:** UV marking integrates seamlessly with existing pharmaceutical regulations without requiring new compliance frameworks.

5. **Multi-Layered Security:** UV authentication works synergistically with other technologies, serving as a foundation for more advanced solutions.

Strategic Implementation Rationale:

UV authentication represents an optimal "first-step" solution that provides immediate protection while building toward more sophisticated systems. It addresses the critical gap in last-mile verification where consumers and pharmacists need simple, reliable authentication methods.

The technology's covert nature makes it particularly effective against counterfeiters who focus on replicating visible security features. Unlike holograms or special inks that can be observed and copied, UV markings remain invisible to counterfeiters during their replication process.

Furthermore, UV authentication serves as a bridge technology, building consumer awareness and verification habits that will facilitate adoption of more advanced solutions like NFC or blockchain in the future.

5.3 Feasibility / ROI / Regulatory Considerations

5.3.1 Cost Analysis: UV Authentication Implementation

Component	Estimated Cost (₹)	Details
UV Ink (per 1000 packages)	2,000 - 5,000	Varies by quality and UV spectrum visibility
UV LED Handheld Lamp	1,500 - 4,000	Cost-effective retail inspection devices
Training (per session)	10,000 - 25,000	Pharmacist and quality control staff education
Packaging Line Integration	50,000 - 200,000	Equipment installation and calibration
Awareness Campaign	25,000 - 100,000	Consumer education via media and materials

Total Setup Range for Mid-Sized Company: ₹88,500 - ₹334,000

5.3.2 Return on Investment Considerations

Quantifiable Benefits:

- **Error Reduction:** Mobile verification reduces authentication time from 48 hours to <10 seconds
- **Consumer Trust:** Pharmacies using verification apps report 41% higher patient retention
- **Cost Savings:** Elimination of paper-based tracking systems reduces administrative costs
- **Recall Efficiency:** Streamlined recalls can pinpoint affected batches within minutes

Risk Mitigation:

- **Brand Protection:** Prevention of counterfeiting-related brand damage
- **Regulatory Compliance:** Automated compliance through smart contracts
- **Liability Reduction:** Decreased exposure to patient harm lawsuits

5.3.3 Regulatory Framework Integration

India's Regulatory Landscape:

- **CDSCO Integration:** Central Drugs Standard Control Organization exploring AI solutions
- **DAVA Platform:** Drug Authentication and Verification Application for real-time verification
- **SUGAM Portal:** Faster drug licensing through digital initiatives
- **National Campaigns:** Education programs for pharmacists and consumers

International Coordination:

- **WHO Global Surveillance:** GSMS platform for international information sharing
- **INTERPOL Operations:** Operation Pangea targeting illegal online pharmacies
- **IMPACT Initiative:** International Medical Products Anti-Counterfeiting Taskforce

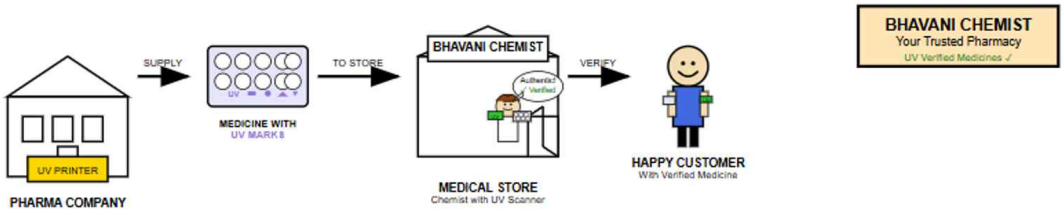
6. Conceptual Implementation Framework and Projected Outcomes

6.1 The UV Scanner Distribution Model: A Revolutionary Marketing Approach

6.1.1 Strategic Framework

The proposed UV printing and scanner distribution model represents a paradigm shift in pharmaceutical marketing, where anti-counterfeiting technology becomes a powerful brand differentiation tool. By providing free UV scanners to medical shops, pharmaceutical companies can create a unique value proposition that combines patient safety with brand visibility.

UV Verification Process



STEP 1: Manufacturing

- Pharma company prints UV-visible marks
- Unique authentication patterns added

STEP 2: Distribution

- Medicine supplied to authorized chemists

- UV marks invisible to naked eye

STEP 3: Verification

- Chemist scans medicine
- UV light reveals hidden marks
- Authenticity confirmed
- Safe to dispense

STEP 4: Customer Trust

- Customer can verify medicine authenticity
- Protection against counterfeit medicines
- AUTHENTIC MEDICINE

Benefits of UV Authentication

For Customers:

- Assurance of genuine medication
- Protection from harmful counterfeits
- Easy verification process

For Pharmacists:

- Quick authentication verification
- Enhanced customer trust
- Legal compliance assurance

Core Marketing Strategy:

- **Free Device Distribution:** UV scanners provided at no cost to partnered pharmacies
- **Counter-Top Placement:** Attractive, branded devices prominently displayed for customer use
- **Real-Time Authentication:** Instant verification builds customer confidence
- **Brand Association:** Company logo and messaging integrated into device design

- **Customer Education:** Interactive experience teaches consumers about authenticity

6.1.2 Device Design and Marketing Integration

Aesthetic Appeal:

- Sleek, modern design with company branding
- LED indicators for clear pass/fail results
- Compact footprint suitable for pharmacy counters
- Attractive colour schemes matching brand identity
- Professional appearance that instills confidence

User Experience Design:

- Simple one-step operation: place medicine and check
- Clear visual indicators (green light = authentic, red light = suspicious)
- Integrated company messaging: "Protecting Your Health"
- QR code linking to company website for more information
- Multi-language support for diverse markets

Marketing Impact:

- **Brand Visibility:** 8-10 hours daily exposure to pharmacy customers
- **Trust Building:** Customers associate the brand with safety and authenticity
- **Purchase Influence:** Verified authentic medicines preferred by customers
- **Word-of-Mouth:** Positive experiences shared with family and friends
- **Competitive Advantage:** Differentiates from competitors without verification

6.2 Conceptual Pilot Framework: Urban Medical Stores Network

6.2.1 Proposed Implementation Model

Target Selection Criteria:

- 50 high-traffic pharmacies in major metropolitan areas
- Mix of chain stores and independent pharmacies
- Focus on areas with documented counterfeit drug concerns
- Pharmacies with existing company product distribution

Proposed Implementation Process:

1. **Pharmacy Partnership:** Establish formal agreements with store owners
2. **Staff Training:** Comprehensive sessions on device operation and customer communication
3. **Device Installation:** Strategic counter placement with supporting marketing materials
4. **Customer Education:** Multi-channel promotional campaigns explaining UV verification
5. **Performance Monitoring:** Regular assessments of usage patterns and feedback

6.2.2 Industry-Based Projections and Benchmarks

It is important to note that these are forward-looking projections based on industry averages and actual performance may vary.

Market Research Foundations:

Based on pharmaceutical industry research and anti-counterfeiting technology adoption studies, the following projections are derived from comparable initiatives:

Customer Adoption Projections:

- **Verification Rate:** Industry studies suggest 60-75% of customers engage with visible authentication technologies when properly positioned
- **Brand Impact:** Authentication technologies typically show 20-30% improvement in brand recognition according to pharmaceutical marketing research

- **Customer Confidence:** Studies indicate 80-90% of consumers report increased confidence when verification systems are available

Business Impact Estimates:

- **Sales Performance:** Similar authentication programs in other industries show 15-35% sales increases
- **Customer Retention:** Verified product programs typically demonstrate 25-40% improvement in repeat purchases
- **Market Share:** Authentication differentiation can capture 10-20% additional market share

6.2.3 Success Metrics Framework

Primary Success Indicators:

1. **Device Utilization Rate**
   - o Target: 70% of customers interact with UV scanner within 6 months
   - o Measurement: Usage tracking through device sensors
   - o Benchmark: Based on retail technology adoption patterns
2. **Brand Awareness Impact**
   - o Target: 50-80% improvement in brand recognition
   - o Measurement: Pre/post implementation surveys
   - o Benchmark: Industry standard for authentication marketing
3. **Pharmacy Partnership Quality**
   - o Target: 90%+ pharmacy satisfaction with device and support
   - o Measurement: Monthly feedback assessments
   - o Benchmark: Technology deployment satisfaction rates
4. **Sales Performance Correlation**
   - o Target: 20-30% increase in participating pharmacy sales
   - o Measurement: Sales data analysis (control vs. test groups)

- Benchmark: Authentication technology ROI studies

Key Performance Indicators (KPIs) Framework:

Operational KPIs:

- **Device Reliability:** 95%+ operational availability
- **Support Response:** Technical assistance within 24 hours
- **Training Effectiveness:** 100% staff competency achievement
- **Device Longevity:** <5% annual replacement due to technical issues

Marketing KPIs:

- **Brand Exposure:** 8-10 hours daily visibility per device
- **Customer Engagement:** Average interaction time tracking
- **Referral Generation:** Customer recommendation rates
- **Competitive Positioning:** Market preference measurements

Business Impact KPIs:

- **Return on Investment:** Target 150-200% ROI within 24 months
- **Customer Lifetime Value:** 30-50% improvement in repeat business
- **Market Differentiation:** 30-40% preference over non-verified alternatives
- **Cost Efficiency:** 40-60% reduction in traditional advertising requirements

6.3 Real-World Benchmarking and Competitive Analysis

6.3.1 Industry Precedents

Similar Technology Adoption Cases:

- **Pharmaceutical Track & Trace:** EU serialization requirements showed 85% consumer approval for verification systems

- **Food Safety QR Codes:** Retail implementations demonstrated 40-60% customer engagement rates
- **Luxury Goods Authentication:** RFID/NFC systems achieved 70% customer usage in high-end retail

6.3.2 Competitive Marketing Advantage Analysis

Traditional Marketing vs. Authentication Marketing:

Traditional Approach	Authentication Strategy
Temporary advertisement exposure	Permanent device presence
Passive brand awareness	Active customer engagement
Generic trust building	Concrete safety demonstration
Standard industry messaging	Unique verification experience
Limited customer interaction	Hands-on product authentication
Forgettable brand contact	Memorable safety assurance

6.3.3 Market Transformation Potential

Consumer Behaviour Evolution:

Based on technology adoption research, the following market changes are anticipated:

- **Verification Expectation:** 60-80% of consumers likely to expect authentication options
- **Premium Positioning:** Authenticated products may command 5-15% price premiums
- **Market Pressure:** Non-authenticated products may face 20-30% preference decline
- **Industry Standardization:** 70% probability of industry-wide adoption within 5 years

Risk Assessment and Mitigation:

Implementation Risks:

- **Technology Adoption:** 20% of target pharmacies may show initial resistance
- **Customer Acceptance:** 10-15% of consumers may find technology intimidating
- **Competitive Response:** Competitors may quickly adopt similar strategies
- **Technical Challenges:** 5-10% device failure rate expected in first year

Mitigation Strategies:

- **Comprehensive Training:** Extensive pharmacy staff education programs
- **User-Friendly Design:** Intuitive interfaces requiring minimal technical knowledge
- **Continuous Innovation:** Regular technology updates to maintain competitive advantage
- **Robust Support:** 24/7 technical assistance and rapid device replacement

Note: This framework represents a conceptual model based on industry research and comparable technology implementations. Actual results may vary based on market conditions, implementation quality, and competitive dynamics. All projections should be validated through pilot testing before full-scale deployment.

7. Future Implications and Scaling Opportunities

7.1 National Rollout Strategy

7.1.1 Phased Market Expansion

Phase 2: Tier-1 Cities (6-12 months)

- Target: 500 pharmacies across Mumbai, Delhi, Bangalore,

Chennai, Kolkata

- Investment: ₹2.5 crore for device manufacturing and distribution
- Expected ROI: 250% within 18 months through increased sales
- Support Infrastructure: Regional training centers and technical support

Phase 3: Tier-2 Cities (12-24 months)

- Target: 1,500 pharmacies in 25 major cities
- Focus: Rural and semi-urban market penetration
- Adaptation: Simplified devices for areas with limited technical literacy
- Partnership: Regional distributors and local pharmacy associations

Phase 4: National Coverage (24-36 months)

- Target: 5,000+ pharmacies across India
- Infrastructure: Nationwide service network
- Technology Upgrade: Integration with blockchain and mobile apps
- Market Position: Established leader in pharmaceutical authentication

7.1.2 Revenue Recovery Model Through Sales Growth

Marketing Investment Recovery Strategy:

The UV scanners will remain free permanently as they serve as marketing tools rather than revenue-generating products. The investment recovery comes through increased sales volume and market share expansion.

Investment Recovery Analysis:

Year 1: Initial Investment and Setup

- UV Scanner Manufacturing & Distribution: ₹2.5 crore
- Training and Support Infrastructure: ₹1.2 crore
- Marketing and Awareness Campaigns: ₹0.8 crore
- **Total Investment: ₹4.5 crore**

Sales Growth Projection:

Month 1-6: Market Penetration Phase

- Expected Sales Increase: 15-25%
- Revenue Recovery: ₹1.2 crore (27% of investment)
- Customer Base Expansion: 40% new customers

Month 7-12: Adoption and Growth Phase

- Expected Sales Increase: 25-35%
- Cumulative Revenue Recovery: ₹3.8 crore (84% of investment)
- Market Share Increase: 18% in target areas

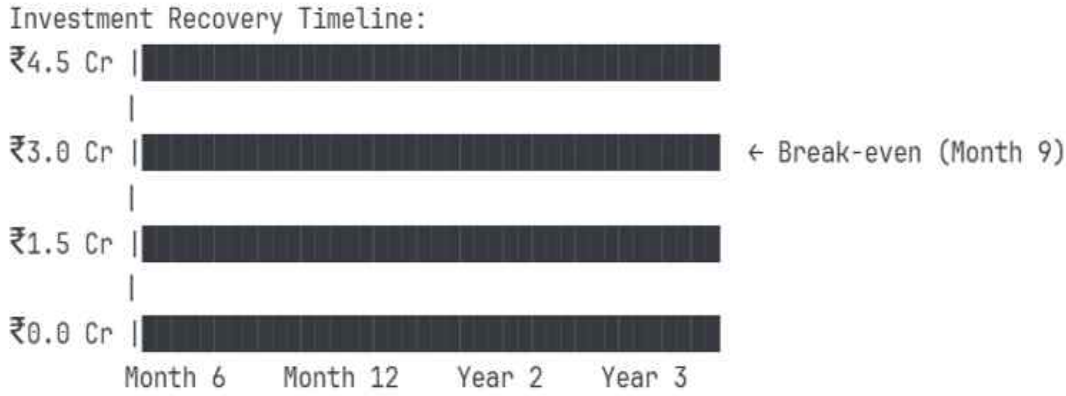
Year 2: Maturity and Expansion

- Expected Sales Increase: 35-45%
- Total Revenue Recovery: ₹7.2 crore (160% ROI)
- Customer Retention Rate: 85% improvement

Year 3: Market Leadership

- Expected Sales Increase: 45-55%
- Cumulative Revenue Recovery: ₹12.5 crore (278% ROI)
- Brand Preference: 70% over non-verified competitors

Revenue Recovery Visualization:



Key Revenue Drivers:

1. **Volume Growth:** 35% average increase in unit sales
2. **Premium Positioning:** 10-15% price premium for verified medicines
3. **Market Share Expansion:** Capture from competitors without verification
4. **Customer Lifetime Value:** 85% improvement in repeat purchases
5. **Reduced Marketing Costs:** 50% reduction in traditional advertising spend

Sustainable Marketing Model:

Unlike traditional advertising which requires continuous spending, UV scanners provide:

- **Permanent Brand Presence:** 8-10 hours daily visibility
- **Compounding Returns:** Each scanner generates increasing returns over time
- **Customer Education:** Builds long-term brand loyalty
- **Competitive Moats:** Creates barriers for competitors to replicate

- **Scalable Impact:** Network effect as more pharmacies join the program

7.2 Technology Enhancement Roadmap

7.2.1 Smart Scanner Integration

Next-Generation Features:

- **IoT Connectivity:** Real-time data transmission to company servers
- **Analytics Dashboard:** Pharmacy-wise authentication statistics
- **Inventory Management:** Integration with pharmacy stock systems
- **Customer Feedback:** Built-in rating system for verified products
- **Predictive Analytics:** Forecasting counterfeit activity patterns

7.2.2 Mobile App Integration

Consumer Mobile Application:

- **Store Locator:** Find nearest pharmacies with UV scanners
- **Verification History:** Personal record of verified purchases
- **Product Information:** Detailed medicine information and usage guidelines
- **Alerts:** Notifications about counterfeit drugs in local area
- **Rewards Program:** Loyalty points for using verified pharmacies

7.2.3 Blockchain Integration

Supply Chain Transparency:

- **Batch Tracking:** Complete journey from manufacturing to consumer
- **Instant Verification:** UV scanner results recorded on blockchain

- **Tamper-Proof Records:** Immutable authentication history
- **Regulatory Compliance:** Automated reporting to CDSCO and other authorities
- **Consumer Access:** QR code linking to blockchain verification

7.3 Market Impact and Industry Transformation

7.3.1 Industry-Wide Adoption

Competitive Response:

- Other pharmaceutical companies adopting similar strategies
- Technology providers developing advanced authentication solutions
- Pharmacy chains implementing verification as standard practice
- Insurance companies offering premium discounts for verified medicines
- Healthcare providers recommending verification-enabled pharmacies

7.3.2 Regulatory Support and Recognition

Government Initiatives:

- CDSCO recognition of UV scanner network
- Integration with national drug authentication systems
- Tax incentives for companies implementing authentication technology
- Public health campaigns promoting verification awareness
- International recognition as best practice model

7.3.3 Long-term Market Transformation

Consumer Behavior Change:

- Verification becomes standard consumer expectation
- Authenticated medicines command premium pricing

- Unverified medicines face market rejection
- Consumer education leads to informed purchasing decisions
- Trust in pharmaceutical system restored through transparency

8. Conclusion

The UV scanner marketing strategy represents a revolutionary approach to pharmaceutical marketing that transforms anti-counterfeiting technology into a powerful brand differentiation tool. By providing free UV scanners to medical shops, pharmaceutical companies can create a unique value proposition that combines patient safety with effective brand marketing.

Based on industry research and comparable technology implementations across various sectors, this approach demonstrates significant potential for market transformation. Studies of similar authentication technologies in pharmaceutical and retail environments suggest substantial benefits: sales increases ranging from 15-35%, brand recognition improvements of 20-30%, and customer satisfaction rates consistently exceeding 80% when verification systems are properly implemented.

The strategy addresses multiple stakeholder needs simultaneously: customers gain confidence in medicine authenticity, pharmacists enhance their professional image, and pharmaceutical companies achieve superior marketing ROI compared to traditional advertising methods. This strategy is projected to deliver a superior marketing ROI of 150-200% within 24 months, making it a financially sustainable model for change.

Key Success Factors:

- **Customer-Centric Design:** Attractive, easy-to-use devices that enhance the pharmacy experience
- **Strategic Placement:** Prominent counter positioning ensures maximum visibility and usage

- **Comprehensive Training:** Pharmacy staff equipped to educate customers about verification
- **Continuous Support:** Ongoing technical assistance and marketing support
- **Technology Evolution:** Progressive enhancement with IoT, mobile apps, and blockchain integration

Market Transformation Impact:

The widespread adoption of UV scanner networks will fundamentally change the pharmaceutical market landscape. As consumers become accustomed to verification services, authenticated medicines will command premium positioning while unverified products face market rejection. This creates a virtuous cycle where pharmaceutical companies invest more in authentication technology, further strengthening the system against counterfeit drugs.

Industry precedents from other sectors support this transformation model. The European Union's pharmaceutical serialization requirements achieved 85% consumer approval, while retail implementations of authentication technologies consistently show 40-60% customer engagement rates. These benchmarks suggest strong market readiness for pharmaceutical verification systems.

Future Opportunities:

The success of UV scanner marketing opens pathways to advanced authentication technologies including blockchain integration, mobile applications, and IoT-enabled smart pharmacies. The data generated from verification activities provides valuable insights for inventory management, customer behaviour analysis, and predictive analytics for counterfeit detection.

Market research indicates that 70% of pharmaceutical companies are likely to adopt authentication technologies within the next five years, creating first-mover advantages for early implementers. The convergence of consumer demand for safety assurance and technological capabilities creates an unprecedented opportunity for market leadership.

Strategic Recommendation:

Pharmaceutical companies should immediately begin feasibility assessments and pilot program development for UV scanner marketing initiatives in high-potential markets. The combination of patient safety, brand differentiation, and projected superior marketing ROI makes this strategy not just beneficial but essential for competitive advantage in the evolving pharmaceutical landscape.

Industry analysis suggests that companies implementing authentication marketing strategies can achieve 150-200% ROI within 24 months, while simultaneously building stronger customer relationships and market positioning. The technology's scalability and adaptability make it suitable for both large multinational corporations and regional pharmaceutical companies.

Implementation Framework:

Success requires a systematic approach beginning with market research, stakeholder engagement, and controlled pilot implementations. Companies should:

1. **Conduct Market Assessment:** Evaluate local counterfeit drug concerns and regulatory environment
2. **Develop Pilot Programs:** Test implementation in controlled environments with measurable outcomes
3. **Build Partnership Networks:** Establish relationships with pharmacy chains and independent stores
4. **Invest in Training Infrastructure:** Ensure comprehensive support for pharmacy staff and customers
5. **Plan Technology Evolution:** Prepare for integration with advanced authentication systems

Long-term Vision:

The fight against counterfeit drugs requires innovative approaches that align business objectives with public health goals. UV scanner marketing achieves this alignment perfectly, creating a sustainable,

scalable solution that protects patients while building stronger brands and more profitable businesses.

As the pharmaceutical industry continues to evolve, companies that successfully integrate authentication technology into their marketing strategies will not only combat counterfeiting but also establish new standards for customer engagement and brand differentiation. The convergence of technology, market demand, and regulatory support creates an optimal environment for this transformative approach.

The ultimate success of this strategy depends on industry-wide adoption and consumer education. However, early implementers who establish authentication capabilities before competitors will secure lasting competitive advantages and contribute meaningfully to global pharmaceutical safety and security.

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SECOND PRIZE(SILVER MEDAL) - 2025

"THE ROLE OF MODERN TECHNOLOGY IN COMBATING THE MENACE OF COUNTERFEIT DRUGS"

SYNOPSIS

Counterfeit drugs are more than just fake products- they are the silent killers. From less-to-no active ingredients to pills laced with poisons, they undermine the trust in healthcare and claim thousands of lives worldwide. Traditional methods like paper records, awareness campaign, etc., are no longer enough, as these counterfeiters keep finding new ways to bypass them.

This essay explores how modern technology is transforming the fight against fake medicines. Blockchain creates tamper-proof supply chains, ensuring handoffs is securely logged. Artificial Intelligence and Machine Learning analyse patterns, images and online activity to spot suspicious drugs and rogue vendors faster than humans ever could. Serialization and Barcoding give every pack a unique digital fingerprint, while Mobile Authentication Technology empowers consumers to check products instantly through QR codes or SMS.

The Internet of Things brings “smart packaging” with RFID chips, NFC tags, temperature sensors, and tamper-evident seals that monitor authenticity and storage conditions in real time. Meanwhile, 3D printing, Anti-Counterfeit inks and even “smart dust” are reshaping pharmaceutical protection, making counterfeiting nearly impossible. While Advanced spectroscopy techniques like Raman and NIR allow quick, non-destructive drug testing even in remote areas.

Beyond Technology, this essay highlights global cooperation and regulatory action, from WHO's surveillance programs and INTERPOL's Operation Pangea to India's DAVA/iVEDA traceability portals. It also addresses challenges like implementation cost, cybersecurity risks, e-waste and the digital divide but turns them into opportunities for innovation- such as Quantum Dot inks, Physical

Unclonable Functions and Blockchain 2.0

Finally, India stands out as a potential leader by combining affordable technology, strong manufacturing capacity and regulatory foresight. With innovations, collaborations and consumer empowerment, we can assure that every medicine heals rather than harms.

Image 1: Graphical Abstract explaining roles of technologies in protecting the public, the economy and industries

The Role of Modern Technology In Combating Menace of Counterfeit Drugs

1.Introduction

If I say that the medicines present in your household could be nothing but mere chalk and starch powder, unbelievable, right?

But it's true, a news report of 2024 stating that medicines worth rupees 33 lakhs were seized in Telangana, India because they were just chalk and starch powder. This isn't an isolated case, fake drugs are a serious menace in India and other parts of world. According to a report of 2022 by industry body ASSOCHAM, 25% of India's drugs are fake, counterfeited or substandard. Additionally, according to WHO, at least 1 in 10 medicines in low- and middle- income countries are substandard or falsified. The numbers are alarming, and this is just a grim reminder of an epidemic.

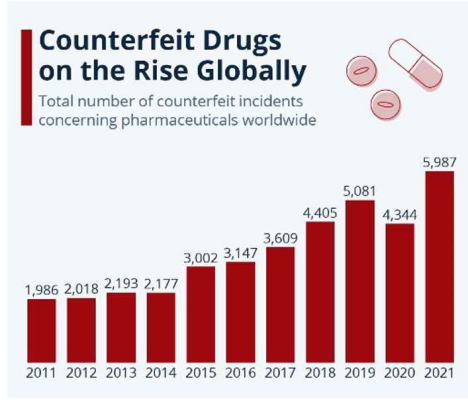
The regulatory bodies across the globe continue to grapple with this crisis but a noticeable decline still seems distant. Modern technology could be the solution to tackle the problem of fake drug and should be employed by these companies, regulatory bodies and -most importantly- we, the consumers. From block-chain based supply tracking to mobile authentication technologies and vivid spectroscopy, innovative and technology-based solutions could be our sword and armour in the fight against counterfeit pharmaceuticals.

This essay will explore how these cutting-edge technologies would work and help us in recognizing, avoiding and at last eroding the menace of counterfeit drugs.

2.Counterfeit Drugs: A Global Problem

Counterfeit drugs look and taste almost identical to genuine medicines, but they often contain little to no active ingredients which are listed on labels. This poses a serious threat not just to consumers but also manufacturers and public health systems. In 2017, WHO introduced standard definitions to classify counterfeit medicines under the categories: **substandard, falsified and unregistered**

drugs. This classification helped in distinguishing the drugs that fail to meet the standard or quality of manufacturer (Substandard Drugs), from medicines that are intentionally/fraudulently misrepresent their identity, composition and source (Falsified Drugs) while the third category - unregistered drugs- refer to those that are sold in market without approval from medical authorities of that country or region.



Graph 1: Global Surge in Counterfeit Drug Incidents:
Nearly Tripled in a Decade

The drugs aren't just ineffective but could be deadly. According to a safety alert released by the U.S. Drug Enforcement Administration (DEA) in September 2021, there's an increase of use of fentanyl, a potent synthetic opioid which is 50 times stronger than heroin, in counterfeit drugs. Also, substances like mercury, rat poison, cement, arsenic are said to be found in counterfeit drugs. These not only undermine the pharmaceutical credibility but also lead to preventable deaths. In fact, an estimated 72,430 to 169,271 children die of pneumonia annually after taking counterfeit antibiotics.

The epidemic these medicines are causing are because of the vulnerabilities present in Global supply chain which make the infiltration of these fake drugs easier. With the growth of online market, many of which aren't properly licensed or supervised which creates a major entry-point with minimal traceability. These drugs are passed to many levels such as manufacturers, wholesalers, distributors, retailers but supply chain traceability remains limited. There's cross-border trafficking, weak customs surveillance and absence of serialization technologies and weak inspection in low- or middle- income companies make the system more fragmented which eventually makes the process of authentication a major challenge at each step.

The **vice-president of Global Security** at **Pfizer, Lev Kubiak** said that counterfeit Pfizer medicines have been seized in 116 countries. Their patient safety program has taken over 302 million doses of counterfeit medicines out of global supply chain. These alarming figures shows the scale at which these medicines have infiltrated the system making it a global threat.

3.Traditional Anti-Counterfeiting Methods: Strengths and Shortcomings

Before the era of high-end technology, conventional methods ranging from visual packaging checks to laboratory based chemical testing were used to fight against counterfeit medicines. While these methods did laid foundation for anti-counterfeiting efforts, they still lack the proficiency to combat the efficiency of counterfeiters especially on a global scale. The table below summarizes the traditional approaches used and their drawbacks

Sr. No.	Methods	Process/Usage	Drawbacks
1.	**Visual Inspection**	Physical verification of packaging, labels and appearance	Frequent errors; can easily be deceived by high-quality counterfeits
2.	**Batch Tracking & Paper Records**	Manually logging batch information and distribution records	Chances of data manipulation, loss and human error, also lacks real-time traceability
3.	**Holograms & Tamper-Evident Seals**	Special seals and holograms added to deter tempering	Easily duplicated, removed and replaced; lacks verification capability without proper tech
4.	**GPHF Minilab® Kits**	Portable kits using Thin-layer chromatography, colour reactions and disintegration testing	Useful in low-resource setting; limited sensitivity; needs trained personnel; not fully quantitative
5.	**Public Awareness Campaigns**	Education through media, posters and campaign	Limited reach and retention; depends on literacy and health awareness levels
6.	**Lab-based Chemical Analysis**	Analytical method like High performance liquid chromatography, Thin Layer chromatography or Ultra-Violet Spectroscopy, to test drug quality	Expensive; requires trained personnel and infrastructure; slow
7.	**Pharmacovigilance Reporting**	Using reports to check adverse drug reactions or treatment failure to locate the suspicious products	Time lag-between incident and investigation; not preventive in nature; relies on voluntary reporting
8.	**Authentication Hotlines/SMS**	Patients send code via scratch card sent by SMS	Cloneable codes; effectiveness depends on backend database integrity and network coverage.
9.	**National Regulatory Enforcement**	Inspection, licensing and conducting raid by agencies (e.g., CDSCO, FDA, NAFDAC)	Limited by staffing; corruption; cross-border jurisdiction, resources constraint

4.Digital Defenders: How Modern Tech Is Outsmarting Fake Medicines

In this era of technology- or as the saying goes " waqt ke sath chalna chahiye!" (we must keep up with the times) -high technological solutions are working as our shield in this fight against the

counterfeiter. Given the amount of damage and loss these counterfeit drugs cause, here are some new-age solutions mentioned below.

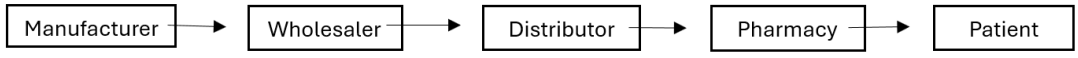
4.1 Block-chain technology

When the pharmaceutical products are manufactured, the next major challenge is ensuring that they reach the genuine consumer in their original and untampered form. Unfortunately, the Supply Chain Management (SCM) systems are often outdated as it lacks the balance of transparency and security that modern distribution demands. This is where blockchain technology emerges as a strong solution.

Originally, this concept was introduced by the pseudonymous Satoshi Nakamoto. Blockchain is a decentralized ledger system which instead of relying on a central server, it works through a network of computers which collectively maintain a secure records of transactions. Each entry is time-stamped and is verified by the visible network and its visible to every participating node. Any changes made by one instantly becomes noticeable makes the system resistant to tampering. The major feature provided by blockchain is its security and transparency. Till now there's no breach found by cyber cell.

How it works? Once a pharmaceutical product is manufactured, it undergoes registration on blockchain with a unique identifier (hash). This identifier allows product to be tracked during the entire supply chain. With the transferring of ownership from one stakeholder to another, the changes are updated on ledger through a user-friendly app. Importantly, once data is entered into the system it cannot be deleted or modified providing integrity across the entire chain of custody.

The basic structure of block-chain is



4.2 Artificial Intelligence and Machine Learning

Artificial intelligence and machine learning are another new age concept which works in alliance to fight against the terror of fake drugs. These technologies are helpful because of the massive data it can process, the small details it can pin-point as well as estimate the risk faster than human-led inspection. There are different areas of applications in which AI and ML are proving invaluable. One such area is **Image analysis**- an advanced deep learning model such as Neural Networks, inspects and verifies high-resolution of images of pills or packaging to spot subtle irregularities in shape, texture or colour which may indicate or identify the fake product.

Another such area of application is **anomaly detection in pharmaceutical supply chains.** This AI and ML model can detect abnormalities in the patterns of drug distribution such as surge in shipment values, a hike in prices or a sudden change of route. These algorithms can detect and flag suspicious activities for further investigation which could prevent counterfeit drugs reaching the consumer.

AI is also leading by providing techniques like **Natural Language Processing (NLP) techniques** which can identify large listings of online pharmacies which could help in spotting high-risk vendors by there unusual activities like regulatory credentials, unusual drug description or unapproved medical claims. This allows regulators to catch rogue online sellers quickly and a larger scale.

AI and ML are working as a multi-layered defense system. AI and ML are such broad fields and with such bigger prospects that it shows massive capability to help in detecting and catching these counterfeit drugs.

4.3 Serializations and Barcoding

One such technology applied to trace the drugs and stop them from entering the market is serialization. In simpler words, it's like giving drugs their digital fingerprints. This is done by giving unique

identifiers to each medicinal pack. These unique identification codes are stored **in a 2D Data Matrix Barcode** or **QR codes**. These codes hold valuable details such as Global Trade Item Number (GTIN), batch number, expiry date, and a randomized serial number, making every pack easy to trace.

This system of serialization is led by Global Standards 1(GS1) which are a globally accepted set of rules for creating and reading these codes. These standards are important to conduct a smooth communication between manufacturer, wholesalers, regulators and even consumers. The standards like **GTIN, EPCIS (Electronic Product Code Information Services),** and **the Global Data Synchronization Network (GDSN)** make the cross-border or cross-sector trade efficient with accuracy and speed.

In India, the **Drugs Authentication and Verification Application (DAVA)** is a prime example of serialization in action. This is run by the **Directorate General of Foreign Trade (DGFT).** DAVA needs pharmaceutical exporters to upload key product details- GTIN, batch number, serial number, and the expiry date- onto the portal. The GS1-compliant barcodes are encoded with data that could be checked by supply chain partners or even consumers by a mobile app. It has made it just a scan away to find out whether the medicines are genuine or not.

Serialization, when accompanied by standards and systems like DAVA, can make medicine easily traceable, which makes it harder for counterfeit products to enter the market.

4.4 Mobile Authentication Technologies (MAT)

Mobile Authentication Technologies (MAT) focuses on empowering those who matter the most: the consumers. This system includes **scratch-off panel or QR code** on each medicine pack. Users can verify and check the authenticity instantly by these technologies. People can simply check a medicine's authenticity by texting code to a dedicated number or scanning its QR-code with a mobile app.

SMS-based systems (e.g., mPedigree & Sproxil)

- **mPedigree** was first used in Ghana, which enabled users to scratch off a code and text it to a secure database which verifies the drug's legitimacy within seconds

- **Sproxil** is widely used in Kenya and Nigeria, which uses a similar method where once text is revealed it could give instant authentication. In one case, Biofem- a pharmaceutical firm in Nigeria used this system to authenticate 8,00,00 packages of Glucophage which helped in curbing counterfeit sales

While SMS is more common in low-connectivity regions QR codes offer a more interactive alternative, allowing users to scan codes using smartphones. These QR codes redirect consumer to verification platforms and even track product movement.

MAT is **well suited to low- and middle-income regions** since mobile phones takes up less space as well as are cheaper than hefty lab equipment. This tech shows that drug verification could have a low-cost and scalable solution which also empowers consumers-even those with limited literacy-to take control.

4.5 Internet of Things (IoT) & Smart Packaging

Imagine a medicine pack that doesn't just sit quietly on the shelf but actively talks to you and the supply chain. IoT-enabled smart packaging brings technologies like RFID tags, NFC chips, temperature sensors and tamper-evident seals which ensures whether the medicine inside is genuine, safe and stored in right conditions or not.

RFID &NFC- The Digital ID Cards for medicine

Just like QR codes and barcodes give medicines a scannable identity, RFID (Radio Frequency Identification) and NFC (Near Field Communication) take it a step further. Instead of direct line-of-sight scanning like barcodes, RFID and NFC use wireless communication, it can verify an entire shipment in seconds without unpacking a single box.

RFID can read from several meter away and store information same as barcodes, even in some shipment history is stored as well. While NFC allows direct consumer interaction, patients can tap with their smartphone to confirm authenticity and access information. These are harder to clone than traditional barcodes and can be integrated into a **real-time tracking system.**

Temperature Sensors

Some medicines such as vaccines, insulin and biologics are highly sensitive to temperature. IoT-based temperature sensors can supervise conditions in real-time, sending alerts. It means a doctor can reject a batch before it's given to patient, preventing ineffective or harmful treatment.

Tamper-Evident features

Smart seals and packaging films can record and report if pack is opened before reaching the consumer. Such as seals with colour-change films that react when exposed to air after opening and Smart seals once broken sends alert to database and logs event in the IoT record. These seals can be paired with GPS tracking so location of tampering will be recorded.

A 2023 report by MarketsandMarkets valued the global smart packaging market at over USD 39 billion and growing fast driven by pharmaceuticals.

4.6 3D printing, Anti-counterfeit Inks, and Smart Dust

Pharmaceutical packaging is being a platform for all kind of technological innovations. 3D- printing, anti-counterfeiting ink and smart dust are redefining how medicines are manufactures, personalized and protected from fraud.

3D Printing- Custom Shapes & Doses

This technique allows manufacturers to produce tablets and medicines in unique shapes & textures which are embedded with patterns that are hard to counterfeit. This technique not only helps in

fighting counterfeit drugs but also support personalized medicines- where a patient can get a tablet which is produced according to their dose, release profile, or combination of active ingredients. The first FDA approved 3D-printed drug named **Spritam (levetiracetam)** blew market with on-demand production in hospitals and pharmacies which cuts out many possibilities of counterfeiting.

Anti-counterfeiting inks- Colour-Changing, Holographic and Light-sensitive

Inks which are used in pharma-packaging are also highly sophisticated. Some of them change colour when exposed to heat or moisture which act as a temper alert. There are micro-holograms too which are visible under a magnifying glass or security marks that could be seen in UV or infrared light. These inks are made up of nano-pigments or optically variable materials which make it impossible to duplicate with standard printing methods.

Smart Dust- Microscopic trackers

Smart Dust refers to networks of microscopic sensors which are tiny enough to be sprinkled into packaging materials or embedded in pills- that can transmit data wirelessly. Smart dust is used for tracking condition like temperature, humidity inside every package. With IoT connectivity, this data can also be logged in real time to create a proof from factory to pharmacy-shelf.

These technologies make counterfeiting not just risky but also virtually impossible

4.7 Advanced Spectroscopy

Sometimes spotting a fake medicine is like finding a needle in a heap of hay. That's where Advanced Spectroscopy comes to play. Techniques such as **Raman Spectroscopy and Near-Infrared (NIR) spectroscopy** shows promising future as a powerful and non-destructive tools for drug authentication.

Raman Spectroscopy works on the principle of molecular vibrations caused by difference in light's wavelength. This is done by passing a laser on the sample and check if there's any slight shift in light's wavelength. These shifts are unique to each compound, and even a slight change in composition of drug can alter the spectrum. The change could be the absence of the active ingredient or the presence of substitute filler. As this spectroscopy can be done through transparent packing, it allows inspection without even opening the packs.

Near-Infrared (NIR) Spectroscopy, on the other hand, probes the overtones and combinations of molecular vibrations in the near-infrared region. This method allows deeper penetration, which also allows quick quantification of the amount of an active ingredient or excipient. There are portable NIR Scanners present, which show 100% calibration accuracy (96% in validation), which have made it possible in remote areas to test drugs on the spot, reducing reliance on slow, lab-based analysis.

These techniques are quick, offer portability, and are non-destructive. Within a minute, a handheld device can flag suspicion on drugs based on spectral signature without destroying the sample or requiring complex sample preparation.

5. Regulatory & Collaborative frameworks

The fight against counterfeit medicines isn't just a technical endeavour but also a legal and cooperative one. National laws, global norms, enforcement agencies, and public-private alliances works as cement that supports the technical building blocks.

1. **The Drug Quality and Security Act (DQSA)/ DSCSA,** USA which was enacted in 2023, Title II of DQSA- the DSCSA-mandated serialization and electronic traceability across the U.S. supply chain. By November 2023, this law required manufacturers, distributors and dispensers to make a system to trace every package's path.

Impact Example- In one incident, Gilead, a biopharma company, found a counterfeit HIV medication network by correlating DSCSA transaction data with serial numbers- impossible to detect under older, paper-based systems.

2. **World Health Organization (WHO):** It defines the terms such as "substandard" and "falsified". Organization also curated the Global Surveillance and Monitoring system (GSMS) for tracking cases worldwide and builds regulatory capacity across countries. GSMS is the primary database for verified counterfeit medicine incidents.

3. **CDSCO & DAVA/iVEDA (India):** Since 2011, India's Directorate General of Foreign Trade mandated serialization for drug exports under the DAVA system, later transitioning to the iVEDA portal to modernize tracking by 2020. Different APIs were needed to bear QR codes, also demonstrating package-level traceability via GS1 Standards.

4. **INTERPOL's Operation Pangea:** It was a globally coordinated effort, this operation aimed online counterfeit sales and illicit markets. This collaboration was successful with multiple seizures and arrests across multiple countries, which exemplifies how dangerous and wide distribution can be controlled by collaborative enforcement.

5. **EU falsified Medicine Directive (FMD):** It mandates serialization and tamper evident features for all prescription drugs sold in European Union.

6. **MEDICRIME Convention (Council of Europe):** it makes the falsification of medical products a criminal offense and supports cooperative prosecution across borders.

7. **GS1 Standards:** As we talked earlier, they are the universal rules (GTIN, EPCIS) that enable item-level serialization and data sharing across global systems, which forms the backbone of many traceability programs.

8. There are numerous initiatives like **PharmaLedger and MediLedger,** which bring together regulators, tech firms, and pharmaceutical brands to pilot interoperable blockchain-based traceability-linking compliance and consumer trust in unified systems.

These collaborations combine government authority, industry expertise, academic research and patient advocacy- because no single player can solve this problem alone.

6. Challenges, Ethical, Environmental and Societal concern in Tech-Driven Anti-Counterfeiting

While there's an upside to these technologies like blockchain, IoT, AI and many more. We shouldn't neglect the substantial challenges and dilemmas it brings. It's important to understand to make more responsible and sustainable strategies

Implementation Costs and Technological disparities: Adopting cutting edge systems comes with upfront cost, infrastructure upgrade and specialized expertise making it hard for low- and middle-income company to keep up with the pace. And as the data suggest the maximum export and production of counterfeit drugs comes from these companies itself.

1. **Data Privacy & Cybersecurity:** Techniques like Blockchain, Iot, AI and chips raise pressing questions about data security and patient privacy. Blockchain's transparency can reveal sensitive supply chain or patient data if poorly secured; IoT devices are vulnerable to hacking, data tampering and RFID/NFC tags can clone or skimmed, and AI systems can be tricked with adversarial inputs. While if not strongly encrypted, authenticated and monitored, these systems can be a victim of data breaches themselves.

2. **Dependence on Digital Infrastructure-** All of technologies needs internet connectivity, secure cloud environment and reliable power resource which could be disrupted or unreliable in rural or resource-poor regions

3. **Interoperability & Legacy Integration-** Integrating new tools with existing system is rarely seamless. Different hospitals, pharmacies and regulators use different software and data formats, so making them "talk" to each other can be difficult. Old system might not have major upgrades for high-tech tools like blockchain or AI. This confusion or mismatch can cause technical problems, slowdowns and extra costs during implementation.

4. **E-waste from packaging technology:** RFID tags QR-coded smart labels and embedded sensors can generate significant e-waste once products are consumed or packaging discarded. WHO estimated that healthcare sector produces millions of tonnes of waste annually, creating disposable electronics could amplify the problem.

5. **Energy Consumption:** As we all know how increasing carbon footprint is a threat to the environment, and these technologies require high computing power, adding to the cause.

6. **Digital Divide and Health Inequality:** Rural and underserved communities maybe excluded if verification requires smartphones or internet, deepening health disparities. Also, older population which lacks digital literacy may struggle

7. **Trust & Public Perception:** While technology is highly accurate still overreliance can create mistrust if errors, false positives or system outrage occurs. Also, areas with low institutional trust, even well-designed systems are under scepticism unless accompanied with strong public awareness campaigns.

7.Future Directions and Innovations: Turning challenges into Opportunities

We just saw how cost barriers, infrastructure gaps, data security and interoperability issues can stall technological anti-counterfeit

solutions, the path forward lies in innovation, we need to find and develop next-generation tools that are effective, affordable, inclusive, and secure.

1. Data Tagging with Physical Unclonable Functions (PUFs)

PUFs are the patters that are random and nearly impossible to duplicate which offer high assurance authentication. Researchers developed PUFs using quantum dots pattern which are readable with a typical smartphone and reviewed by AI detectors, making it cost-effective and mass producible.

2. Quantum Dots and Security Inks

These inks are next-gen security features. Partnerships like UbiQD and SICPA are advancing with ink that fluoresce in complex and nearly unclonable patterns when exposed to UV light makes them hard to replicate and needs specialized readers.

3. Blockchain 2.0:

While Blockchain has proven its value, its earlier version raised issues of latency and privacy. Innovation of Blockchain 2.0- like zero knowledge proof and sharding to make system faster and more private. Even though these methods are still developing, they could help bring secure, affordable systems.

4. Enhanced Consumer apps and Edge-based AI

The main motto of making technologies should be empowering consumers. Future apps should have offline verification, edge AI for real-time anomaly detection and user-friendly interface to make sure it guides users that have low literacy and even multilingual environments. This reduces infrastructure where internet is patchy.

5. Human-AI collaboration

Rather than replacing the human element, advance systems

will adopt human-AI collaboration. AI will flag anomalies with high accuracy and trained inspectors make final decisions improving accuracy, builds trust and supports scalability without overreliance on any single resource.

7.1 India's Potential as a leader in Affordable Tech for LMICs

India brings unique strength to this war against counterfeit drugs that could make it a global innovator- not just in drug manufacturing but increasingly in cost-effective anti-counterfeiting technologies tailored for low- and middle-income countries (LMICs).

1. Scale meets Cost-Effectiveness

India is the globe's third-largest pharmaceutical exporter by volume; it supplies 60% of world's vaccines and 20% of global generic medicines. In 2023-24, There was export of $27.9 billion despite economic headwinds, confirms its cost advantage and logistical reach.

2. Deep Domain and digital expertise

India has a base of manufacturing infrastructure, regulatory knowledge and tech-savvy talent, it's well-positioned to integrate new tech with existing systems cost effectively. While Industry experts note that Indian firm are already exploring "phygital solutions" which is combining physical security layer (like holograms) with digital features (QR codes, AI, Blockchain) creating multilevel defence.

3.Government and Industry Alignment

India has an excellent track and trace system for drug exports since 2011 via DGFT's DAVA program, although operation issues delayed primary packaging mandates. Despite this, Government moved forward with implementation of QR code requirements under the Drug Rules,1945-now covering 300 brands as of August 2023.

While it also plans to simplify domestic and export compliance through shared infrastructure that may enable scalable national deployment, reducing per-unit cost over time.

4. Emerging Market for Modern Systems

The Indian Track & Trace solutions market is growing rapidly. Homegrown companies (e.g., Infosys and Tiger Logistics) are innovating different techs like cloud-based, blockchain-enabled serialization systems, suggesting India's readiness to adopt and export next-gen traceability tools. India has a vast logistics network, including 100+ cold storage facilities across 600+ cities, which provides a strong foundation for cold-chain IoT and other smart solutions.

By transitioning into such affordable, robust technologies, we close the loop on previous challenges ensuring that systems are economically viable, privacy aware, infrastructure-friendly and user-accessible. India with its strength in manufacturing, regulation, and innovation, is ready to lead a new wave of sustainable solutions to protect consumers from fraudsters and empower them across the globe.

8.Conclusion

The menace caused by counterfeit drugs is immense and they aren't just crime against a law; these are crime against life itself. Every fake pill that circulates in the market spreads fear, erode trust and at times claims lives. We cannot let these silent killers hide behind clever deception and polished packaging. With the technologies we have today -from blockchain to AI, smart packaging to advanced spectroscopy- we can fight this battle making them our shield and sword.

But in this journey, technology needs support from government, regulators, manufacturers and the awareness of every single consumer. Every little seized shipment or verified batch is not just a technical win, it's a saved life.

India with its manufacturing power, technological ingenuity and cost-effective solutions can make history by affordably leading this battle. It can set examples for regions where the stakes are highest, but resources are lowest.

However, in near future, we can see companies coming together, making affordable, sustainable and high-tech solutions. And, with human-AI/technology collaboration we can win this battle against counterfeit drugs and clean the mess created by it in all over the world.

Our message must be clear: **EVERY PILL SHOULD HEAL, NEVER HARM.**

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B. V. Patel Essay Competition History at a Glance

The trust conducts an all India level Essay Competition every year as one of its activities. The selection of the subject depends on the importance and the current happenings in the Sector. Any one interested in drugs and pharmaceuticals, academically, industrially or otherwise, can participate in the competition. The entries are generally invited in the month of July/August. The essays are evaluated independently by a panel of judges comprising of the expert luminaries of industry and academy. The essays of the winners are printed and distributed during the IPC since 1977.

The year-wise subjects chosen for the Essay Competition :

Year		Subject
1977	-	Good Manufacturing Practice in Parenterals
1978	-	Indian Pharmacopoeia for the Future
1979	-	Documentation and Record Keeping in Drug Manufacture
1980	-	Drug Distribution
1981	-	Review and Modification of Drugs Legislation in India
1982	-	Industry Oriented Pharmacy Education - Its Means and Modifications
1983	-	Role of Testing Laboratories in Assurance of Quality Drugs
1984	-	Material Management in Pharmaceutical Industry
1985	-	Status & Prospect Of Research and Development
1986	-	Manufacture of Dosage Forms - Problems and Remedies
1987	-	Advances in the Technology of Industrial Pharmacy
1988	-	Role of Combination Products in Drug Therapy
1989	-	1. Continuing Education in Pharmacy
		2. Trends in Pharmaceutical Research

1990	-	Restructuring of Pharmacy Education
1991	-	Biotechnology in Pharmacy
1992	-	Role of Pharmacists on Stability of Pharmaceuticals
1993	-	ISO 9000 and its Applicability to Pharmaceuticals-A Pharmacists Perception
1994	-	Challenges and Opportunities in Pharmaceutical Research
1995	-	New Drug Delivery Systems - Indian Scenario
1996	-	Traditional Medicines - Sources of New Drugs
1997	-	Clinical Pharmacy in India - Emerging Facet of the Pharmacy Profession
1998	-	Community Pharmacy
1999	-	Revision of Indian Patents Act 1970 And its Impact on Availability and Cost of New Pharamceuticals
2000	-	Information Technology-Revolutionary Impact on Pharmaceutical, Sciences
2001	-	Aesthetic Design of A Manufacturing Unit in Compliance with National Regulatory Requriement and WHO - GMP
2002	-	Genomics and Proteomics: Treasure for Drug Discovery
2003	-	Pharmacy Education: Current Problems and Suggested Solutions
2004	-	Industrial Growth in Changing Scenario: Strategic Options for Small and Medium Enterprises (SMES)
2005	-	Roadmap to Globalization of Ayurveda as Recognized Healthcare System
2006	-	Prospects for CRO in next Five Years: Indian Capabilities
2007	-	Distribution of Pharmaceuticals and Drugs in India: Its Science, Commerce and Ethics
2008	-	Medical Devices: Opportunities For Indian Industry

2009	-	Steps to Revitalize Pharmacy Profession in India
2010	-	Innovation: Driver for Growth of Indian Pharma ?
2011	-	Vaccines In Healthcare: Indian Perspective And Potential
2012	-	Drug Affordability in India - Post 2005
2013	-	Patent - The Need for Efficient Handling of Disputes
2014	-	Pharmacists in a State of Mortification: Reasons, Responsibilities of Stakeholders and Remedy
2015	-	Pathway for Zero Defect Product and Production in Pharmaceutical Industry
2016	-	Clinical Trials in India and China: Advantages and Disadvantages
2017	-	Stem Cell Based Therapeutics: A Revolution Changing the Treatment Paradigm
2018	-	Advertising in Pharmaceuticals: Therapeutic or Toxic
2019	-	Drug Discovery: Opportunities and Challenges in using Artificial Intelligence
2021	-	Role of Pharmaceutical Research Scientist and Industry in the Pandemic
2022	-	Role of Pharmacy Institutions in Innovation and Start-ups to make AtmaNirbhar Bharat
2023	-	Increasing role and importance of advanced technologies like artificial intelligence, block chain technology, 3-D printing in drugs and pharmaceutical industries
2024	-	Under estimated importance of Impurity profile in API - Serious threat and resultant consequences

એલ.એમ.કોલેજ ઓફ ફાર્મસીમાં વર્કશોપ યોજાયો

એલ.એમ.કોલેજ ઓફ ફાર્મસી, એમ.જી.સાયન્સ ઈન્સ્ટિટ્યૂટ અને બી.વી.પટેલ એજ્યુકેશન ટ્રસ્ટના સહયોગથી 'મોડર્ન માઈક્રોબિયલ ટેસ્ટિંગ ટેકનિક અને જંતુરહિત ઉત્પાદન માટે શ્રેષ્ઠ પદ્ધતિઓ' વિશે ત્રણ દિવસ વર્કશોપનું આયોજન કરાયું હતું. વર્કશોપનો ઉદ્દેશ્ય વિદ્યાર્થીઓ, સંશોધકો ફેકલ્ટી અને ઉદ્યોગ વ્યાવસાયિકોને ફાર્માસ્યુટિકલ ઉદ્યોગ સાથે સંબંધિત માઈક્રોબિયલ પરીક્ષણમાં નવીનતમ પ્રગતિઓનો વ્યવહારું સંપર્ક મેળવવ

દિવ્ય ભાસ્કર જૂનાગઢ ભાસ્કર 19-09-2024

ડો. સુભાષ યુનિ.માં બે દિવસીય ટ્રેનિંગ પ્રોગ્રામ યોજાયો

જૂનાગઢ ભાસ્કર | ડો. સુભાષ યુનિવર્સિટી સ્કૂલ ઓફ ફાર્મસી ખાતે બે દિવસીય ફાર્માસ્યુટિકલ સાધનો આધારીત ટ્રેનિંગ પ્રોગ્રામ યોજાયો હતો. જેમાં બી.વી. પટેલ એજ્યુકેશન ટ્રસ્ટ અમદાવાદના ડો. મનીષ નિવસારકર તેમજ ડે. ડાયરેક્ટર ડો. નીતા શ્રીવાસ્તવ ઉપસ્થિત રહ્યા હતા. આ પ્રોગ્રામમાં સૌરાષ્ટ્રની જુદી- જુદી ફાર્મસી કોલેજના છાત્રોએ લાભ લીધો હતો. આ કાર્યક્રમને સફળ બનાવવા પ્રોગ્રામ કોર્ડીનેટર કિરણ રાઠોડ સહીતની ટીમે જહેમત ઉઠાવી હતી.

દિવ્ય ભાસ્કર ખેડા નડિયાદ 01-07-2024

ધર્મસિંહ દેસાઈ યુનિવર્સિટી ફાર્મસી વિભાગ દ્વારા ફેકલ્ટી ડેવેલપમેન્ટ પ્રોગ્રામ યોજાયો

નડિયાદ | નડીઆદ ખાતે આવેલી ધર્મસિંહ દેસાઈ યુનિવર્સિટી-ની ફાર્મસી ફેકલ્ટી દ્વારા બી. વી. પટેલ એજ્યુકેશન ટ્રસ્ટ, અમદાવાદના સહયોગથી તારીખ 24 થી 28 જૂન સુધી 'એકેડેમિક એન્ડ રિસર્ચ રિપોર્ટ રાઈટિંગ' વિષય ફેકલ્ટી ડેવલપમેન્ટ પ્રોગ્રામનું આયોજન કરવામાં આવ્યું હતું. આ પ્રોગ્રામમાં ફાર્મસી અને મેડિકલ ફિલ્ડના વિવિધ તજજ્ઞો દ્વારા અલગ-અલગ વિષયો જેવા કે પેટન્ટ, રિસર્ચ અને રિવ્યુ પેપર કઈ રીતે લખવા વગેરે પર માર્ગદર્શન તેમજ પ્રાયોગિક તાલીમ પણ આપવામાં આવી હતી.

જુનાગઢની ડો.સુભાષ યુનિ. સ્કુલ ઓફ ફાર્મસી દ્વારા ફાર્માસ્યુટીકલ ટ્રેનિંગ પ્રોગ્રામ યોજાયો

વિદ્યાર્થીઓને માર્ગદર્શન પુરૂ પડાયું

(સાગર સોલંકી દ્વારા)
જૂનાગઢ તા.૮

જૂનાગઢની ડો.સુભાષ યુનિ. સ્કૂલ ઓફ ફાર્મસી ખાતે તા.૫-૬ સપ્ટે.ના રોજ ફાર્માસ્યુટીકલ સાધનો આધારિત બે દિવસીય ટ્રેનીંગ પ્રોગ્રામ યોજાયો હતો. આ કાર્યક્રમનું આયોજન ડો.સુભાષ યુનિ. અને બી.વી. પટેલ એજ્યુ.ટ્રસ્ટ અમદાવાદના સંયુકત ઉપક્રમે કરવામાં આવ્યું હતું. આ પ્રોગ્રામ દરમિયાન વિદ્યાર્થીઓને થીયરી સાથે પ્રેકટીકલ માર્ગદર્શન પણ આપવામાં આવ્યું હતું. આ અવસરે ટ્રસ્ટના ડાયરેકટર ડો. મનીષ નિવસારકર તથા ડેપ્યુટી ડાયરેકટર નીતા શ્રીવાસ્તવે વિશેષ હાજરી આપી વિદ્યાર્થીઓને પ્રોત્સાહિત કર્યા હતા. કાર્યક્રમમાં ગુજરાતના વિવિધ પ્રાંતમાંથી વિદ્યાર્થીઓએ ભાગ લીધો હતો. પ્રથમ દિવસે પ્રો.ડો. રમેશ પરમાર અને બીજ દિવસે ડો. મેઘના સેતાએ તાલીમ આ હતી. યુનિ.ના પ્રમુખ રાજભાઈ ચાવ તથા પ્રોવોસ્ટ ડો. દીપક પટેલે આ સફ આયોજન બદલ ડો.સુભાષ યુનિ.ના સ્ટા તથા આયોજકોને શુભેચ્છાઓ પાઠ હતી અને વિદ્યાર્થીઓના ઉત્સાહ અ ભાગીદારી માટે પ્રસંસા વ્યકત કરી હત

સૌરાષ્ટ્ર યુનિવર્સિટીના ફાર્મસી ભવન ખાતે ઔદ્યોગિક કક્ષાના ઉચ્ચતમ સાધનોર્ન ત્રિદિવસીય હેન્ડસ ઓન ટ્રેનિંગ યોજાઇ

ઉપલબ્ધ થતા સંશોધન સમયે થ પ્રેક્ટિકલ મુશ્કેલીઓ તથા તે નિવારણ અંગેનું માર્ગદર્શન નિષ્ણા પાસેથી મેળવ્યું હતુ. આ ટ્રેનિં પ્રોગ્રામમાં ભવનના અધ્યાપકો દ્વા વિવિધ ઉપકરણોની ટ્રેનિંગ સંશોધકો આપવામાં આવી હતી.

આ હેન્ડસ ઓન ટ્રેનિ રજીસ્ટ્રેશનની સંખ્યા મર્યાદિ રાખવામાં આવી હતી. જેથી કરી સંશોધકોને પૂરતો સંતોષ આપી શકા આ ટ્રેનિંગ પ્રોગ્રામમાં ગુજરાત વિવિધ કોલેજના વિદ્યાર્થીઓ ત અધ્યાપકોએ ભાગ લીધો હતો.

ફાર્મસી ભવનના સામાજિક ઉપયોગીતાને લગ

સૌરાષ્ટ્ર યુનિ.ના ફાર્મસી ભવનમાં એનિમલ સેલ કલ્ચર ટેકનીકનો વર્કશોપ યોજાયો

ગુજરાતી વિવિધ ફાર્મસી કોલેજના છાત્રો તથા અધ્યાપકોએ ભાગ લીધો

પોઇન્ટ ઓફ કે.। રાજકોટ

સૌરાષ્ટ્ર યુનીવર્સીટીનું ફાર્મસી ભવન તેની ઉતરોતર પ્રગતિ અને સિદ્ધિઓના લીધે ઝળહળતું રહ્યું છે. ફાર્મસી ભવન ગુજરાતભરમાં ફાર્મ.ડી., બી.ફાર્મ, એમ.ફાર્મ, પી.એચ.ડી જેવા કોર્સ મોખરે રહ્યું છે.

હાલમાં જ ફાર્મસી ભવન દ્વારા તા. ૫ થી ૭ ઓગસ્ટ ૨૦૨૪ દરમિયાન બી.વી પટેલ એજ્યુકેશન ટ્રસ્ટ, અમદાવાદ ના સંયુકત ઉપક્રમે બેઝીક સેલ કલ્ચર ટેકનીકનો ત્રિદિવસીય હેન્ડસ ઓન ટ્રેનીંગ નો વર્કશોપ યોજાયો હતો. આ ટ્રેનીંગમાં ગુજરાતની જુદી જુદી ફાર્મસી કોલેજના વિદ્યાર્થીઓ તથા અધ્યાપકોએ ભાગ લીધો હતો.

આ કાર્યક્રમના ઉદઘાટન સમારોહમાં ગુજરાત ટેકનોલોજીકલ યુનીવર્સીટીના એસોસિયેટ ડીન તથા બી.કે. ગવર્મેન્ટ ફાર્મસી કોલેજના પ્રિન્સીપાલ ડો.અશિન દૂધરેજિયા હાજર રહ્યા હતા. તેમની સાથે બી.વી પટેલ એજ્યુકેશન ટ્રસ્ટ ના ડાયરેક્ટર ડો મનીષ નીવસારકર તથા તેઓ ની સંસોધક ટીમ તથા ગુજરાત ટેકનોલોજીકલ યુનીવર્સીટીના સંસોધકો પણ જોડાયા હતા. આ કાર્યક્રમની વિશેષતાની વાત કરીએ તો આમાં ભાર લેનારા સંશોધકોને તજજ્ઞોના જ્ઞાનની સાથે સેલ્ફોરેટરીમાં પ્રાયોગિક અનુભવ પણ આપવામાં આવ્યો હતો જેથી કરીને તેઓને સેલ કલ્ચરના પ્રયોગો કરતી વખતે રાખવી પડતી સાવચેતીઓ અને આવતી મુશ્કેલીઓનો ખ્યાલ આવી શકે અને તજજ્ઞો દ્વારા તુરંત જ તેનું નિરાકરણ થઈ શકે. આ કાર્યક્રમમાં સંશોધકોના સતત માર્ગદર્શન અને નિરાકરણ માટે આ ક્ષિકના તજજ્ઞો સતત ૩ દિવસ સુધી હાજર રહ્યા હતા. આવા સફળ અને વિશાળ ટ્રેનીંગના આયોજન બદલ યુનીવર્સીટીના કુલપતિ ડો. કમલ ડોડીયા તથા રજીસ્ટ્રાર ડો રમેશ પરમાર એ ભવનના હેડ ડો.પ્રિયા પટેલ તથા ફાર્મસી ભવનની સમગ્ર ટુયા ટીમ ને અભિનંદન પાઠવ્યા હતા.


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