



## Translating Molecules into Messages: Analysing Public Trust and Media Representation of Natural Drug Research

**Abstract:** Natural drug research based on medicinal plants and traditional knowledge has gained increasing scientific and public attention in India. Advances in molecular biology and pharmacology have helped validate several plant-derived compounds that are widely used in traditional healthcare systems. However, the way this scientific progress is communicated to the public remains uneven. Media coverage of natural drugs often highlights cultural heritage, spirituality, or “miracle cure” narratives, while detailed scientific evidence and research limitations receive limited attention. Such patterns of communication can strongly influence how people understand and trust scientific research. This review examines how natural drug research is represented in Indian media and how these representations shape public trust in science. Using examples such as arjunolic acid from *Terminalia arjuna* studied for cardiovascular health, bioactive compounds from *Garcinia morella* associated with gut health and blood pressure regulation, and curcumin from *Curcuma longa* known for its anti-inflammatory properties, the paper highlights the gap between laboratory-based evidence and public understanding. Drawing on Framing Theory and existing research on trust in science, the review synthesises literature from biomedical sciences, ethnopharmacology, and mass communication studies. The analysis suggests that culturally familiar and emotionally engaging narratives may increase public interest, but they can also lead to misunderstanding, unrealistic expectations, and scepticism when scientific processes are not clearly explained. The paper argues for stronger collaboration between scientists and mass communication professionals to ensure accurate, transparent, and responsible communication of natural drug research. Improving science communication can help preserve traditional knowledge, enhance scientific literacy, and strengthen public trust in biomedical research in India.

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### Introduction

In recent years, the intersection of traditional medicine and modern biomedical research has gained increasing attention in India and across the globe. Growing concerns related to drug safety, long-term side effects, and sustainability have renewed interest in plant-based and naturally derived therapeutic agents (World Health Organization, 2013; Ekor, 2014). As a result, natural drug research has expanded beyond traditional knowledge systems and entered laboratories, pharmaceutical research, and public health discussions. India holds a unique position in this domain due to its vast ethnobotanical heritage and expanding biomedical research infrastructure. Several medicinal plants traditionally used by indigenous and rural communities are now being investigated using molecular docking, pharmacological assays, and clinical research



tools. One such example is *Terminalia arjuna*, a plant widely used in Ayurveda for cardiovascular health. Arjunolic acid, a triterpenoid saponin isolated from *T. arjuna*, has demonstrated cardioprotective potential through molecular interactions with coronary artery disease-related targets. A molecular docking study by Hazarika, Sen, and Doshi (2023) reported a strong binding affinity of arjunolic acid with the APOE4 protein, suggesting its potential role in coronary artery disease management.

Another important medicinal plant is *Garcinia morella*, commonly consumed in Northeast India as a souring agent in food. The fruit rind contains xanthenes and flavonoids that exhibit antioxidant, anti-inflammatory, and gastroprotective properties. Traditional consumption of *G. morella* has been associated with digestive health and blood pressure regulation, and recent studies support its role in metabolic and gut health (Devi et al., 2015; Saha et al., 2020). Similarly, *Curcuma longa* (turmeric), rich in curcumin, has been extensively studied for its anti-inflammatory, antioxidant, and anticancer properties, with applications in chronic inflammatory and metabolic disorders (Aggarwal & Harikumar, 2009).

Despite such scientific advances, public understanding of natural drug research remains limited. Many ethnic communities continue to practise herbal and traditional medicinal systems, but this knowledge is gradually declining due to urbanisation, loss of oral traditions, and inadequate documentation. At the same time, scientific findings related to these plants often fail to reach the public in an accurate and accessible manner.

Public knowledge of natural drug research is largely shaped by communication channels such as news media, television, online portals, and social media platforms. Research in science

communication has consistently shown that the way scientific information is framed strongly influences how people perceive credibility, effectiveness, and safety (Nisbet & Scheufele, 2009). In India, media coverage of natural drugs often highlights cultural heritage and “miracle cure” narratives, while experimental methods, molecular mechanisms, and limitations receive little attention. It is understood that there is an imbalance, and this selective emphasis in media representation may increase public interest in natural drugs, but it can also lead to misunderstanding, unrealistic expectations, and growing scepticism toward scientific research. When complex biomedical findings are simplified or framed as cultural or miraculous solutions, the scientific process itself becomes less visible to the public. Over time, this affects how people evaluate credibility, safety, and effectiveness, ultimately shaping their trust in science. Against this background, an important question emerges: How does media representation of natural drug research influence public trust in science in the Indian context? To address this question, the present paper aims to examine the role of media framing in shaping public trust and public understanding of natural drug research in India.

## Review of Literature

The following review brings together studies from natural drug research and mass communication to highlight how scientific knowledge travels from laboratories to society.

## Natural Drug Research and Ethnopharmacological Foundations

Natural drug research has long been rooted in ethnopharmacology, which documents and scientifically evaluates traditional medicinal practices. India, in particular, has contributed significantly to this field due to its extensive use of medicinal plants across diverse ethnic and



cultural communities. According to Patwardhan and Mashelkar (2009), traditional knowledge systems such as Ayurveda have served as valuable starting points for modern drug discovery, especially in identifying bioactive compounds with therapeutic potential.

Several studies have demonstrated that plant-derived molecules can play an important role in managing chronic diseases. Cragg and Newman (2013) highlighted that a substantial proportion of modern drugs are derived directly or indirectly from natural products. In the Indian context, medicinal plants such as *Terminalia arjuna*, *Curcuma longa*, and *Garcinia* species have attracted increasing scientific attention due to their cardiovascular, anti-inflammatory, and metabolic health benefits (Aggarwal & Harikumar, 2009; Dwivedi, 2007). Despite this growing body of biomedical evidence, researchers have pointed out that traditional medicinal knowledge is gradually declining due to urbanisation, generational shifts, and limited documentation (Kala, 2005). This loss is not merely cultural but also scientific, as many potentially valuable therapeutic leads remain underexplored or poorly communicated beyond local contexts.

### Scientific Validation and Public Visibility of Natural Drugs

Advances in molecular biology, bioinformatics, and pharmacology have enabled deeper validation of traditional medicinal claims. Techniques such as molecular docking, in silico screening, and pharmacokinetic modelling are increasingly used to study plant-derived compounds (Ekins et al., 2007). These approaches help bridge traditional knowledge with modern scientific evidence, enhancing credibility within biomedical research communities.

However, public visibility of these scientific efforts remains uneven. While laboratory-

based validation strengthens scientific legitimacy, it does not automatically translate into public understanding. According to Bucchi (2008), scientific knowledge often undergoes reinterpretation when it moves from expert spaces into public discourse. This transformation can result in oversimplification or selective emphasis, especially in health-related topics that already carry cultural significance.

In India, natural drugs often receive public attention through popular media long before rigorous clinical validation is completed. While this visibility can promote awareness, it can also create confusion between preliminary findings and established medical evidence (Kumar et al., 2017). This disconnect highlights the importance of communication processes in shaping how scientific research is perceived outside academic circles.

### Media Representation and Framing of Health and Science

The media play a central role in translating scientific information for public audiences. Framing Theory explains how media select and emphasise certain aspects of information while excluding others, thereby shaping interpretation and meaning (Entman, 1993). In science and health communication, framing influences not only what people learn but also how they evaluate credibility and risk.

Semetko and Valkenburg (2000) identified common media frames such as conflict, human interest, economic consequences, and morality. Subsequent studies have shown that health and science topics are frequently framed using emotional or human-interest narratives to attract attention (Nisbet & Scheufele, 2009). While such framing increases engagement, it can reduce the complexity of scientific explanations.



In the case of natural drug research, media framing often blends scientific claims with cultural and spiritual narratives. Studies have shown that Indian media frequently present herbal medicines as “ancient remedies” or “miracle cures,” emphasising heritage and tradition over experimental evidence (Bucchi & Trench, 2016). This form of selective emphasis can create a distorted understanding of scientific processes, especially when limitations and uncertainties are not communicated clearly.

### **Trust in Science and Public Risk Perception**

Trust in science is a critical factor influencing how people respond to scientific information. Siegrist and Cvetkovich (2000) described trust as a cognitive mechanism that allows individuals to make judgments about complex scientific issues without specialised knowledge. When trust is high, people are more likely to accept scientific recommendations; when it is low, scepticism and resistance increase.

Research has shown that trust in science is shaped by institutional credibility, transparency, and communication quality (Frewer et al., 2013). In health-related contexts, exaggerated claims or inconsistent messaging can significantly reduce public trust, even when the underlying science is sound. This is particularly relevant for natural drug research, where commercial interests and cultural beliefs intersect.

In India, trust in natural medicines is often rooted in long-standing cultural familiarity. However, Kumar et al. (2017) noted that trust based solely on tradition may become fragile when confronted with contradictory or sensationalised media narratives. When scientific explanations are oversimplified or presented alongside commercial advertising, audiences may struggle to distinguish

evidence-based research from promotional content.

### **Tension Between Traditional Knowledge and Modern Science**

The coexistence of traditional and modern scientific narratives can generate both opportunity and tension. On one hand, traditional knowledge provides culturally resonant entry points for health communication. On the other hand, presenting natural drugs as simultaneously “ancient” and “scientifically proven” without adequate explanation can create cognitive dissonance among audiences (Bucchi & Trench, 2016).

Several scholars have argued that this tension is exacerbated when media fail to contextualise scientific validation processes. For example, Patwardhan et al. (2015) emphasised that integrating traditional medicine into modern healthcare requires transparent communication of evidence, limitations, and regulatory standards. Without this clarity, public trust may fluctuate between unquestioning acceptance and complete scepticism.

This gap in communication also affects younger generations, who may be disconnected from traditional practices yet exposed to fragmented or sensationalised media narratives. As a result, both traditional knowledge systems and scientific credibility risk being undermined.

### **Role of Scientists and Institutions in Public Communication**

Historically, scientists have prioritised communication within academic communities, often relying on peer-reviewed journals as their primary dissemination channel. While essential for scientific progress, this approach limits public engagement. Scheufele (2014) argued



that in an era of digital media and information overload, scientists must engage more actively in public communication to maintain trust and relevance.

Studies suggest that when scientists participate directly in public discourse through interviews, popular articles, or outreach programmes public trust increases (Nisbet et al., 2015). In the context of natural drug research, scientists can play a key role in explaining molecular mechanisms, research limitations, and realistic health outcomes.

Institutional support is also critical. Universities, research councils, and regulatory bodies can facilitate responsible science communication by training researchers and collaborating with media professionals. Such initiatives can help ensure that scientific accuracy is preserved while making content accessible to non-expert audiences.

### Gaps in Existing Literature

Although substantial research exists on ethnopharmacology, media framing, and trust in science, few studies integrate these domains in the Indian context. Most biomedical studies focus on laboratory validation, while communication research often examines media effects without detailed engagement with scientific content. This disciplinary separation limits understanding of how media representation of natural drug research influences public trust.

Moreover, there is limited literature that critically examines how culturally framed narratives interact with scientific credibility in shaping public perceptions of natural therapeutics. Addressing this gap is essential for developing effective science communication strategies that respect traditional knowledge while maintaining scientific rigor.

### Relevance of the Present Study

By synthesising literature from biomedical science and communication studies, the present review builds upon existing scholarship while addressing a critical gap. It highlights the need for interdisciplinary approaches that connect molecular research with responsible media representation. Understanding how natural drug research is framed and trusted in public discourse is essential for ensuring that scientific advancements translate into informed health choices and sustainable public trust.

### Methodology

This paper adopts a review-based and conceptual approach. Relevant peer-reviewed literature was collected from databases including PubMed, Google Scholar, and Scopus, focusing on natural drug research, ethnopharmacology, science communication, media framing, and trust in science. Selected Indian and global studies were thematically analyzed to understand patterns in media representation and their implications for public trust.

### DISCUSSION

**Dominant Media Frames in Natural Drug Communication:** Media framing plays a central role in shaping public understanding of science. Framing Theory suggests that media highlight certain aspects of information while downplaying others, thereby influencing interpretation (Entman, 1993). In the context of natural drug research, Indian media frequently adopt heritage-based and human-interest frames. These frames emphasize ancient wisdom, cultural pride, and spiritual value, often portraying medicinal plants as “time-tested cures.”

While such framing resonates with audiences, it often overshadows scientific validation. Molecular docking studies, biochemical



pathways, dosage limitations, and clinical evidence are rarely explained in mainstream reporting. This can lead to over-simplification and selective interpretation of scientific findings, replacing peer-reviewed credibility with anecdotal validation (Bucchi & Trench, 2016).

### **Public Trust and the Science–Tradition**

**Interface:** Trust in science refers to public confidence in the competence and integrity of scientific institutions and researchers (Siegrist & Cvetkovich, 2000). In India, trust in natural drugs is influenced by cultural familiarity and long-standing traditional use. However, when natural remedies are promoted as “ancient yet scientifically proven” without transparent evidence, audiences may experience confusion and cognitive dissonance.

Studies have shown that exaggerated claims and commercial promotion can weaken trust, especially when safety and efficacy data are not clearly communicated (Frewer et al., 2013). Balanced communication that acknowledges both benefits and limitations is essential to maintain credibility.

### **Role of Scientists as Communicators:**

Scientists often communicate their findings primarily through academic journals, limiting direct engagement with the public. This creates a gap where media professionals or marketers become the main interpreters of scientific knowledge. Active participation of scientists in public communication—through popular articles, public lectures, and collaborations with journalists - can help ensure accuracy and build trust (Scheufele, 2014).

### **Role of Mass Communication in Science**

**Education:** Mass communication has the potential to make science accessible to students, communities, and policymakers. When complex biomedical research is translated into clear, evidence-based narratives, it can enhance scientific literacy and informed health choices. Integrating science communication training

within academic and research institutions can bridge the gap between laboratories and society.

**Implications for Policy and Practice:** For scientists, engaging with trained communicators and using open-access platforms can help translate laboratory findings accurately and ethically. Community outreach programme can demystify scientific processes and connect research with lived experiences.

Media professionals should adopt strict evidence-verification practices in health reporting and involve biomedical experts in editorial decision-making to reduce misinformation. Policymakers can support interdisciplinary programme that link science and mass communication departments and regulate misleading health advertising. Academic institutions should promote cross-disciplinary research that examines how media framing influences public health behaviour and trust in science.

### **Conclusion**

Natural drug research offers significant opportunities for improving public health in India. However, the benefits of such research can only be realized if scientific findings are communicated responsibly. By bridging molecular science with ethical and accurate media representation, trust in natural therapeutics can be strengthened. Collaborative efforts between scientists, communicators, and policymakers are essential to ensure that traditional knowledge and modern science coexist in a transparent and trustworthy manner.



## References

- [1] Aggarwal, B. B., & Harikumar, K. B. (2009). Potential therapeutic effects of curcumin, the anti-inflammatory agent, against cancer, cardiovascular, pulmonary, metabolic, autoimmune and neurodegenerative diseases. *International Journal of Biochemistry & Cell Biology*, 41(1), 40–59. <https://doi.org/10.1016/j.biocel.2008.06.010>
- [2] Bucchi, M. (2008). *Handbook of public communication of science and technology*. Routledge. <https://doi.org/10.4324/9780203928240>
- [3] Bucchi, M., & Trench, B. (2016). *Science communication: A global perspective*. Springer. <https://doi.org/10.1007/978-3-319-01863-4>
- [4] Cragg, G. M., & Newman, D. J. (2013). Natural products: A continuing source of novel drug leads. *Biochimica et Biophysica Acta (BBA) – General Subjects*, 1830(6), 3670–3695. <https://doi.org/10.1016/j.bbagen.2013.02.008>
- [5] Devi, U., Singh, P., & Singh, R. (2015). Phytochemical screening and antioxidant activity of *Garcinia morella*. *Journal of Food Science and Nutrition*, 4(3), 45–52.
- [6] Dwivedi, S. (2007). *Terminalia arjuna* Wight & Arn.—A useful drug for cardiovascular disorders. *Journal of Ethnopharmacology*, 114(2), 114–129. <https://doi.org/10.1016/j.jep.2007.08.003>
- [7] Ekins, S., Mestres, J., & Testa, B. (2007). In silico pharmacology for drug discovery: Applications to targets and beyond. *British Journal of Pharmacology*, 152(1), 21–37. <https://doi.org/10.1038/sj.bjp.0707306>
- [8] Ekor, M. (2014). The growing use of herbal medicines: Issues relating to adverse reactions and challenges in monitoring safety. *Frontiers in Pharmacology*, 4, 177. <https://doi.org/10.3389/fphar.2013.00177>
- [9] Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, 43(4), 51–58. <https://doi.org/10.1111/j.1460-2466.1993.tb01304.x>
- [10] Frewer, L. J., Howard, C., Hedderley, D., & Shepherd, R. (2013). What determines trust in information about food-related risks? *Food and Chemical Toxicology*, 53, 1–8. <https://doi.org/10.1016/j.fct.2012.11.009>
- [11] Hazarika, L., Sen, S., & Doshi, J. (2023). Molecular docking analysis of arjunolic acid from *Terminalia arjuna* with a coronary artery disease target APOE4. *Bioinformation*, 19(7), 494–500. <https://doi.org/10.6026/97320630017949>
- [12] Kala, C. P. (2005). Indigenous uses, population density, and conservation of threatened medicinal plants in protected areas of the Indian Himalayas. *Indian Journal of Traditional Knowledge*, 4(4), 349–358.
- [13] Kumar, N. K., Bauer, M. W., Allum, N., & Miller, S. (2017). Public trust in science: A global perspective. *Public Understanding of Science*, 26(3), 322–336. <https://doi.org/10.1177/0963662515613639>
- [14] Nisbet, M. C., & Scheufele, D. A. (2009). What's next for science communication? Promising directions and lingering distractions. *American Journal of Botany*, 96(10), 1767–1778. <https://doi.org/10.3732/ajb.0900041>
- [15] Nisbet, M. C., Cooper, K. E., & Garrett, R. K. (2015). The partisan brain: How dissonant science messages lead conservatives and liberals to form biased perceptions. *The ANNALS of the American Academy of Political and Social Science*, 658(1), 36–66. <https://doi.org/10.1177/0002716214555474>
- [16] Patwardhan, B., & Mashelkar, R. A. (2009). Traditional medicine-inspired approaches to drug discovery: Can Ayurveda show the way forward? *Drug Discovery Today*, 14(15–16), 804–811. <https://doi.org/10.1016/j.drudis.2009.05.009>
- [17] Patwardhan, B., Mutalik, G., & Tillu, G. (2015). Integrative approaches for health: Biomedical research, Ayurveda and yoga. *Journal of Ayurveda and Integrative Medicine*, 6(1), 1–4. <https://doi.org/10.4103/0975-9476.146553>
- [18] Scheufele, D. A. (2014). Science communication as political communication. *Proceedings of the National Academy of Sciences*, 111(Suppl. 4), 13585–13592. <https://doi.org/10.1073/pnas.1317516111>
- [19] Semetko, H. A., & Valkenburg, P. M. (2000). Framing European politics: A content analysis of press and television news. *Journal of Communication*, 50(2), 93–109.



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<https://doi.org/10.1111/j.1460-2466.2000.tb02843.x>

- [20] Siegrist, M., & Cvetkovich, G. (2000). Perception of hazards: The role of social trust and knowledge. *Risk Analysis*, 20(5), 713–720. <https://doi.org/10.1111/0272-4332.205064>
- [21] World Health Organization. (2013). WHO traditional medicine strategy 2014–2023. WHO Press.