EASY TO SWITCH

Ethnoveterinary medicine is a low-cost alternative to reduce antibiotic use in Indian dairy sector

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SOME LIFESAVING solutions are so simple and obvious that they remain hidden in plain sight. This is particularly true for livestock disease treatments that have evolved over generations through experiences of communities, withstood the test of time and are embodied in local culture and practices. Yet the knowledge remains untapped in the absence of standardisation and scientific validation. More often than not, dairy farmers, and some field veterinarians, indiscriminately use crucial antibiotics for treating even benign infections in animals.

Researchers with Delhi-based Centre for Science and Environment found evidence of such rampant misuse and overuse of antibiotics during consultations with dairy farmers and experts from sectors, including animal husbandry, food safety, human health, conducted in 2020 and 2021. CSE had observed that most dairy farmers also skip the critical withdrawal period—a prescribed number of days during which treated animals should be excluded from the milk supply chain to allow antibiotic residues excreted out of the body. In 2018 the Food Safety and Standards Authority of India (FSSAI) also found antibiotic residues in milk samples.

Such abuse of antibiotics not only adds to the treatment costs, but also adds to the growing burden of antimicrobial resistance (AMR). Interaction between antibiotic residues and pathogens in various environmental matrices (soil and water) and in humans lead to the formation and spread of bacteria that are resistant to antibiotics. A study published in peer-review journal *The Lancet* in January 2022 says in 2019 alone, 4.95 million deaths were associated with bacterial AMR across the world, with 1.95 million deaths directly attributable to bacterial AMR.

"Antibiotic residues interfere with the manufacture of several dairy products by delaying starter culture activity for buttermilk, *shrikhand* (a dessert made with yoghurt), curd and other fermented products," says Anilkumar Bayati, managing director of Sabarkantha district co-operative milk producers' union, also known as Sabar Dairy.

One common infection among dairy animals that prompts farmers to depend on antibiotics is mastitis, triggered by rough milking or any other injury to the udder tissue and due to unhygienic farm conditions. Since the infection is caused by over 100 types of microorganisms such as bacteria, fungus and virus, there is no vaccine against it. The infection causes inflammation of mammary glands and blockage of milk ducts, and manifests in change of milk colour, consistency or even blood in milk. Milk yield also reduces. A review of studies in 2021 by National Institute of Veterinary Epidemiology and Disease Informatics, the only institute conducting surveillance and monitoring of animal diseases, states that 18 per cent dairy animals in the country suffer from clinical mastitis, while 45 per cent display subclinical mastitis (it shows no specific symptom except a slight decrease in milk yield). "Dairy farmers lose up to 3-4 liters of milk per animal per day because of mastitis," says A V Hari Kumar, deputy general manager, animal health, at the National Dairy Development Board (NDDB). Now call it lack of enough field veterinarians in the country, or easy over-the-counter access to antibiotics or the fear of losing milk, and therefore, income, most dairy farmers rush to administer high doses of antibiotics to the cattle even at the slightest sign of mastitis.

For managing such common ailments and rationalise drug usage, especially antibiotics, NDDB in 2014 launched a project, Mastitis Control Popularisation Programme (MCPP). The programme, piloted at Sabar Dairy, initially focused on early detection of mastitis so that the animal can be treated using simple methods. Milk brought to the society by the farmer was checked using a tool California Mastitis Test (CMT). If the milk tested positive for mastitis, the farm was traced back, the animal was identified and was given an oral regimen trisodium citrate. After 10 days, the animal was tested again. A trial on 218 animals found that two consecutive trisodium citrate treatments led to 89 per cent recovery. This is when MCPP turned its focus to ethnoveterinary medicines.

It joined hands with Sabar Dairy and the University of Trans-Disciplinary Health Sciences and Technology (TDU), in Bengaluru, which had already been researching on ethnoveterinary medicines. In 2016, they conducted a trial on 30 cows

PHOTOGRAPH: VIKAS CHOUDHARY / CSE

REVIVING LOST WISDOM

2013
Mastitis identified as one of the major animal health issues based on ear-tagging data

2014
National Dairy Development Board (NDDB) launched Mastitis Control Popularisation Programme (MCPP)

2016
Ethnoveterinary medicines (EVM) integrated into MCPP

2017
NDDB along with University of Trans-Disciplinary Health Sciences and Technology prepares brochure for farmers for important bovine ailments in 12 vernacular languages

2019
Sabar Dairy starts manufacturing and packaging of EVM products Facebook page on traditional herbal formulations for cattle and buffaloes created

2020
Mastitis cases at Sabar Dairy treated with 85% cure rate using EVM; between 2017-eGopala mobile app launched

2021
eGopala web version launched; Kaira milk union (Amul dairy) started manufacturing and packaging of EVM products

2022
So far, 576 demonstration plots established by milk unions under NDDB guidance; trained 260 core group of veterinarians from 34 milk unions and producer companies; licensed EVM products launched

Source: Centre for Science and Environment

severely affected with clinical mastitis. Application of a reddish paste, prepared by mixing aloe vera, turmeric powder and lime on mastitis-infected area thrice daily for four to five days, along with feeding whole lemons to the cattle, cured 29 cattle, with one farmer dropping out. "We found that ethnoveterinary practices can be used both as preventive and curative. It can be used as a first response to any condition by the farmers themselves," says M Balakrishnan Nair, Emeritus Professor, School of Health Sciences, TDU. Following the successful trial, Sabar Dairy used its network of technicians, who conduct artificial insemination, to make farmers aware of its benefits. "We gave them an incentive of ₹22 lakh to implement the approach on the ground," says Bayati. Since then, MCPP was expanded to 25 district-level cooperative unions and milk producer companies across eight states—Kerala, Assam, Punjab, Andhra Pradesh, Karnataka, Maharashtra, Gujarat and Uttar Pradesh. (Nine cooperative unions have dropped out of the programme due to reasons such as insufficient funds and no longer require handholding.) The expenditure of MCPP in 2021 was estimated to be ₹2,605 lakh, with NDDB paying ₹356 lakh and the rest borne by respective dairy cooperatives. Eight years later, CSE visited various cooperative unions and milk producer companies and interacted with associated farmers and veterinarians to understand the impact of MCPP. Its impact has been overwhelming.

WHAT MAKES IT SPECIAL

Simple ingredients of ethnoveterinary medicines that can work against several bovine ailments

Disease/Condition	Ingredients
Mastitis (all types)* (Water based preparation)	Aloe vera, turmeric, calcium hydroxide, lemon
Mastitis (all types)* (Oil based preparation)	Aloe vera, turmeric, calcium hydroxide, lemon, mustard or gingelly oil
Teat obstruction*	Neem leafstalk, turmeric, butter or ghee
Udder oedema*	Sesame or mustard oil, turmeric, garlic
Retention of placenta#	White radish, lady's finger, jaggery, salt
Repeat breeding#	Jaggery, salt, white radish , aloe vera, moringa, cissus stem, curry leaves, turmeric
Prolapse*	Aloe vera, turmeric, mimosa pudica (shameplant)
Foot and mouth disease-mouth lesions*	Cumin seeds, fenugreek seeds, black pepper, turmeric, garlic, coconut, jaggery
Foot and mouth disease-foot lesions/wound*	Acalypha indica (indian copperleaf), garlic, neem, coconut or sesame oil, turmeric, mehndi, tulsi (holy basil)
Fever#	Garlic, coriander, cumin, tulsi (holy basil), dry cinnamon, black pepper, betel leaves, shallots, turmeric, chirata leaf powder, sweet basil, neem, jaggery
Diarrhoea#	Fenugreek seeds, onion, garlic, cumin seeds, turmeric, curry leaves, poppy seeds, pepper, jaggery, asafetida
Bloat and Indigestion#	Onion, garlic, dry chilly, cumin seeds, turmeric, jaggery, pepper, betel leaves, ginger
Worms#	Onion, garlic, mustard seeds, neem, cumin, bitter gourd, turmeric, pepper, banana stem, common leucas, jaggery
Tick/Ectoparasites*	Garlic, neem leaves and fruit, acorus rhizome (sweet flag), turmeric, lantana leaves, tulsi (holy basil)
Pox/wart/cracks*	Garlic, turmeric, cumin, sweet basil, neem, butter or ghee
Allergy / poisoning / venomous sting/bite#	Betel leaves, black pepper, salt, jaggery
Hygroma (Swelling of joints) *	Aloe vera, lime, cissus quadrangularis (veldt grape), turmeric, garlic, gingelly oil
Cough#	Adhathoda (adusa), tulsi (holy basil), garlic, turmeric, pepper, jaggery
Downer (not able to get up)#	Desi chicken eggs, moringa, cissus quadrangularis (veldt grape), jaggery
Toxicity (Pesticide /HCN / Mycotoxin) #	Betel leaves, black pepper, salt, jaggery, tamarind, water, moringa extract
Blood in milk#	Curry leaves, moringa leaves, jaggery, lemon
Anoestrus#	Betel, pepper, moringa, tamarind, salt, jaggery

Note:* Topical application
Oral administration

READY-MADE REMEDIES

Ethnoveterinary medicines sold by different milk cooperative unions and private players

LICENSED PRODUCTS

Malabar, milk cooperative, Kerala

Masticure*: Prevent all types of mastitis
Diar end: Prevent diarrhea
Pyrexcure: Reduce fever
Crack heal*: Treatment of warts, pox and cracks in teats
Heal all*: Wound healing
Rumatore: Indigestion, bloat, anorexia in cattle
Milk let: Galectogogue in cattle
Fly repel: Ectoparaceticide/ticks in cattle

Ayurvet Ltd, herbal animal drugs company, Delhi

Diaroak: Diarrhea of different etiology, Calf scours, Non-specific diarrhea
Mastidip*: Prevention of udder infections, for teat and udder antisepsis, routine udder sanitization
Charmil plus*: FMD lesions, Deep-seated wounds, Fungal infection, Yoke gall, Pyoderma, Non-specific skin problems, Scabies, Maggot wounds, surgical wounds
Mastilep*: Treatment and control of clinical and sub-clinical mastitis, improving milk quality, promoting udder health

Trieto Biotech, a veterinary drugs company, Gujarat

Mastic lap*: Prevent mastitis
Mustfree: Prevention of subclinical and clinical mastitis, increased milk yield, milk fat and SNF content.
Immuno syrup: Curing all types of pyrexia
Dlgiboost Syrup: Curing all types of nutritional diarrhoea

FEED SUPPLEMENT

Amul Dairy, milk cooperative, Gujarat

Amul Masta Mix: Prevent subclinical and clinical mastitis, helps increase in milk yield and in let-down of milk
***Mastitis powder:** Prevent mastitis
Amul Immune: Improve immunity
Amul Rumen pro: Improve digestion in animals
Amul Utero Plus: Prevent metritis, helps in retention of placenta, abortion and agalactia

Sabar Dairy, milk cooperative, Gujarat

Sabar Sanjivani: Prevent mastitis and sub clinical mastitis, helps to increase in milk production and fat, helps in agalactia
Sabar Mix*: Prevent mastitis
Sabar Saral: Improve digestion in case of diarrhea, indigestion, impaction
Sabar Sudarshan: Prevent fever and improve immunity
Sabar Amrut: Prevent mastitis
Sabar Uterine Cleanser: Prevent uterine infection, retention of placenta
Aloe sabar*: Prevent mastitis
Amrut: Prevent mastitis

Banas Dairy, milk cooperative, Gujarat

Banas Shital: Prevent pyrexia
Banas Amrut: Prevent mastitis
Banas Pachak: Prevent Indigestion, Diarrhoea, Enteritis

Source: Centre for Science and Environment

EXPANDING HORIZON

The success of ethnoveterinary medicines on mastitis prompted a greater demand from farmers and veterinarians on their use for other bovine ailments. NDDB thus expanded the scope of MCPP to 29 other diseases, which includes common diseases like diarrhoea, de-worming, fever, wounds, indigestion, and critical diseases such as foot and mouth disease. Effect of the medicines were recorded on NDDB's Animal Health Management Information System. CSE researchers have analysed the data collected till October 2022. They found a very high cure rate—80.4 per cent of the

PROMISING NUMBERS

Cure rates achieved by farmers associated with different milk cooperative unions using ethnoveterinary medicines

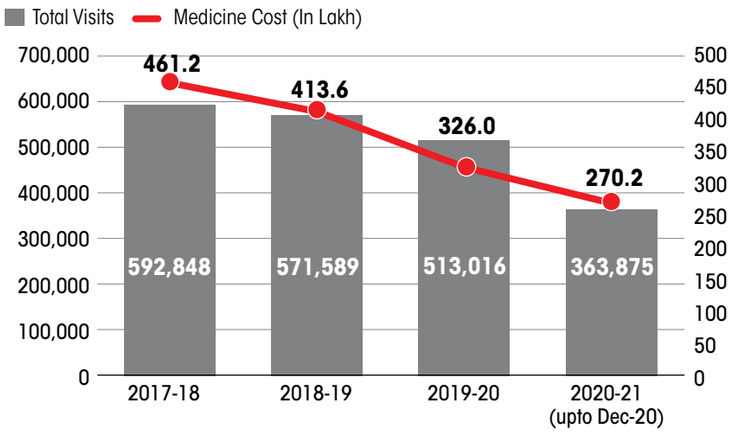
*MCPP is the Mastitis Control Popularisation Programme initiated by the National Dairy Development Board

MILK COOPERATIVE UNIONS CURRENTLY WITH MCPP*	Mastitis (Fig in%)	Fever (Fig in%)	Diarrhoea (Fig in%)	Indigestion (Fig in%)	Wound (Fig in%)	Bloat (Fig in%)	Retention of placenta (%)	Lumpy skin disease (%)	Prolapse (Fig in%)	Other ailments (Fig in%)	Cure rate (Fig in%)
Andhra Pradesh											
Shreeja Mahila Milk Producer Company Ltd.	73.6	100	84	66.4	33.3	88	100	57.9		52.6	68.3
Assam											
West Assam Milk Producers' Co-operative Union Ltd.	96.1	-	-	-	-	97.3	-	98	100	79	94.3
Gujarat											
Maahi Milk Producer Company Ltd.	80.8	-	85.7	100	100	66.7	92.9	-	-	88.6	85.2
Sabarkantha District Co-operative Milk Producers' Union Ltd.	80	82.4	85.5	91	-	-	-	-	-	90.3	82.9
Karnataka											
Bengaluru Co-operative Milk Union Ltd.	78.9	81.8	84.2	89	87.1	82.3	81.4	78.6	77.1	76.3	79.6
Dakshina Kannada Co-operative Milk Producers' Union Ltd.	83	86.6	88.4	88.1	-	87.3	-	-	-	82.7	84
Kolar District Co-operative Milk Producers' Societies' Union Ltd.	56.9	59.8	67.4	66.4	66.5	61.7	57.9	76.2	51.4	60.7	61.1
Mysore District Co-operative Milk Producers' Societies' Union Ltd.	73.9	50.6	82.8	-	87.5	41	75.6	72.6	53.3	83	81.1
Kerala											
Malabar Regional Co-operative Milk Producers'' Union Ltd.	76	85.2	76.2	81.6	-	-	-	-	-	99.1	80.2
Maharashtra											
Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd.	71	74.2	78.7	84.8	89.6	82.5	67.7	-	68.4	73	73.3
Pune Zillha Sahakari Dudh Utpadak Sangh Ltd.	96.6	-	97.9	100	-	100	50	-	100	98.3	97.3
Rajarambapu Patil Sah Dudh Sangh Ltd.	74.6	67.9	69.4	70.7	79.3	76.7	-	-	62.3	70.9	73
Punjab											
Baani Milk Producer Company Ltd.	96.8	98.5	93.1	99.5	86.6	94.6	89.7	-	83.4	93.4	95.1
Ludhiana District Co-operative Milk Producers' Union Ltd.	88	-	-	-	-	-	-	-	-	88	87.9
Ropar District Co-operative Milk Producer's Union Ltd.	72.8	59.3	67.5	62.6	76.9	-	74.3	33.6	60.8	77.3	72.4
Uttar Pradesh											
Saahaj Milk Producer Company Ltd.	83.5	91.3	81.5	80	66.7	86.7	75.3	50	82.5	82.8	82.8
MILK COOPERATIVE UNIONS CURRENTLY NOT WITH MCPP*											
Andhra Pradesh											
Krishna district Milk Producers' Mutually Aided Co-operative Union Ltd.	69.1	89.4	92	96.6	97	96.6	89.9	-	89.5	87.8	87.2
Sri Vijaya Visakha Milk Producers Company Ltd.	81.8	-	-	-	-	-	-	-	-		81.8
Gujarat											
Surat District Co-operative Milk Producers' Union Ltd.	95.8	-	-	-	-	-	-	-	-		95.8
Karnataka											
Tumkur Co-operative Milk Producers' Societies' Union Ltd.	39.6	58.4	55.1	49.1	50.5	55.2	40.6	-	41.2	43	46.4
Maharashtra											
Aurangabad District Co-operative Milk Producer's Union Ltd.	90.1	-	-	100	100	-	100	-	100	77.2	86
Baramati Taluka Sahakari Doodh Utpadak Sangh Maryadit	71.5	75.8	73.3	72.2	66.4	70.2	74.3	75.5	61.2	68.3	70.3
Punjab											
Jalandhar District Co-operative Milk Producers' Union Ltd.	72	62.7	69.2	-	-	64.1	62.1	-	61.1	65	67.8
Tamil Nadu											
Erode District Co-operative Milk Producers' Union Ltd.	61.7	36.1	47.3	92.1	68.8	61.8	21.8	-	53.3	87.7	71.3
Salem District Co-operative Milk Producers' Union Ltd.	73.5	81.8	71	80.2	72.3	65.8	70.4	-	75.8	48.6	75.3

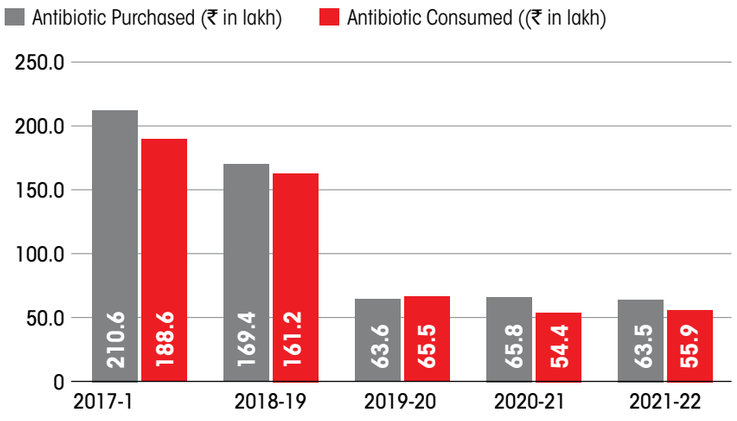
Source: Centre for Science and Environment

Double benefits of ethnoveterinary medicine

: Reduction in veterinary visits 2017-2021 at Sabar Dairy in Gujarat



Reduction in investment on purchase of antibiotics between 2017-2022 by Sabar Dairy in Gujarat



Source: Centre for Science and Environment

780,000 cases analysed—across the ailments. Almost 80 per cent of the animals were suffering from ailments like mastitis, fever, diarrhoea, indigestion, wound, retention of placenta, bloat, lumpy skin disease and prolapse. Farmers usually depend on antibiotics for treating these diseases. Those suffering from mastitis, fever and diarrhoea and indigestion accounted for 77 per cent of the total cases with an average cure rate of 81.2 per cent. This means four of every five animals were cured using ethnoveterinary medicines for these four common ailments.

Of the 255,000 cases of mastitis, reported across all the 25 cooperative unions, 78.4 per cent could be cured with ethnoveterinary medicines. Baani milk producer company in Punjab and Pune zillha sahakari dudh utpadak sangh in Maharashtra showed the highest cure rates of 96.8 and 96.6 per cent, with Kolar milk union in Karnataka showing the lowest 56.9 per cent cure rate. Similarly, 163,000 cases were treated for fever, with 82.2 per cent cure rate. Sabarkantha milk union in Gujarat and Malabar milk union in Kerala showed the highest cure rates of 82.4 and 85.2, with Kolar milk union reporting the lowest 60 per cent cure rate. In case of diarrhoea, 84.4 per cent of the 151,000 cases were cured. Sabarkantha milk union in Gujarat and Bengaluru milk union in Karnataka showed highest cure rate of 85.5 and 84.2 per cent. In case of indigestion, cure rate was 83.4 per cent.

The efficacy of ethnoveterinary medicines has also been reported in the treatment of lumpy skin disease (LSD), a viral disease of cattle for which no cure or vaccine is available and is causing major outbreaks across the country since July this year. Under MCPP, 3,000 cases have been subjected to treatment using ethnoveterinary medicines with a cure rate of 66.2 per cent. The Department of Animal Husbandry and Dairying recognised the importance of ethnoveterinary medicines approaches in treatment of LSD and recommended its use in the LSD control and treatment guidelines released in August 2022. NDDB is now considering renaming the MCPP as "Disease Control through Alternative Methods".

A high cure rate not only indicates that the use of antibiotics could be reduced, it also ensures higher income for dairy farmers. Harish Patel, a small dairy farmer in Bhuvel village of Sabarkantha sells his milk to Sabar Dairy. Patel also procures ethnoveterinary medicines from Sabar Dairy. "Since we began using these, the incidence of mastitis on the farm has drastically reduced," says Patel. "This medicine is extremely useful. We use it two to three times a year to treat mastitis and also after calving to improve milk output," says Kiritbhai Patel, another farmer in the village, who sells 30 litres of his daily milk produce to Sabar Dairy. "Use of these preparations have reduced treatment cost. We spend only ₹100-200 on medicines instead of ₹2,000-3,000 earlier," he adds.

Cooperative unions and some private players have begun manufacturing ready-made ethnoveterinary medicines

CHEAPER AND BETTER

"To scale up the use of ethnoveterinary medicines and to take it to the last mile, to the farmer, NDDB has propagated extension materials for various common ailments in various forms like videos, brochures, posters and apps in all major vernacular languages," says Meenesh Shah, chairman, NDDB.

Gurwinder Singh, a dairy farmer from Patiala who sells his milk to Baani milk producer company, says, he is now able to prepare and administer ethnoveterinary medicines without waiting for the veterinarian. "Once the plant ingredients are available, these preparations are simple to make and administer, requiring no special expertise or logistics," says Singh.

Cooperative unions are also benefitting from the switch. Data with Sabar Dairy shows a notable reduction in antibiotic purchased over last five years—from ₹2.1 crore in 2017-18 to ₹63 lakh in 2021-22. "Before rolling out ethnoveterinary medicines we were purchasing 12,000 to 15,000 vials of 30 ml sulfadimidine and sulfamethoxazole-trimethoprim injections. We no longer purchase even a single vial of it. This antibiotic has a very long withdrawal period and its residues are harmful for humans," says Samir P Patel, assistant manager, Sabar Dairy. This has helped the cooperative union save ₹1.91 crore on costs of medicines, including antibiotics, non-steroidal anti-inflammatory drugs and other supplements. Data with Sabar Dairy shows a reduction of about 229,000 veterinary calls between 2017-18 and December 2020. "There has been a significant reduction of veterinary calls after establishing the ethnoveterinary medicine facility in 2018-19, indicating increased usage of these preparations by the farmers," says Bayati. NDDB's latest annual report 20-21 highlights that an average savings of 30 per cent in drug costs and that milk unions which have seriously embarked on use of ethnoveterinary medicines have reduced their medicine purchases, especially antibiotics, to the tune of ₹10 lakh per month. "Ethnoveterinary preparations provide a simple, cost effective and efficient option to milk producers for health care management of their animals. It also provides an instant management option to households, devoid of the veterinary delivery system," says R S Sodhi, managing director, Amul Dairy.

With time, the use of ethnoveterinary medicines are gradually shifting from being prepared at homes to using readymade packaged formulations. "It is not possible for farmers to have access to all the raw materials all the time," explains Hargovindbhai Patel, who works at the Banaskantha District Co-opertaive Milk Producers Union

in Palanpur (Banas Dairy). "Farmers mostly tend to opt for ready-made preparations. If we tell them to make preparations themselves from raw material, they are less likely to make such effort. This is one of the reasons people choose allopathic medicine as it was ready to use," says a staff at the Kaira feed plant of Kaira District Co-operative Milk Producer's Union Ltd (Amul Dairy) in Anand, Gujarat. As of now, readymade formulations are sold as feed supplements or licensed drugs by both milk unions and private players (see 'Ready-made remedies). Both Amul Dairy and Sabar Dairy have set up dedicated plants, with support of NDDB, for manufacturing and selling readymade ethnoveterinary medicines products in the districts they cover, while Banas Dairy has recently started packaging their products. Ready-made pouches are only available at the dairy co-operative societies of the union and sold at low prices for registered farmers. These are not available with local pharmacists. For example, the Sabar Dairy manufactures different ethnoveterinary medicines products for management of mastitis, uterine health, improved digestion, better immunity, improvement of fever and retention of placenta. Sabar Sanjivani, is sold as 60 gram pouches for ₹15, Sabar Mix at ₹10 for 60 gram pouch while Sabar Amrut is sold at ₹20 for a 500 ml bottle. The Amul Dairy also manufactures and sells packaged ethnoveterinary medicines pouches for prevention of mastistis (Amul Masta Mix) improved digestion (Amul Rumen Pro), immunity (Amul Immune), retention of placenta, abortion and agalactia. Taking a step forward, the Malabar Regional Co-operative Milk Producers Union, a milk union in Kerala, has obtained a licence from the state's Drug Control Department for ethnoveterinary medicines products it manufactures under a startup, called Ethnovet MLMA. In June 2022, the start-up launched eight types of ethnoveterinary medicines products to prevent mastitis (Masticure), diarrhoea (Diar end), healing of wound (Heal all), improve digestion and bloating (Rumatore), reduce fever (Pyrexcure), improve milk production in cattle (Milk let), treatment of warts or cracks in teats (Crack heal) and keeping away of ticks or ectoparasiyes (Fly repel). Owing to the licensing, these products can be marketed like any other medicine. They are priced between ₹80 and ₹200.

There is also a newfound interest among private players to sell licensed ethnoveterinary medicines. For example, several unions under Punjab State Co-operative Milk Producers' Federation have been using Mastitis Malam and Must free manufactured by Trieto Biotech, which has been supplying their products to several dairy co-operatives in Gujarat since 2016.

Ayurvet Limited in Delhi is another company that manufactures several ethnoveterinary medicines for cattle. Recently, in 2021, a medicine called Mastirak Gel, developed by National Innovation Foundation, an autonomous body of the Department of Science & Technology, has been commercialized through the industry partner Rakesh Pharmaceuticals. It is a poly-herbal and cost-effective medicine to treat Mastitis and can be purchased at medical stores supplying veterinary medicines in various parts of the country.

MAINSTREAM THE ALTERNATIVE

Ethnoveterinary approach is the low-cost, effective way to tackle bovine diseases. Here's how it can be made popular

- Develop a research agenda, promote pilot projects across states for different diseases and formulations, and publish results for greater learning and trust building among stakeholders
- Modify curriculum for veterinarians to include ethnoveterinary medicines
- Make available ethnoveterinary medicines preparations/products and appropriately regulate them for price and quality
- Make ethnoveterinary medicines ingredients/preparations available through supporting herbal gardens and manufacturing/mixing plants such as through self-help groups, local producers, community as well as small and medium enterprise
- Monitor ethnoveterinary medicines interventions and document their impact on cost, livelihood, health, antibiotic residues, reduction in AMR load.

SURE GAME CHANGER

By now, there are ample studies to establish that the use of ethnoveterinary medicines present a way to reduce and conserve the use of antimicrobials critical for human healthcare and also provide safe milk to consumer. Ambika Prasad, Sundarban Co-operative Milk and Livestock Producers' Union, says, "We train our farmers for organic milk production, and ethnoveterinary medicines is part of the training programme." Reduced use of antibiotics in dairy farm also means lesser amount of unmetabolised antibiotics will find their way in to the dairy farm waste. Use of such antibiotic-free dung as manure for other agricultural farms will also prevent the inter-sectoral transfer of resi-

Ethnoveterinary preparations provide a simple, cost effective and efficient option to milk producers

R S SODHI
Managing Director, Amul Dairy, Gujarat

To scale up ethnoveterinary medicines, NDDB has propagated materials for various ailments in forms like videos, brochures, posters and apps in major languages

MEENESH SHAH
Chairman, NDDB

dues or resistant bacteria. This will add to the organic movement by being AMR safe. Studies also suggest that this will also help improve carbon sequestration of soil.

A study by TDU and Tamil Nadu Veterinary and Animal Sciences University in Chennai, published in the *Research & Reviews: Journal of Veterinary Sciences* in 2017 shows that use of ethnoveterinary medicines led to a reduction of antibiotic residues in milk. Twenty seven animals infected with clinical mastitis were treated by applying ethnoveterinary formulation externally over the udder 10 times per day for seven days. Affected cows were also fed with two lemon fruits twice daily. Post-intervention impact analysis after one year showed up to 18-49 per cent reduction in antibiotic residues. "Due to the problem of resistance, there is only 20-25 per cent cure rate of mastitis cases with allopathic therapy, but we have seen above 80 per cent cure rates for mastitis and several other ailments with herbal preparations", says Arvind Yadav, Manager, Saahaj Milk Producer Company, Agra.

There is also some momentum around integrating Ayurveda and its allied disciplines into veterinary science. TDU has also initiated a PG Diploma course in EthnoVeterinary Practices jointly with Tamil Nadu Veterinary and Animal Sciences University (TANUVAS). Some 61 veterinarians have already enrolled for the course. "We have signed an MoU with the Ministry of AYUSH where we are not only talking about R & D on the herbal products but also bringing this education into the formal system of education in the veterinary curriculum", said Praveen Malik, Animal Husbandry Commissioner of the Department of Animal Husbandry and Dairying.

The use of ethnoveterinary medicines as an alternative to the use of antimicrobials seems promising as the country is the largest producer of milk in the world, contributing 23 per cent of global milk production. But for this to happen, the Union and state governments should promote upscaling ethnoveterinary medicines at the federation level as well as big and small milk producers and procurement agencies through suitable policies and programmes. This should involve:

- Creating awareness among veterinarians, para-veterinarians, farmers, milk procurement agencies, dairy collectives through training and capacity building
- Develop a research agenda, promote pilot projects across states for different diseases and formulations, and publish results for greater learning and trust building among stakeholders
- Modify curriculum for veterinarians to include ethnoveterinary medicines
- Make available ethnoveterinary medicines preparations/products and appropriately regulate them for price and quality
- Make ethnoveterinary medicines ingredients/preparations available through supporting herbal gardens and manufacturing/mixing plants such as through self-help groups, local producers, community as well as small and medium enterprise
- Monitor ethnoveterinary medicines interventions and document their impact on cost, livelihood, health, antibiotic residues, reduction in AMR load etc.
- Incentivize antibiotic free milk or milk produced without use of antibiotics and labelling of milk and milk products
- Make consumer aware about ethnoveterinary medicines in dairy and its role in reducing antibiotic residues in milk and AMR
- Incentivise cattle dung not treated with antibiotics for use in crops as organic manure
- Ethnoveterinary medicines should be promoted for poultry and aquaculture wherein a lot of antibiotics are used and can be replaced. Similar measures can be adopted if initial results are positive. DTE