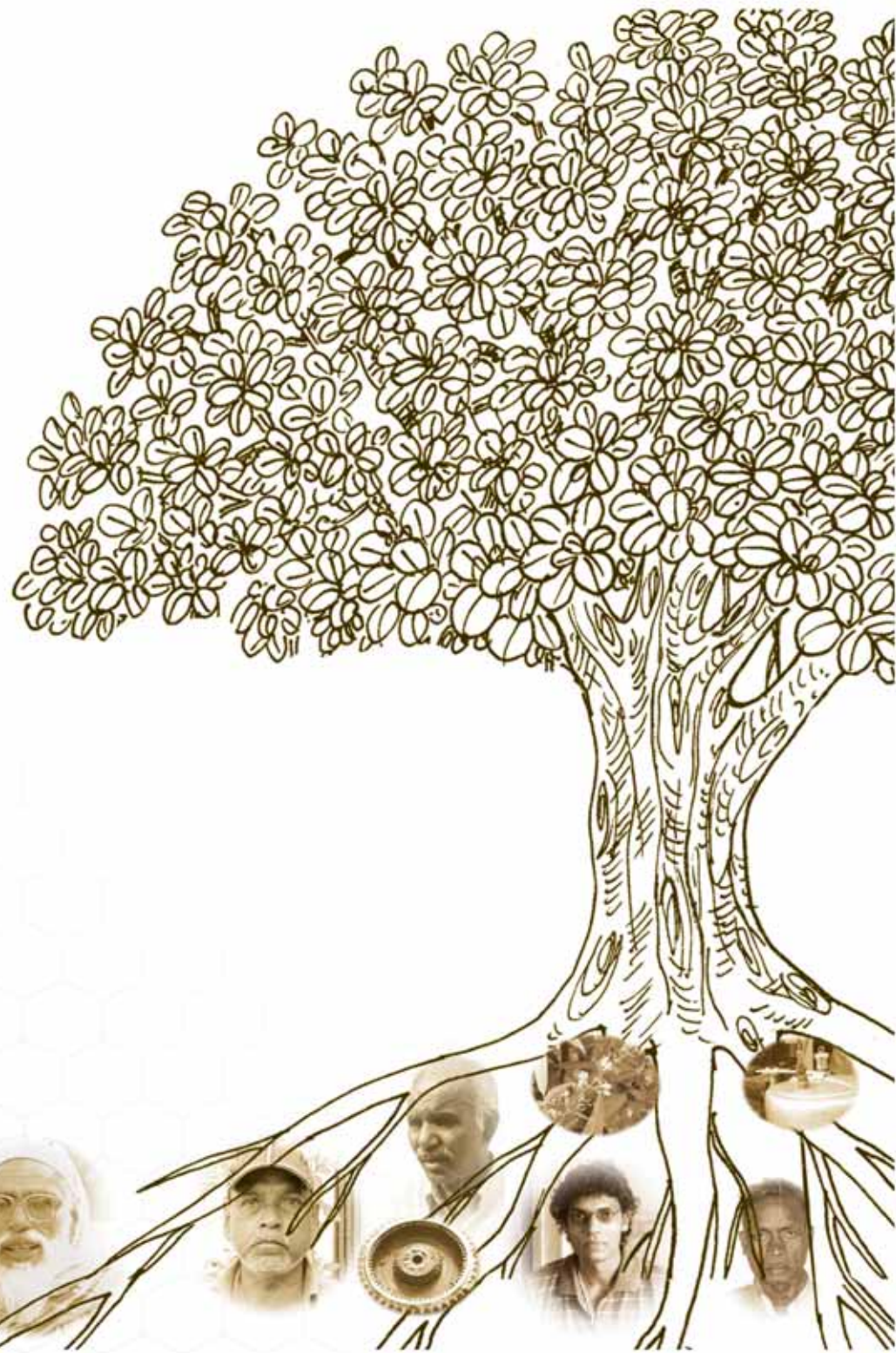


BIHAR INNOVATES



BIHAR INNOVATES



HONEY BEE NETWORK

www.honeybee.org

Regional Collaborator
Dr. Ambedkar Sansthan (AWCCDS), Siwan

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PREFACE

National Innovation Foundation (NIF) has been pursuing the mission of making India innovative and a creative society since 2000 with the active support of Department of Science and Technology, Government of India. Till date NIF has been able to scout innovations and traditional knowledge practices from over 520 districts across India.

Thanks to the support of volunteers from Honey Bee Network, we have been able to discover many unsung heroes and heroines of our society who have solved local problems without any outside help.

Despite various constraints, NIF has put together a small book celebrating creativity, innovation and traditional knowledge from Bihar. I am conscious of its limitation in terms of coverage and outreach. But if we could uncover at least a few examples of the ability of local communities and individuals to solve problems on their own without outside

help, how much more can be done if state and private sector agencies join hands with NIF actively.

I invite the state government and its various organs to actively support our quest to uncover many more creative communities and individuals in rural and urban areas. NIF will then help in building value chain around them.

The book is divided in three parts. The mechanical innovations developed by innovators from Bihar are covered in part one. Selected examples of herbal traditional knowledge are given in part two. The innovations from other parts of the country suitable for the development of Bihar are given in part three.

By no stretch of imagination, could we claim that we have achieved a great deal. We have merely made a simple point. There are a large number of knowledge rich people who may not have been educated much, may in fact be

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economically poor also, but still have the ability to solve a few problems so well.

The challenge really is to work out a synergy so that no creative voice remains unheard, and no solution remains localized and unrecognized. By adapting public policy in support of grassroots innovators and traditional knowledge holders, we can make economic development process more inclusive and sustainable.

This book on innovations has been compiled at the request of Dr. Vijay Kelkar, Chairman, Finance Commission and the Member, Governing Council of the National Innovation Foundation as a tribute to the creativity and innovation at grassroots. This presentation is part of a series of innovation compendium prepared for every State of India. We hope this will be followed up in the form of concrete policy and institutional initiatives in each State to empower creative

people to improve the quality of life of common people and thus promote inclusive growth.

It is my belief that such examples will act as spur for other State government departments to look for creative efforts of their staff and users at ground level. I hope that NIF will have the opportunity to work closely with the State government in future and expand knowledge base, add value to selected technologies and help them diffuse through commercial and non-commercial social channels for improving the livelihood of the majority of the people.



R. A. Mashelkar, FRS
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Building a Bridge with Grassroots Innovators in Informal Sector

To make the Indian development process more inclusive, there is no escape from building upon creative and innovative experiments pursued by common people at village or semi-urban level. Many of these experiments lead to development of innovations, which can improve productivity and generate employment. However, the purpose of a particular innovator may often be to solve just his/her problem. There is no mechanism available for him to share the knowledge, innovation or practice with other people in different regions. Sometimes, ideas and innovations get diffused through word of mouth. But many times, these ideas remain localized. In the process, potential growth and social development gets constrained. To overcome this constraint, Honey Bee Network with a handful of volunteers triggered a movement, twenty years ago to scout, spawn and sustain the unaided innovations and outstanding traditional knowledge from the informal sector of our country.

Drawing upon this experience, National Innovation Foundation (NIF) was set up in 2000 with the help of Department of Science

and Technology, Government of India to scale up the idea of learning from grassroots innovators.

Under the inspiring leadership of Dr. R. A. Mashelkar, Chairperson NIF and former Director General, Council of Scientific and Industrial Research (CSIR), NIF has taken major initiatives to serve the knowledge-rich, economically poor people of the country. It is committed to make India innovative by documenting, adding value, protecting the intellectual property rights of the contemporary unaided technological innovators, as well as of outstanding traditional knowledge holders. It aims at promoting lateral learning among local communities to generate low cost affordable solutions of the persistent and emerging problems, and enhance the diffusion of innovations on a commercial as well as non-commercial basis.

How does NIF work?

Primarily, NIF has five functions: (a) Scouting and documentation, (b) Value addition and research and

¹ The Honeybee collects pollen from the flowers but they are not impoverished, in the process links one flower to another enabling cross-pollination. Similarly, the Honey Bee Network strengthens people-to-people contacts, learning and networking by pooling the solutions developed by individuals across the world

in different sectors. The network acknowledges the innovators, traditional knowledge producers and communicators so that they do not remain anonymous.

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development, (c) Business development and Micro Venture, (d) Intellectual Property Rights protection and (e) Dissemination, database development and IT applications.

NIF has been entrusted with the responsibility of building a National Register of Grassroots Innovations and Traditional Knowledge. It is not enough to document or disseminate the innovations or outstanding traditional knowledge. Value addition is very important for harnessing the full potential of the idea. NIF has entered into MOU with CSIR and Indian Council of Medical Research (ICMR) besides other organizations. CSIR has allocated funds to support research on grassroots innovations in CSIR labs. Similarly, ICMR supports research on such herbal healing knowledge, which has not been documented in the classical texts and formal institutional literature. NIF also helps in generating a very large pool of open source / public domain technologies. A small number of innovations are also protected by patents and other IPRs.

For most innovators, attracting risk capital for converting innovations into enterprise is very difficult. They neither can offer much collateral nor are they able to develop a business plan or deal with formal R&D system.

A Micro Venture Innovation Fund (MVIF) has been set up with the help of SIDBI to provide risk capital for technologies at different stages of incubation. Under single signature, innovators are trusted and investments are made to help them commercialise their innovations. Most innovators do not make good entrepreneurs. For entrepreneurship, one has to make consistent batch by batch production of products. Innovators are often incorrigible improvisers. They seldom make two things alike. NIF has helped such innovators to license their technologies to third party entrepreneurs. Most of the licenses have been given to small entrepreneurs and in a few cases, to medium enterprises.

A very elaborate benefit sharing system has been developed, governed by the Prior Informed Consent (PIC) of the knowledge

The Honey Bee Network strongly believes in sharing knowledge among the providers of innovations in their own language, which is achieved by publishing local language versions of Honey Bee newsletter. It also ensures that a fair

share of benefits arising from commercial exploitation of local knowledge and innovations reaches the innovators and knowledge providers.

providers. Attempt is made to share benefits not only with the innovators but also with their communities and for nature conservation. In addition, a small part is kept for contingency support to needy innovators, for R&D stakeholders, promoting women's innovations and meeting overhead costs.

It is remarkable that grassroots innovations are generating global demand, as evident from inquiries from around fifty-five countries for various technologies, NIF has succeeded in commercializing products across countries in six continents apart from being successful in materialising thirty cases of technology licensing with the help of partner agencies.

What has it done?

With major contribution from the Honey Bee Network, NIF has been able to build up a database of more than 1,00,000 ideas, innovations and traditional knowledge practices (not all unique, not all distinctive) from over 520 districts of the country.

NIF has filed 198 patents in India and seven in US and one PCT application. Out of these, 33 patents have been granted to grassroots innovations in India and four in US. NIF has funded

113 projects under MVIF to the extent of Rs.1.3 crores. Hundreds of technologies have diffused through farmer to farmer social network.

NIF has proved that Indian innovators can match anyone in the world when it comes to solving problems creatively. Where they perform better than rest is in generating more affordable sustainable solutions by using local resources frugally.

Those who see poor only as the consumer of cheap goods, miss the knowledge richness at the grassroots level. The Poor can be the Providers also.

The Grassroots to Global (G2G) model that NIF is propagating is all set to change the way the world looks at the creativity and innovations at grassroots.

How can state government join hands with NIF?

- a. NIF has no field extension unit nor does it want to have one. However, state government has several field functionaries in the area of agriculture, education, industry, rural development, women and child care, forestry, etc. There can be a very fruitful partnership between NIF as a

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- source of innovative ideas and technologies and state government as partner in dissemination, value addition and even commercialization through incentives, promotion, subsidies, etc.
- b. State government can join the national campaign for scouting innovations and traditional knowledge and motivate its grassroots functionaries to join hands with NIF in uncovering the talent at the community level.
 - c. Students in schools and colleges can be motivated to scout creative and innovative people in their neighbourhoods and send the entries to NIF (Post Box No.15051, Ambavadi, Ahmedabad 380 015, campaign@nifindia.org). Examples of innovations can also be included in the curriculum for the school and college education.
 - d. Demonstrations and trials can be organized at various regional research stations and KVKs (Krishi Vigyan Kendras) so as to create awareness about the creative potential of common people.
 - e. The research institutions can be mandated to add value to the knowledge of innovative people and help in protecting their knowledge rights.
 - f. On the state's website, link to NIF can be given and the innovations from the region can be displayed to put forward the creative face of the state before the people.
 - g. Some of the innovative people identified by NIF and/or state government could be awarded at district and state level besides giving them support for further work.
 - h. A nodal officer could be appointed to keep in dynamic touch with NIF to ensure that all the areas of possible cooperation are explored.

I hope that NIF would be able to develop a functional, fruitful and fulfilling relationship with the State of Bihar. Tremendously rich knowledge of biodiversity and environment besides numerous grassroots innovations can be leveraged through the proposed collaboration.



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“Innovation opens up new vistas of knowledge and new dimensions to our imagination to make everyday life more meaningful and richer in depth and content”.

- Dr A P J Abdul Kalam



“The purpose of innovation is to create a new value for an individual, team, organization or for society at large”.

- Dr R A Mashelkar

PART I

INNOVATIONS

from BIHAR

This section contains grassroots innovations emerging from rural/urban areas of Bihar





Mohammad Rozadin
East Champaran

Cooker for coffee

Conventionally, the pressure cookers have been used for making food only. However, the innovator has modified the normal cooker and made it into an espresso coffee making machine.

The modified cooker is used to boil water and generate steam. It is then passed through a modified delivery system, attached to the lid, to a jar containing milk, coffee and sugar. In five minutes frothy, tasty coffee gets ready!

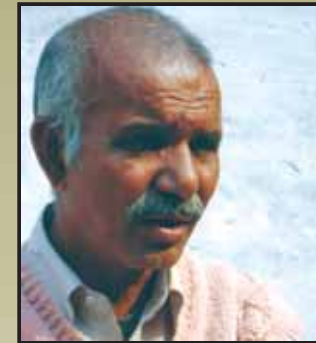
The modified cooker has been in great demand and even tea stall vendors from nearby districts have bought it for their shops.



Reducing the pollution

For operating a welding machine, the generator used by the innovator emitted a lot of flue gases and also produced unwanted noise. To solve this problem, the innovator retrofitted a cylindrical container to the exhaust pipe of the engine. The specific arrangement of different types of fins in the cylinder filters out the particulates and allows the clean air to pass, resulting in very low emissions and thus controlling pollution and reducing noise.

BIT Mesra, Ranchi has confirmed considerable reduction in the proportion of carbon monoxide and carbon dioxide in the flue gases after adding the device instead of conventional muffler. The temperature of the flue gas was also reported to be significantly reduced. The testing was facilitated by NIF.



Virendra Kumar Sinha
East Champaran





Ramashankar Sharma
Siwan

Handpump with a change

The plunger design of a hand pump has been modified by the innovator, which has resulted in substantial increase in the efficiency. The change of material has also helped in reducing the cost and weight as well.

BIT Mesra, Ranchi tested the same at NIF's instance and found that the hand pump with the modified plunger gave 69 percent more discharge than the hand pump with the conventional plunger for the same number of strokes and head.



Novel gear mechanism & Cap for the wooden pencil

Novel gear mechanism

The innovator has come up with this device to reduce the hard work involved while riding a bicycle/rickshaw uphill. The new gear mechanism enables a person to pedal backwards and yet move the cycle forward, thereby reducing effort and fatigue. It also prevents the reverse motion of the vehicle on slopes.

Cap for wooden pencils

The innovator has interestingly devised a cap for the normal wooden pencil, which prevents the tip from being broken easily. The cap also has an eraser and a sharpener to address the other needs of the user.



Nishant Ray
Khagaria





Mohammad Saidullah
East Champaran

Amphibious bicycle & others

Saidullah's penchant for innovations has made him lead such a rich life that it can inspire generations to come. He made the amphibious bicycle in mid 1970s to cross over from one place to another during a flood in the region. Thereafter he has been churning one innovation after the other over the years with his latest being an amphibious rickshaw. Among his many innovations a few that can be mentioned are a mini tractor, key operated table fan, fodder cutter operated centrifugal pump, spring loaded bicycle, mini turbine etc.

The serial innovator, Shri Saidullah was given the Life Time Achievement Award at the hands of the then President of India, in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.



Bicycle that can be carried in a bag

A gritty and hard working graduate, Sandeep made this folding bicycle, which can be assembled and dismantled easily in a very little time. When dismantled and folded, the bicycle becomes portable such that it can be put in a bag and carried along!



Sandeep Kumar
Muzaffarpur





Ghulam Rasul
Katihar

Solar cycle along with FM, radio and charging facility & Multifunctional emergency light

Solar cycle along with FM, radio and charging facility

Move over petrol and electricity operated two-wheelers for here comes the solar cycle, working on solar batteries. Using a 12 V motor, the cycle gives a speed up to 30 km per hour, good enough for a joyful city ride. It also has a tape recorder and FM radio for listening pleasure apart from a plug point, which enables the stored energy to be used for charging/operating various small devices.

Multifunctional emergency light

Who says an emergency light can only be used for lighting purposes? Definitely not the innovator, for he has come up with a solar powered light having tubes that can glow up to twelve hours, along with a FM radio, a mobile charger, a WLL Telephone battery charger and a 12 V DC fan that can be operated for four hours. Apart from solar energy, this emergency light can also be conventionally charged by electric power.



Tobacco leaf cutting machine

It is a manually operated machine for cutting tobacco leaves. The leaves are passed between the cylindrical rasps, flattened and then cut. Depending upon the cutting requirements, adjustments can be made in the assembly also.



Udayshankar Sharma
Sheikhpura





Dharendra Kumar
Muzzaffarpur

New brake mechanism in bicycle

This bicycle is unlike normal bicycles where a lever attached to the cable is pressed to apply the brakes. In this bicycle an accelerator like action is used, where by rotating the hand grip, the brakes are applied.

The innovator has also modified a foot operated water pump to make it more efficient.

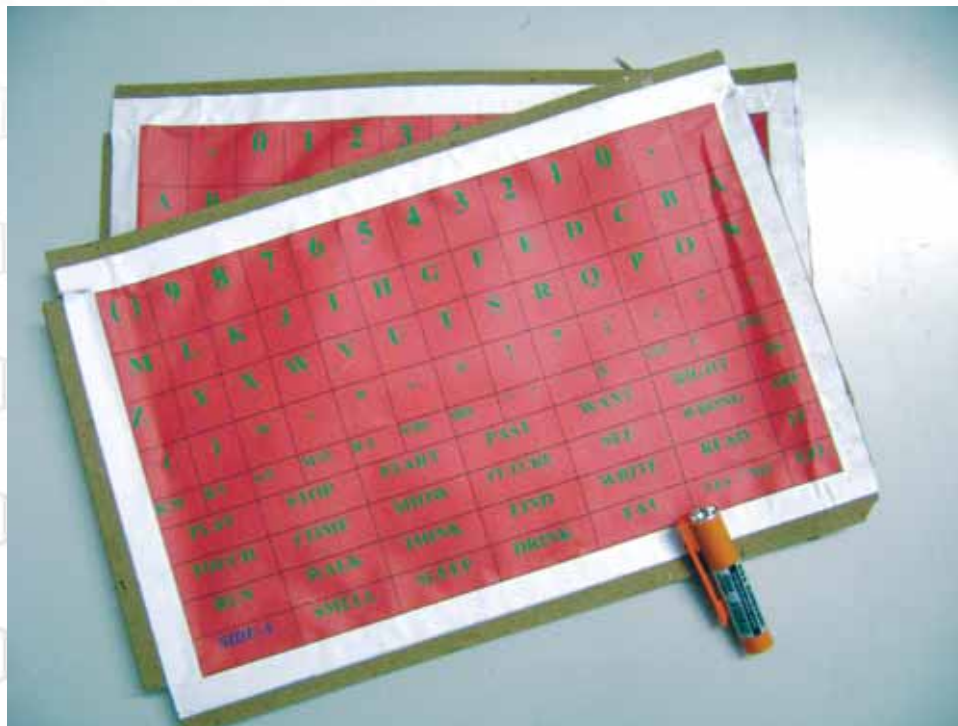


Communication board for the deaf and the dumb

This thoughtful effort from a student enables deaf and dumb people to communicate with others as well as among themselves easily. This is a board that has alphabets, numbers and commonly used words written on it. The user has a torch, which is used to illuminate the specific word, alphabet or number such that the person viewing the board can understand the meaning.



Kundan Kumar
Patna

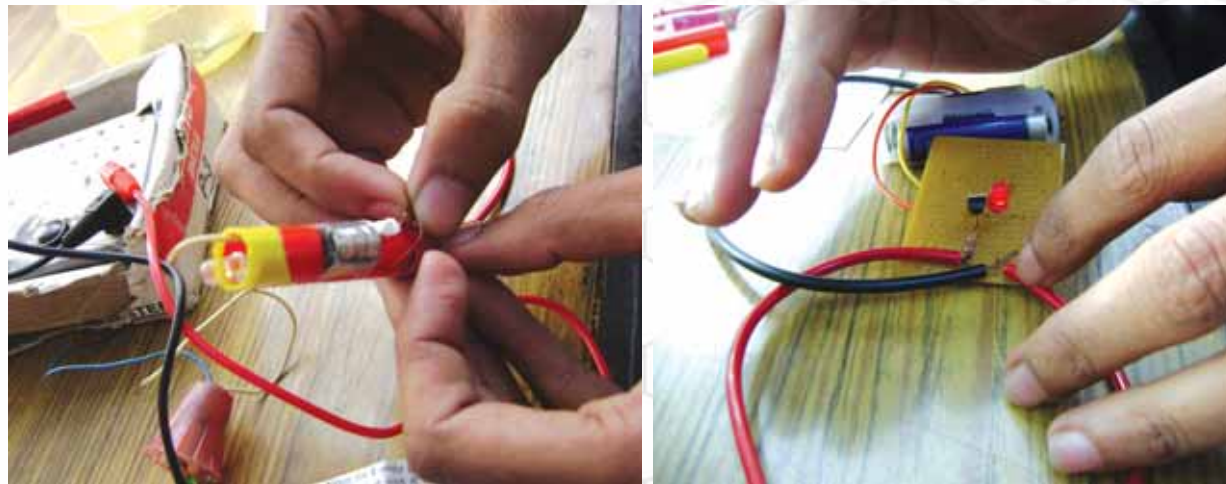




Manish Nirmohiya
Patna

Pen multimeter

The innovator has modified a ball pen to act as an electric current tester and a sort of multimeter to check diode, resistance and capacitor's ratings. Moreover, it also has a small LED which can be used at night as a source of light.



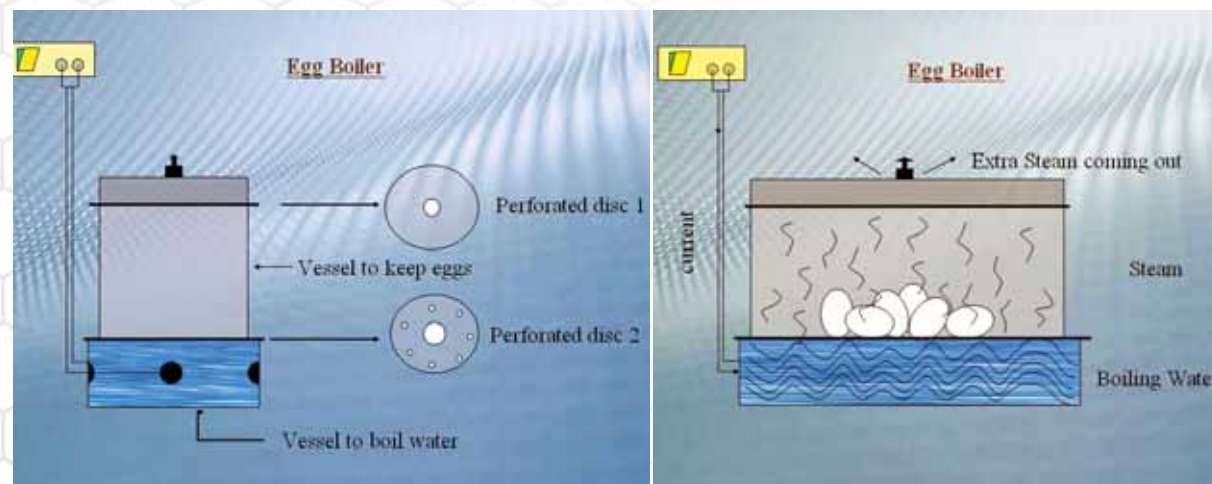
Efficient egg boiler

Understanding that steam at an equal temperature is hotter than water, Pradeep has come up with an egg boiler that uses steam instead of water to boil the eggs. In the lower compartment water boils and the steam rises through a perforated opening to the upper chamber where the eggs are kept. This way the eggs boil quickly saving fuel.

The innovator was awarded in the student's category in NIF's First National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2001.



Pradeep Mandal
Purnia





PART II

HERBAL PRACTICES & PRODUCTS

This section contains details of herbal preparations used traditionally for various ailments and products based on such traditional knowledge.



Uses of *Achyranthes aspera* L. (Apamarg)

NIF Database

Uses from Bihar

Toothache

Teeth are brushed with freshly plucked roots
- *Bhagvat Prasad Yadav, Nawada, Bihar*

Itching

Powdered roots (5g) are taken orally with water twice a day for seven days
- *Indira Kumari, East Champaran, Bihar*

Fever

Roots (5g) are ground with half black pepper into a fine powder, which is administered orally
- *Rajkishor Prasad, Shivhar, Bihar*

Hemorrhoids

Dried roots are ground into a fine powder; one spoon of this taken on an empty stomach till the ailment cures
- *Vishwanath Mahato, East Champaran, Bihar*

Veterinary practice

Topical inflammation

Plant paste is applied externally on topical inflammation
- *Sheikh Hifazat Hussain, East Champaran, Bihar*

Uses from other states

Headache

Tablets (of about 5g) are prepared from the pounded roots; one tablet is taken in the morning with water for three days
- *Jagjit Bahadur, Sitapur, Uttar Pradesh*

Asthma

The whole plant (50-100g) is ground into a fine powder. 5g of this powder is taken with water till cured
- *Ahmed Hussain, Lohardaga, Jharkhand*

Poisonous bites

Root paste is applied on the spot of bite and also administered orally
- *Jagjit Bahadur, Sitapur, Uttar Pradesh*

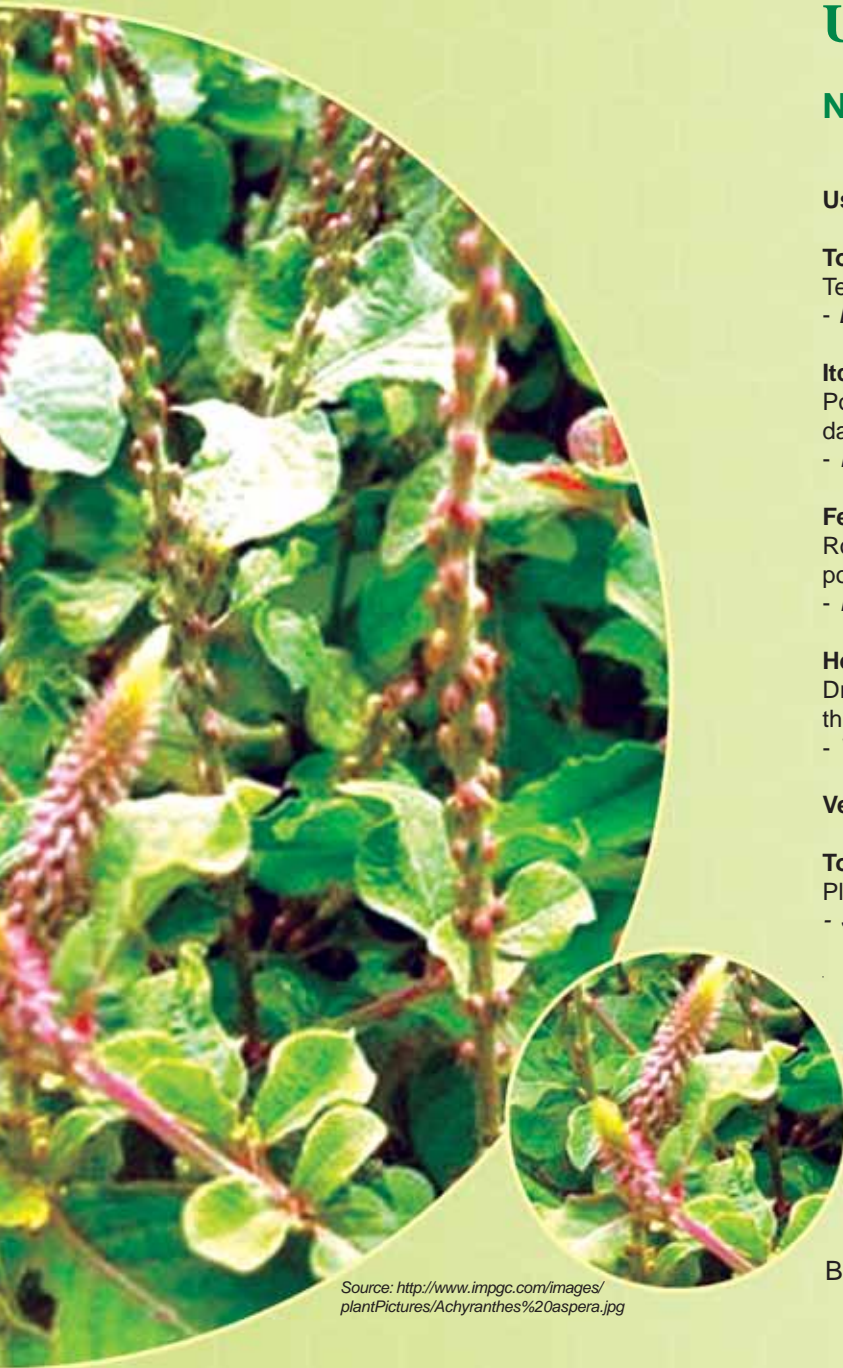
Abscess

Root paste is applied on the abscess
- *Ravi Uraav, Hazaribagh, Jharkhand*

Uses in Classical Codified Literature

Dried aerial parts are taken orally in case of diabetes¹; powder made from the dried plant given orally to treat whooping cough²; decoction of the plant used as laxative³; decoction of the plant applied externally on boils and pimples³.

Product 'Cystone'⁴ is made from this plant, which inhibits calculogenesis by reducing stone-forming substances like oxalic acid, calcium hydroxyproline and prevents urinary tract infections. Thirty five patents have been found on the medicinal applications of *Achyranthes* like for curing laryngopharyngitis⁵, bronchial asthma⁶ etc.



Source: <http://www.impgc.com/images/plantPictures/Achyranthes%20aspera.jpg>

Uses of *Aegle marmelos* (L.) Corr. (Bel)

NIF Database

Uses from Bihar

Ulcer

Leaves of bel (100g), petals of rose (100g) and turmeric (50g) are pounded and mixed with honey (50g). Tablets are prepared from this mixture and given thrice a day for 7-10 days
- Rameshwari Singh, Nawada, Bihar

Fever

Leaves of bel and chirayata (*Andrographis paniculata* (Burm.f.) Wall.ex Nees) 250g each are boiled in a litre of water to obtain a decoction of 250g. 100g decoction is given to the patient twice a day for seven days
- Sindhoo Kumari, Gopalganj, Bihar

Jaundice

Freshly plucked green leaves are soaked in a glass of water. This water is taken on an empty stomach 2-3 times a day till the ailment cures
- Akhilesh Kumar Yadav, East Champaran, Bihar

Diabetes

Equal quantity of leaves of bel and fruits of Indian gooseberry are taken and the juice is extracted. A teaspoon of the juice is given to combat the disease
- Vinita Kumari, Sitamarhi, Bihar

Veterinary practice

Abdominal pain

Leaves of *Aegle* and *Euphorbia neriifolia* L., flower of *Tagetes erecta* L., are mixed with fodder and fed to the animal
- Dipendra Kumar, East Champaran, Bihar

Uses from other states

Eye diseases

Juice is extracted from the green leaves and two drops are put in the eye
- Kumari Nigar Pravin, Hazaribag, Jharkhand

Sunstroke

Juice is extracted from the fresh leaves and taken orally
- Vijaya Bharati, Hazaribag, Jharkhand

Intestinal worms

Juice is extracted from the green leaves and taken orally
- Jagjeet Bahadur, Sitapur, Uttar Pradesh

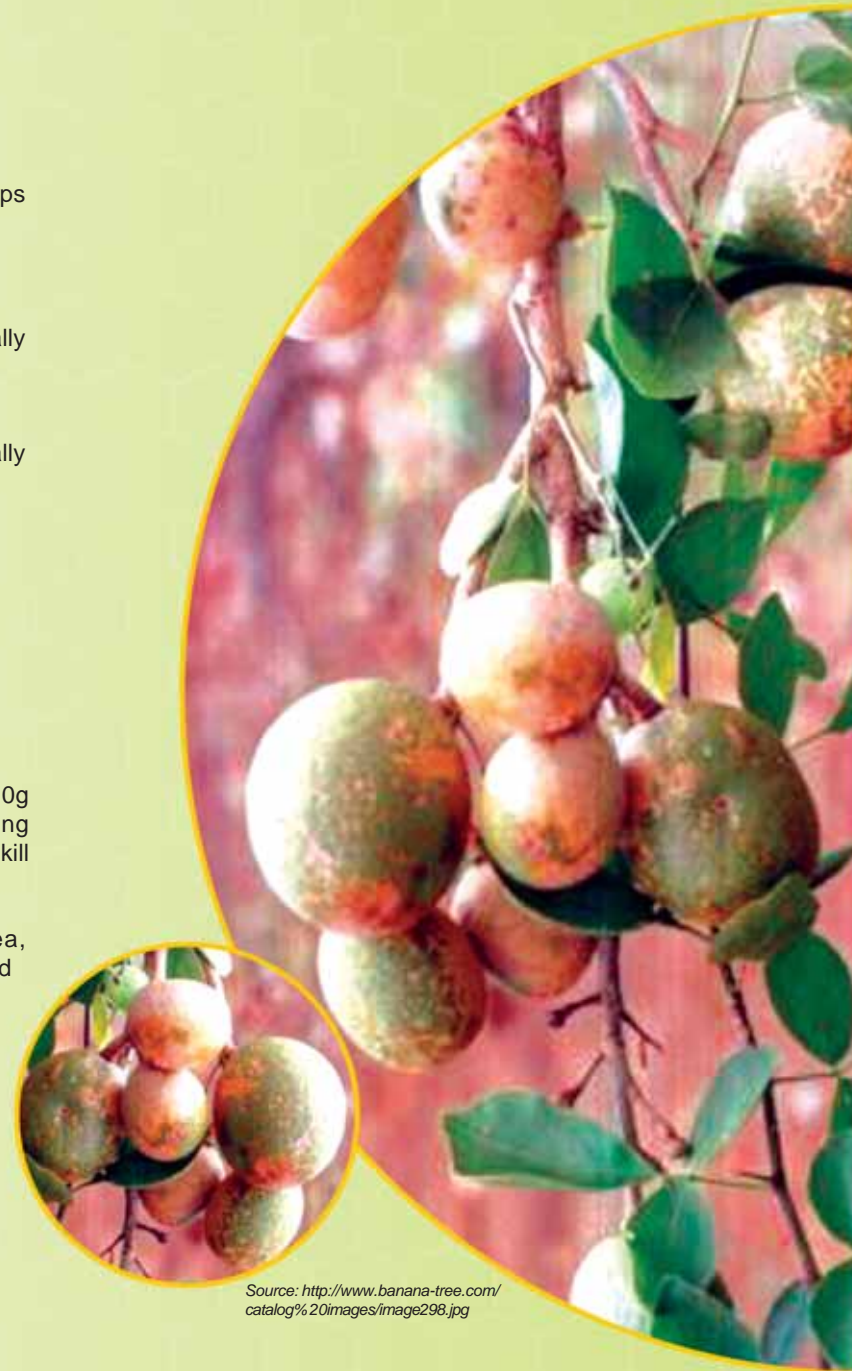
Diarrhoea

Pulp of the ripen fruit is taken orally
- Jagjeet Bahadur, Sitapur, Uttar Pradesh

Uses in Classical Codified Literature

Burnt fruit pulp is applied on rheumatic arthritis²; 10g fruit pulp is given before sleep to overcome morning sickness⁷; fruit rind is applied externally on head to kill headlice⁸.

'Bael'⁴, prepared from *Aegle* is used in diarrhoea, dysentery and GI disorders. It has digestive and carminative properties. 'Lukol's'⁴ tonic is made from this plant along with other plants, which improves uterine circulation, and its antimicrobial and astringent actions on the mucous membrane of the genital system control leucorrhoea. 'Bilwa'⁹, a product of *Aegle*, is used as a medicine to cure a number of diseases. Fifty three patents have been found on the medicinal applications of *Aegle* like for treating diabetes¹⁰, gastric ulcer¹¹etc.



Source: <http://www.banana-tree.com/catalog%20images/image298.jpg>

Uses of *Boerhaavia diffusa* L. (Punarnava)

NIF Database

Uses from Bihar

Jaundice

Juice extracted from the plant is given orally for three days consecutively

- Jagnarayan Singh, Gopalganj, Bihar

Kidney stone

Milk boiled with the roots is taken

- Monika Kumari, Sitamarhi, Bihar

Stomach disorder

Juice is extracted from the plant and mixed with equal amount of cow's urine. Two spoonful of the mixture is taken

- Monika Kumari, Sitamarhi, Bihar

Uses from other states

Headache

Leaves are ground into a fine paste and applied on the forehead

- Sukumar Nath, North Tripura, Tripura

Conjunctivitis

Decoction of the root (50g) is given once a day

- Ramnarayan Gameti, Udaipur, Rajasthan

Cough

Leaves of punarnava (5g), one small onion, a small piece of ginger and a spoonful of cardamom are cooked well and taken orally

- Hasina Khan, Margav, Goa

Uses in Classical Codified Literature

Juice extracted from the leaves is given with milk to get relief from cataract¹²; decoction of the plant is given orally to purify blood¹³; the plant extract is used as diuretic¹⁴; decoction of the leaves is applied externally in case of any skin infections¹⁵.

'Liver-kidney care'¹⁶ is made from this plant, which works synergistically on the liver and kidney to heal and prevent infections in both systems. Fourteen patents have been found on the various medicinal applications of *Boerhaavia* for different ailments like liver disorders¹⁷, hypertension¹⁸ etc.



Source: SRISTI database

Uses of *Bombax ceiba* L. (Semal)

NIF Database

Uses from Bihar

Pimples

Paste made using thorn and milk is applied on the pimples for seven days

- Pravin Kumar Sharma, East Champaran, Bihar

Wound

Fresh bark is ground and the paste is applied on the infected part

- Pravin Kumar Sharma, East Champaran, Bihar

Diarrhoea

Juice from the leaves is extracted and a spoonful given to the patient along with sugarcandy for four days

- Neha Kumari, East Champaran, Bihar

Veterinary practice

Bloat

Fruits (100g) are mixed with an equal amount of buffalo ghee and fed to the animal twice a day

- Ramnath Thakur, East Champaran, Bihar

Uses from other states

Gynaecological disorder

Powdered gum (5g) is mixed with water and given to the patient to drink for five days

- Jugeshwar Ram, Hazaribag, Jharkhand

Constipation

Bark powder (3g), coriander powder and jaggery is taken with water

- Devaram, Sirohi, Rajasthan

Piles

Paste (10g) of roots is taken with water for seven days

- Antaryami Pradhan, Angul, Orissa

General health

Few flowers are soaked in a glass of water overnight and the water is taken next morning to give a coolant effect to the body

- Mukta Kumavat, Sikar, Rajasthan

Uses in Classical Codified Literature

Decoction of the bark is given orally to combat fever¹⁹; diabetics should take decoction of the heartwood²⁰; and to reduce stomachache administer bark juice ²¹.

Product 'Acne-n-Pimple Cream'²² is prepared from *Bombax* along with other plants to treat pimples and skin eruptions. 'Evecare'⁴, a multi herb product made from this plant, has a regularizing influence on the menstrual cycle. Eight patents have been found on the medicinal applications of *Bombax* like for skincare²³, AIDS²⁴ etc.



Uses of *Carica papaya* L. (Papita)

NIF Database

Uses from Bihar

Kidney stone

Pounded roots (6g) are mixed with water (50g) and taken orally

- Sandhya Suman, Sitamarhi, Bihar

Intestinal worms

Fresh latex from a branch is taken and administered orally along with a spoonful of honey

- Prabhat Kumar Pandey, East Champaran, Bihar

Ringworm

Milky latex is applied topically

- Mukesh Kumar, East Champaran, Bihar

Veterinary practice

Lactogogue

Fruits are fed daily to enhance milk production

- Manoj Kumar, Madhubani, Bihar

Uses from other states

Toothache

Cotton dipped in the latex of the stem is kept on the aching tooth

- Mangeram Jani, Hissar, Haryana

Headache

Seeds and garlic are ground into a fine paste and applied on the forehead

- Saiba Barman, Borpeta, Assam

Jaundice

Curry made from the raw/unripe fruit is taken orally

- Sharda Devi Gangwal, Jaipur, Rajasthan

Uses in Classical Codified Literature

Decoction of the flower is used as cardiotoxic²⁵; bark powder is applied externally on wounds²⁶; decoction of the bark is given orally to get rid of intestinal worms²⁷; beverage of the fruit is taken orally to cure diarrhoea²⁸.

Natural moisturisers and creams²⁹ are prepared from *Carica* in combination with other plants. Thirty patents were found on its medicinal uses such as an antiallergic³⁰ and for prevention of cancer³¹.



Uses of *Datura metel* L. (Dhatura)

NIF Database

Uses from Bihar

Cough

Juice from the roasted leaves is extracted; two spoonful of the juice is mixed with a spoon of ghee and taken orally

- Mohani Kumari, Lakhisaray, Bihar

Bodyache

Equal quantity of leaves of dhatura, bark of neem, leaves of chirayata (*Andrographis paniculata* (Burm.f.) Wall.ex Nees), leaves of tobacco are taken and boiled in 1 litre of water till the total solution is reduced to 1/4th. Sesame oil is then mixed in it and the mixture applied on the affected part

- Lalbabu Sahni, Madhubani, Bihar

Arthritis

Leaves of dhatura, *Anthocephalus chinensis* (Lamk.) A.Rich.ex.Walp. (ten each) and ginger (100g) are ground together with sugar (50g), and the paste is applied on the aching body part

- Ramanand Shah, East Champaran, Bihar

Eczema

A fruit is roasted and ground to make a fine powder, sesame oil (250g) and milk are then added to make a paste. The paste is applied on the infected part

- Vikas Kumar, Nawada, Bihar

Veterinary practice

Diarrhoea

Roasted fruits are given with fodder

- Jawaharlal Prasad, East Champaran, Bihar

Uses from other states

Alopecia

Juice is extracted from the leaves, smeared on the head, and left for 30 minutes

-Bansi Ghosal, West Midnapur, West Bengal

Headache

Seeds are chewed and spat for instant relief

- Ganesh Das, Sirohi, Rajasthan

Asthma

A seed soaked in water is taken orally initially, gradually a seed is increased every week for five weeks

- Rani Farhat, Hazaribag, Jharkhand

Diarrhoea

Seeds are ground with little water. The mixture is filtered and administered orally

- Ajit Singh Rathod, Nagor, Rajasthan

Uses in Classical Codified Literature

One fruit, filled with 10g *Piper longum* L. is burnt and 5g of the ash is taken with honey, morning and evening for 5 days to cure malaria³²; the thumb is kept inserted within the fruit to treat finger felon³³; root paste is applied externally on poisonous bites³⁴. 'Muscles & joint rub'⁴ is a highly effective medicine for backache, muscular sprain and joint pain made from the plant.



Uses of *Eclipta alba* (L.) Hassk. (Bhangra)

NIF Database

Uses from Bihar

Greying of hair

Handful of leaves are ground and mixed in mustard oil (50g). The mixture is then applied on the head
- *Supriya Kumari, Lakhisaray, Bihar*

Earache

1-2 drops of the juice is extracted from fresh leaves and used as ear drop
- *Dipak Kumar Tiwari, Gopalganj, Bihar*

Jaundice

Juice is extracted from the plant and three spoonful are given orally along with sugar candy (50g) twice a day till the ailment cures
- *Raghuvansh Prasad Singh, Munger, Bihar*

Uses from other states

Mouth sores

Fresh leaves are chewed for immediate relief
- *Sanjay Singh Uplana, Nagda, Madhya Pradesh*

Cough

Juice is extracted from the pounded leaves and honey is added. 1-2 drops of this is given thrice a day
- *Sanjay Singh Uplana, Nagda, Madhya Pradesh*

Bodyache

Juice is extracted from the leaves and applied
- *Vijay Gupta, Mujjafarpur, Uttar Pradesh*

Cuts

Shoot paste is applied on cuts
- *Rani B. Bhagat, Pune, Maharashtra*

Uses in Classical Codified Literature

Powder of dried aerial parts is used for asthma³⁵; buds are ground in sesame oil and applied on the forehead to get rid of headache³⁶; plant is applied on ringworm lesions³⁷.

'Bhringraja'³⁸ is used as a liver tonic and for various chronic skin diseases. 'Eclipta tincture'³⁹, is a highly effective medicine of liver ailments such as cirrhosis and infective hepatitis and other conditions involving hepatic enlargement. Thirteen patents have been found on its medicinal applications mainly for liver disorders⁴⁰ and for hair care⁴¹.



Source: http://www.missouriplants.com/Whiteopp/Eclipta_alba_plant.jpg

Uses of *Holarrhena antidysenterica* Wall. (Indrajo)

NIF Database

Uses from Bihar

Fever

Leaves (5g), along with those of *Picrorhiza kurroa* Royale ex. Benth. (5g), are boiled in 100ml of water till the decoction remains 10ml. This is taken orally till the ailment cures

- Hariom Kumar, East Champaran, Bihar

Malaria

Equal amount of leaves of *indrajo* and *Cyperus rotundus* L. are ground into a fine powder. One spoonful is taken orally to combat the disease

- Chandan Kumar, East Champaran, Bihar

Dysentery

Paste is prepared from the bark. 10g of the paste is given along with a spoonful of honey

- Kundan Kumar, East Champaran, Bihar

Uses from other states

Kidney stone

Juicy paste of the bark is mixed with soured ghee and taken

- Robert L. Hnamte, Aizawl, Mizoram

Bodyache

Bark is ground in water; some quantity is taken orally and the rest is applied on the body

- Devaram, Sirohi, Rajasthan

Anemia

Paste of bark is mixed with salt and taken orally

- Robert L. Hnamte, Aizawl, Mizoram

Skin disease

The dried bark is powdered, mixed with ghee and honey and is taken orally

- Robert L. Hnamte, Aizawl, Mizoram

Uses in Classical Codified Literature

Dried bark powder is given orally to cure stomachache⁴²; seeds are ground into a powder, a dose of 5-10g of the powder is given with water as an antidote and a paste of the seeds is also applied locally to relieve pain and swelling on poisonous bites⁴³.

'Diarex vet'⁴⁴ is used for diarrhoea in cattle. 'Kutajarista and Kutajavaleha'⁴⁴ are the most popular preparations used in diarrhoea, dysentery, colitis and bleeding problems.

Thirteen patents have been found on its medicinal applications mainly for gastrointestinal disorders⁴⁵.



Source: <http://www.motherherbs.com/pcat-gifs/products-small/kudsappalai.jpeg>

Uses of *Leucas aspera* Spr. (Guma)

NIF Database

Uses from Bihar

Fever

Equal amounts of flower of guma; leaves of *Azadirachta indica* A. Juss., *Ocimum sanctum* L., roots of *Cyperus rotundus* L., *Solanum xanthocarpum* Schrad. & Wendl. and black pepper seeds are pounded and the juice extracted, two spoonful are taken orally
- Nushrat Jahan, Gopalganj, Bihar

Stomachache

Curry made from the plant is taken
- Usha Rani, Darbhanga, Bihar

Eczema

Plant is burnt and some coconut oil is mixed with the ash. The paste is applied on the infected body part
- Gokul Singh, East Champaran, Bihar

Piles

Equal amounts of roots of guma and black pepper are ground, a spoonful of the mixture is given twice a day till the ailment cures
- Umesh Mishra, East Champaran, Bihar

Veterinary practice

Anorexia

Juice is extracted from the leaves and flowers, 3-5 spoonful is given orally
- Chandrashekhar Prasad Kushwaha, East Champaran, Bihar

Uses from other states

Migraine

Juice is extracted from the freshly plucked leaves and 2 drops of the same is put in the nose
- Ramji Chink Badaik, Gumla, Jharkhand

Sinusitis

Juice of leaves is put in the nose
- Nayan Kalita, Kamrup, Assam

Jaundice

Juice from the pounded leaves is extracted and little quantity of goat urine is mixed; this is given twice a day for 4 days
- Shalini Shrivastava, Balia, Uttar Pradesh

Uses in Classical Codified Literature

Dried plant powder is applied on scabies⁴⁶; the plant is used as an anthelmintic⁴⁷; a handful of flowers (5g) are roasted in ghee and taken once a day to cure cough³⁷.

'Herbal Steam Bath'⁴⁸ is useful to get rid of various primary health and hygiene problems like cleaning and removing bad odour of the body, for treating burning sensation in eyes, watery eyes, headache, nausea, migraine etc.



Source: NIF Database

Uses of *Nyctanthes arbor-tristis* L. (Harshingar)

NIF Database

Uses from Bihar

Cough/cold

Paste is prepared using three leaves and black pepper. This paste is taken orally with water
- *Ashok Kumar Yadav, East Champaran, Bihar*

Diabetes

Decoction of the leaves is taken orally for 40 days
- *Shama Pravin, Gopalganj, Bihar*

Wound

Topical application of leaf paste gives relief
- *Ranjeet Kumar, Sheohar, Bihar*

Piles

Seed paste is taken orally with water
- *Lavli Kumari, Gopalganj, Bihar*

Uses from other states

Intermittent fever

Two leaves of harshingar, neem, three black pepper and four leaves of tulsi are ground in half litre of water and boiled till half a cup of residue remains. This is cooled and taken orally
- *Arjun Singh, Bharatpur, Rajasthan*

Intestinal worms

Oral intake of leaf juice kills the worms
- *Rani B. Bhagat, Pune, Maharashtra*

Pain

Fresh leaf paste is applied on the fractured part to alleviate pain
- *Ramsharan Dhruv, Dhamtari, Chhattisgarh*

Uses in Classical Codified Literature

Dried fruits are used orally to get relief from cough⁴⁹; decoction of dried flower is given with jaggery as an anti-fertility agent in females⁵⁰; leaf juice is applied externally on ringworm and other skin diseases⁵⁰.

'Lupin'⁵¹, a medicine used for pain and inflammation, is associated with musculoskeletal and joint disorders. Six patents have been found on its medicinal uses such as for treating Leishmaniasis⁵² and also for its natural property as adye⁵³.



Source: <http://prathom.swu.ac.th/panmai/pic/7-10110-002-110.JPG>

Uses of *Solanum nigrum* L. (Makoi)

NIF Database

Uses from Bihar

Cough

Juice extracted from the roots is taken orally
- Priyanka Kumari, Gopalganj, Bihar

Jaundice

Juice extracted from the roots is taken orally
- Suman Kumari, Gopalganj, Bihar

Uses from other states

Stomachache

Leaves of makoi (200g) are fried in mustard oil (20ml), salt is added and then taken orally
- Sukhai Mali, Faridabad, Haryana

Nasal bleeding

Dry fruit (25g) is boiled in mustard oil (100g), oil is filtered and applied on the forehead
- Sahim Ansari, Lohardaga, Jharkhand

Mouth ulcer

Leaves are chewed
- Shripal Singh, Bulandshahar, Uttar Pradesh

Uses in Classical Codified Literature

Powdered fruit is given orally to reduce fever⁵⁴; juice is extracted from the whole plant and applied externally on the burnt part⁵⁵; poultice of the plant is placed on the aching joint⁵⁶; fruits are ground and taken orally to cure diarrhoea⁵⁴.

'Herbolax'⁴, made from *Solanum* along with other plants, is used as gentle laxative, for constipation and electrolyte balance. Ninety patents were found for its medicinal uses mainly on hepatitis^{57, 58}.



Uses of *Vitex negundo* L. (Nirgundi)

NIF Database

Uses from Bihar

Stomachache

Powdered leaves of *Vitex*, *Cocculus hirsutus* (L.) Diels. and *Bombax ceiba* L. are mixed in equal ratio and taken
- Yusuf Khan, East Champaran, Bihar

Muscular pain

Leaves are smeared with mustard oil, warmed slightly and applied on the affected part
- Savita Kumari, Gopalganj, Bihar

Veterinary practice

Wound

Leaf paste is applied topically on wound
- Nageshwari Devi, Hazaribag, Bihar

Uses from other states

Ear pain

Leaves are boiled in mustard oil, oil is then filtered and used as an ear drop
- Bhagat Ram, Kangra, Himachal Pradesh

Ulcer

Half cup juice is extracted from the leaves and taken orally
- P D Walikar, Bagalakot, Karnataka

Rheumatism

Lukewarm leaves are applied on aching joints
- Naganath Durga Chogule, Sholapur, Maharashtra

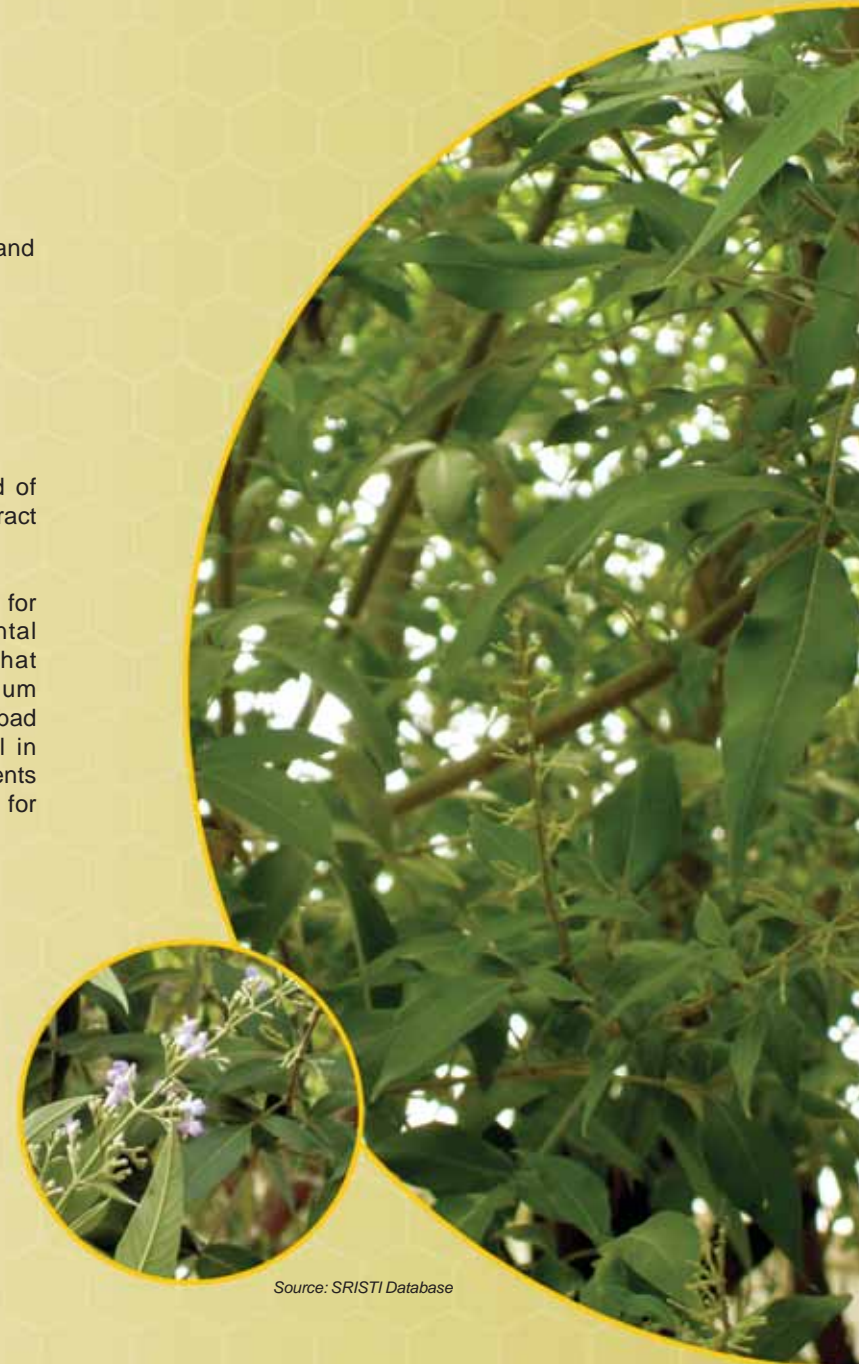
Skin disease

Small pieces of plant are mixed with cow's urine and applied on the affected skin
- K. Lakshmana Shetty, South Karana, Karnataka

Uses in Classical Codified Literature

Smoulder leaves and inhale the smoke to get rid of cough²; in case of diarrhoea flowers are used⁵⁹; extract of the plant is taken as a diuretic².

'Muscle & joint rub'⁴ is a highly effective medicine for backache, muscular sprain and joint pain. 'Dental Cream'⁴ is a specially formulated toothpaste that tightens and reduces swelling of gums, stops gum bleeding, prevents toothache, decay and controls bad breath. 'Atharva Nirgundi Siddha Tail'⁶⁰ is useful in arthritis, joint pain, relieves oedema. Thirty five patents have been found on the medicinal applications like for treating rheumatic arthritis⁶¹.



Source: SRISTI Database

Herbal Formulations for Healthy Crops

SRISTI SHASTRA

Arkhiben Vankar, Ranabhai Kamaliya, Banidan Gadhvi, Gemal Rana, Rajnikant Patel, Ahmadbhai Kadivala, Gujarat.

It flourishes the growth of the plant by increasing flowering as well as fruiting. Besides overall vegetative growth, it is not harmful to nature and human beings. It also controls sucking pests like white fly, heliothis, aphid etc.

SRISTI KRUSHAK

Popatbhai Rupabhai Jambucha, Gujarat

It is an excellent remedy for leaf curl disease. Besides controlling the disease it increases the vigor of the plants by increasing overall growth.

SRISTI SURAKSHA

Community Knowledge, Gujarat

It is a very efficient treatment for termite and acts as a vitaliser to the affected crops. To control termites the herbal formulation is mixed with sand and spread in the field. Some times it is released in the field along with the flow of irrigation water. In some cases, it is also drenched in the affected part of the plant and sprayed on the vegetation to repel termites.

SRISTI PRAYAS

Community Knowledge, Gujarat

It is a highly effective formulation to act as a herbal growth promoter, which stops shedding of flowers as well as increases the overall growth of the plant. This formulation strengthens the plants internally and enables them to withstand extreme weather conditions. Constant use of this formulation increases the yield and reduces the toxic content in our daily diet.

SRISTI SHAKTI

Community Knowledge, Gujarat

A herbal growth promoter, which helps in production of excellent quality organic food grain. Constant use of this formulation not only increases the yield but also reduces the toxic contamination in our food and environment.



Herbal Formulations for Livestock and Poultry~



Coccicure

Sudakarbhai K. Gaudi & Jeevalbhai M. Gaudi, Dang, Gujarat

It is a unique herbal medication for prevention and curing of Coccidiosis (*Eimeria* sp infections) in Poultry. The primary function of the medication is to reduce the oocytes maturation and affects the life cycle of various *Eimeria* species.

Poultmax

Community knowledge, Valsad, Dang, Gujarat

It is a unique herbal medication for promoting poultry immunity. It cures symptoms like greenish diarrhoea, conjunctivitis, nasal sputum, drop in egg production and respiratory distress in poultry. About 30g/100 birds for 0-4 weeks & 60g/100 birds for 4-8 weeks may be administered for seven days in stress or for three days before and three days after expected stress.

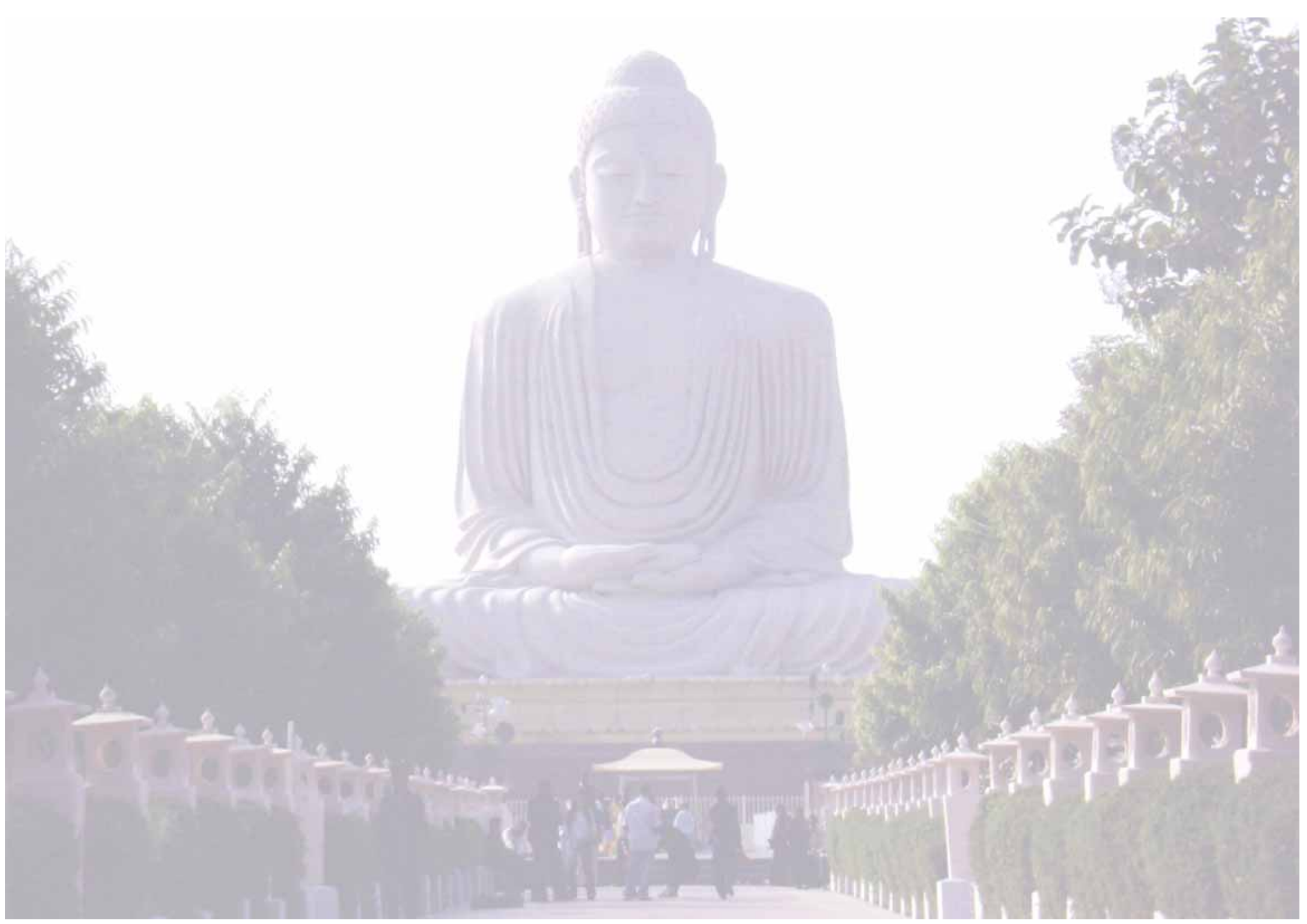
Mastiherb

Ukhardiyabhai S. Raot, Dang, Gujarat

Mastiherb is a unique intramammary herbal medication for curing mastitis in animals. Clinical trials indicated efficacy of the medication over subclinical mastitis; clinical mastitis and chronic mastitis. It was also validated in case of mastitis due to *Staphylococcus aureus*. The dose rate was found to be single intra mammary infusion for minimum three days after adequate standardization.



~These formulations are based on traditional knowledge of farmers and developed by Sadbhav-SRISTI Sanshodhan Laboratory (www.sristi.org). These products are licensed to Matrix Biosciences Pvt. Ltd, Hyderabad, Andhra Pradesh. The benefits are shared with the knowledge providers, communities, nature, those who add value and other stakeholders in the knowledge and value chain.



PART III

INNOVATIONS for BIHAR

This section contains details of national innovations,
which are deemed suitable for introduction
in Bihar





Arvindbhai Patel
Gujarat

Auto air kick pump

This innovation is a low cost, portable, compact aid to inflate tyre tubes/punctures of any vehicle having kick start or auto start mechanism so as to fix the problem on the spot and enable the rider to reach the nearby gas station or repair shop. This device uses the engine as the compressor for pumping air into the tube. A pinch of polymer granules is also inserted in the tube to seal the leakage in the tube.

Arvindbhai won a National Award in NIF's Second National Competition for Grassroots Innovations and Traditional Knowledge in 2002. NIF, apart from filing a patent in his name, facilitated sales of a few hundred pieces to customers in Assam and Arunachal Pradesh through dealership technology licensing and local entrepreneurs. The technology is available for licensing to entrepreneurs in different states.



Unicool- the natural water cooler

We already have refrigerators that operate on the principle of heat transfer and earthen pots that work on the principle of evaporation to cool water today. Arvindbhai has combined both features. In his natural water cooler, water is passed through cotton string covered copper coils, which are continuously being moistened by a dripper. Evaporation of water from lining on the coil cools the water inside. Cool water without electricity, isn't it a nice idea!





N Sakthimainthan
Tamil Nadu

Hand operated water lifting device

An efficient way of pumping water to meet requirements in a cost effective way is always a challenge in rural India.

Developed from locally available materials, this hand operated water lifting device is simple in design, delivers high discharge and is low cost compared to conventional hand pump, bucket pump, and bicycle operated pumps.

The Innovation has been taken up for value addition at CMERI Durgapur (WB) through the NIF-CSIR JIC Fellowship Scheme.



Earthen kitchen products

Tawa/pan

Non stick tawas have become an essential part of our kitchens to prepare low oil food but are costly. Their non stick coating also doesn't last long. Blending traditional and modern technology, Mansukhbhai has developed a clay tawa with a black non-stick food grade coating. Being non-metallic, the rotis, dosas and other items cooked on it give a different taste and feel altogether.

Mitticool

A fridge for the common man that does not require electricity and keeps food fresh too. With this basic premise in mind Mansukhbhai came up with Mitticool, a fridge made of clay. It works on the principle of evaporation. Water from the upper chambers drips down the side, taking heat from the inside gets evaporated, leaving the chambers cool. Cool and affordable, this is the option to keep food, vegetables and even milk fresh naturally for days.



Mansukhbhai Prajapati
Gujarat



A. Muruganandam
Tamil Nadu

Sanitary napkin making machine

Sanitary napkins, a universally needed product, have a very low penetration in India due to high price and the traditional trend of using cheaper but unhygienic old cloth pieces. The innovator has developed a machine that produces quality sanitary napkins at a low cost.

One can prepare sanitary napkins with industry standard raw materials while cutting down the cost in production. It requires three to four persons to produce two pads per minute. Costing less than half of conventional options, this machine produces sanitary pads @ Rs.1 to Rs. 1.50 per pad approximately.

The innovator prefers to sell the napkin making machinery only to self-help groups of women. He has also designed a napkin vending machine such that one can put a coin and get a pad. With the support from the Micro Venture Innovation Fund scheme of NIF, the innovator has been able to install over fifty units in seven states.



An improved dual pod variety of chick pea- “Sushil Laxmi”

The most distinctive feature of the variety is that it bears two pods per axil as compared to single pod per axil, which is a common feature of all the varieties that are available in the market. Plant is tall (50-60cm), spreading and has bushy type growth habit. Foliage is dark green and seeds are attractive, bold (25-30 gram/100 seeds) and brown in colour. The variety has been reported to be tolerant to wilting and insect pest attack in farmer's field, yielding on an average 14 - 16 quintals per acre under irrigated conditions and 12 - 13 quintal per acre in unirrigated conditions.



Balasaheb Patil
Maharashtra





Raghav Gowda
Karnataka

Manual milking machine

Safe milking of cows/buffaloes is a requirement across rural India and this product is an efficient step in that direction. It is a low cost, manually operated device that helps farmers to milk the animal hygienically and also reduces drudgery in the process.

The machine has simple controls and can be easily operated by women as well. The creation of suction and low vacuum makes it suitable for other applications also. NIF has been giving marketing support to the innovator. As a result, this machine has also been sold to customers in Phillipines, Uganda and Ethiopia apart from India.



Aloe vera gel extractor

The innovator has developed an effective multipurpose unit capable of pulverizing, steaming, and extraction of gel for herbal applications.

With this device, the innovator uses the specially designed pressure cooking chamber to extract the essence from *Aloe vera*. Being a compact portable unit, it can be quickly and easily transported and used anywhere, to process herbs and deliver on demand. The present machine has a capacity to process 100 kg of *Aloe vera* per hour. The innovator was supported for production and commercialisation through GIAN North from the Micro Venture Innovation Fund at NIF. One unit has been sent to Kenya on a pilot basis for application feasibility study in the country.



Dharamveer
Haryana





Amrutbhai Agrawat
Gujarat

Aaruni-the tilting bullock cart

In a traditional bullock cart, with two wheels, part of the load is borne by the draft animals on their shoulders and neck. Moreover, the harnessing system makes it difficult to negotiate sharp bends or turns in the road. This causes galls on the neck of the bullocks, which affects not only the efficiency of the animals but also their stamina. This cart is thus designed to overcome the shortcomings of the traditional carts by having an extra wheel to balance the load. In addition, the cart has a tilting mechanism that is based on the rope and pulley system, which can be controlled by a lever located alongside the cart driver.



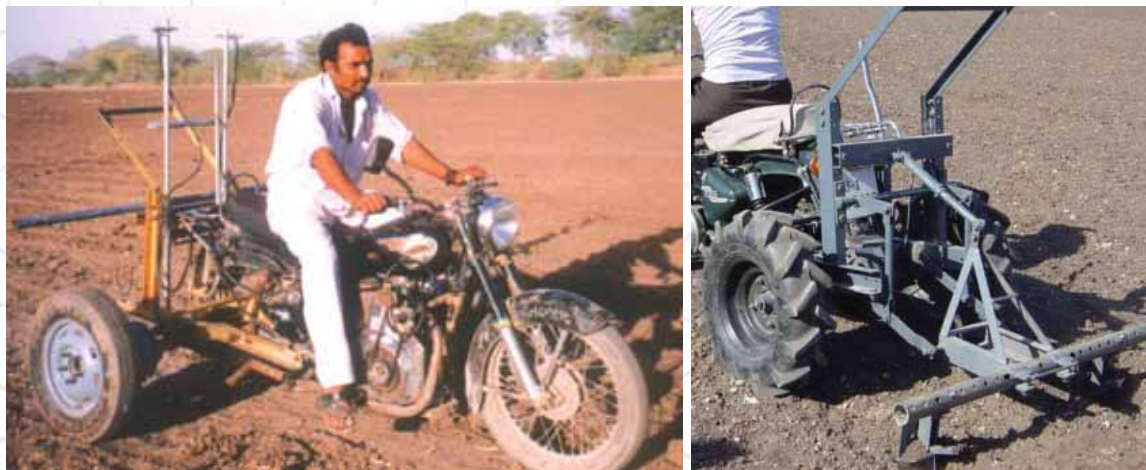
Bullet Santi-motorcycle based multipurpose plough

Like other drought prone regions, Amreli region, from where the innovator belongs, has severe labor shortage, few farm animals or mechanized implements to conduct farming operations. To address this need, the innovator designed a unique unit: the 'Bullet Santi'.

Using the chassis, drive and power of an Enfield Bullet motorcycle, the innovator has retrofitted an attachment with two wheels at the rear with a tool bar to fit various farm implements. This helps in ploughing, weeding and sowing seeds. Being a unique local solution, the machine has proved to be cost effective and fuel efficient. Bullet Santi can plough an acre of land in half an hour consuming only two litres of fuel. Innovator got a patent in India and USA. Given the fact, many other users and innovators copied this technology, he has appreciated the concept of 'Technology Commons' implying no restrictions for other innovators to copy and adapt. But commercial firms will need license from members of the 'Technology Commons'.



Mansukh Bhai Jagani
Gujarat





Dulal Choudhary*
Kamrup

Production of soft *muga* silk

The innovator has mechanised the process of *muga* silk weaving by way of making modifications in the conventional mechanised loom. *Muga* silk weaved with the device becomes soft as well as blocks UV radiations up to 80 % as per laboratory tests at Tezpur University.

The innovator has made various products like shirts, belts, caps etc. with the *muga* weaved from this loom. He has also made an umbrella out of this material which is durable, stain free, and water proof. It has a pleasing golden shine which illuminates colour, better than that offered by conventional umbrellas.

NIF had facilitated the technology transfer of this *muga* umbrella to Assam Silk Development Centre.



*As per its mandate, NIF does not consider such professionals for awards or financial support, but only helps in providing visibility or linkages.

Mobile operated switch and multi-media poster

Imagine a village where the farmer has the luxury of being able to stay at home and switch his irrigation pump in the faraway field on or off as required during the day or at night. This is made possible by this innovation, which uses the power of mobile telephony to trigger electrical control switches.

The farmer can remotely know the status of the pump in his cell phone and turn the motor on or off by calling the particular configured number. It activates the switching by certain number of rings and hence incurs no call charges. Prem Singh has developed several other innovations, one of which is the viewer triggered multi-media poster. If any agency wants to communicate some graphic message with different language audios or videos, this multi-media poster can be very useful. NIF facilitated a Mumbai based company to purchase two hundred units of the talking poster worth around eight lakh rupees for diffusion in various states. These were made available in five local languages.



Prem Singh Saini
Haryana





Prakash Singh Raghuvanshi
Uttar Pradesh

‘Kudrat-9’- an improved variety of wheat

The innovator believes that every farmer should get good quality seeds to deliver high yielding varieties of crops. He has developed a number of improved wheat, paddy, mustard and pigeon pea varieties, which are high yielding, robust stem, having bold seeds with good taste and resistance to major pests & diseases.

“Kudrat 9”, an improved wheat variety, developed by him using simple method of selection is quite popular among the farmers in different parts of Uttar Pradesh, Madhya Pradesh, Chattisgarh, Maharashtra, Rajasthan, Gujarat and some parts of Bihar, Haryana and Punjab. This variety bears large number of ear bearing tillers with lengthy spikes and has a hardy stem. The grain contains high protein and has better taste. The average yield of this variety is 55-60 quintals / hectares.



Herbal growth promoter

A herbal plant growth promoter, which is effective in protecting the plants from a broad spectrum of pests apart from providing necessary nutrition has been developed. It is named as “*Kamaal*” meaning wonderful, due to its performance. It is effective in field crops as well as in vegetable crops.

The main ingredients of the product are “*aak*” (*Calotropis gigantea*), “*reetha*” (*Sapindus trifoliatus*), “*dhatu*” (*Datura metel*), “*neem*” (*Azadirachta indica*), Tobacco (*Nicotiana tabacum*), and “*bhang*” (*Cannabis sativa*), etc.

The innovator won a Consolation Award in NIF’s Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007. He has also been supported under the Micro Venture Innovation Fund of NIF for commercialising “*Kamaal*”. The product is a good hit in the local market and is fetching steady income for the innovator. This product has also been supplied for use in the gardens in the Rashtrapati Bhavan with encouraging results.



Ishwar Singh Kundu
Haryana





Jai Prakash Singh
Uttar Pradesh

An improved variety of pigeon pea- “Virat (JP-6)”

This new variety has coloured flowers, long leaves and bunchy type pods bearing at the top. The seed weight (19 – 20 gram/ 100 seeds), number of pods / plant (500 - 600), big size pods (3 – 5 inch), number of seeds/pod (5 – 6) and perennial yield (1st year 12 -14 quintal/ acre and 2nd year 14 – 15 quintal/ acre) is higher as compared to the local popular variety. This variety requires less quantity of seed (4 – 5 kg/acre) and maintenance as compared to other varieties grown in the region.



An improved variety of pigeon pea- “Richa 2000”

This variety has coloured big flowers, long leaves and bunchy type pod bearing at the top. Topping is done periodically, which results in bushy growth. This variety has synchronous maturity with higher yield (24 quintals/acre), more branches / plant (12-14) and more pods/plant (700 – 800) than other local popular varieties of the region.



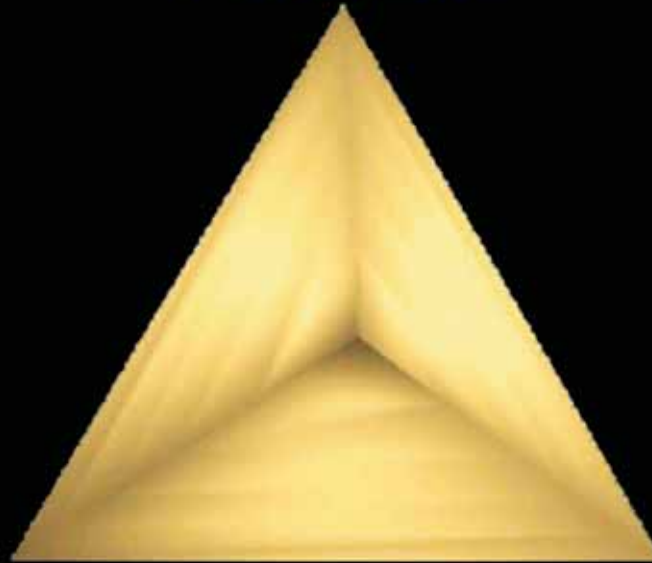
Rajkumar Rathore
Madhya Pradesh

End notes & References

- 1) Akhtar, M.S. 1992. Hypoglycaemic activities of some indigenous medicinal plants traditionally used as antidiabetic drugs. *J. Pak. Med. Ass.* 42 (11): 271-277.
- 2) Reddy, M.B., Reddy, K.R. and Reddy, M.N. 1989. A survey of plant crude drugs of Anantapur district, Andhra Pradesh, India. *Int. J. Crude Drug Res.* 27 (3): 145-155.
- 3) Zagari, A. 1992. *Medicinal plants*. Vol. 4. (5th ed.) Tehran, Iran. Tehran University Publications, p. 969.
- 4) Himalaya healthcare products, <http://www.himalayahealthcare.com/products.htm>, dt. 20.08.2008.
- 5) Guangkui, Z. 2008. *Chinese traditional medicine preparation for curing laryngopharyngitis*. Hunan Times Sunlight Pharmaceu (CN). (Pat no. CN101116680 dt. 06.02.2008; <http://v3.espacenet.com>, dt. 20.08.2008).
- 6) Muthuswamy, M.P. 2003. *Polyherbal composition for the treatment of Bronchial Asthma and the process*. Dalmia C.T. for Res and Dev (IN) and Murali Panchapagesa Muthuswamy (IN). (Pat no. WO03055558 dt. 10.07.2003; <http://v3.espacenet.com>, dt. 20.08.2008).
- 7) Bhattarai, N.K. 1994. Folk herbal remedies for gynaecological complaints in Central Nepal. *Int. J. Pharmacog.* 32 (1): 13-26.
- 8) Shrivastava, R.K. 1985. *Aegle marmelos*: An Ipso Facto plant of India. *J. Res. Edu. Ind. Med.* 4 (3/4): 21-25.
- 9) Bazar of India herbal products, <http://www.bazaaroindia.com/productsnew.asp?pid=100K38&catid=BC&subcatid=CL>, dt. 04.08.2008.
- 10) Pushpangadan, P. and Dhan, P. 2006. *Herbal nutraceutical formulation for diabetics and process for preparing the same*. CSIR, New Delhi. (Pat no. 7014872 dt. 21.03.2006; <http://patft.uspto.gov>, dt. 20.08.2008).
- 11) Rao, J.M., Sampathkumar, U., Sastry, B.S., Yadav, J.S., Raghavan, K.V., Palit, G., Rai, D., Varier, P.M., Muraleedharan, T.S. and Muraleedharan, K. 2003. *Composition for treating gastric ulcer and a process for preparing the same*. (Pat no. 20030180398 dt. 25.09.2003; <http://www.freepatentsonline.com>, dt. 20.08.2008).
- 12) Reddy, M.B., Reddy, K.R. and Reddy, M.N. 1988. A survey of medicinal plants of Chenchu tribes of Andhra Pradesh, India. *Int. J. Crude Drug Res.* 26 (4): 189-196.
- 13) Arseculeratne, S.N., Gunatilaka, A.A.L. and Panabokke, R.G. 1985. Studies on medicinal plants of Sri Lanka. Part 14. Toxicity of some traditional medicinal herbs. *J. Ethnopharmacol.* 13 (3): 323-335.
- 14) Gaitonde, B.B., Kulharni, H.J., Nabar, S.D. and Joglekar, S.N. 1974. Diuretic activity of Punarnava (*Boerhavia diffusa*). *Bull. Haffkine Inst.* 2: p. 24.
- 15) Olukoya, D.K., Idika, N. and Odugbemi, T. 1993. Antibacterial activity of some medicinal plants from Nigeria. *J. Ethnopharmacol.* 39 (1): 69-72.
- 16) Organic ayurvedic herbal products, <http://www.ayurveda.cz/en/organic-ayurvedic-herbal-products.htm>, dt. 20.08.2008.
- 17) Bapurao, M.N. 2005. *Herbal composition for the treatment of hepatic and splenic disorders*. Sahajanand Biotech Private Ltd (India). (Pub no. GB2404147 dt. 01.06.2005; <http://v3.espacenet.com>, dt. 22.08.2008).
- 18) Tomer, O.S., Glomski, P. and Borah, K. 2000. *Herbal compositions and their use as agents for control of hypertension, hypercholesterolemia and hyperlipidemia*. New Jersey, Chromak Research Inc. (Pat no. 6162438; <http://patft.uspto.gov>, dt. 22.08.2008).
- 19) Manandhar, N.P. 1995. An inventory of some herbal drugs of Myagdi district, Nepal. *Econ. Bot.* 49 (4): 371-379.
- 20) Khan, M.A. and Singh, V.K. 1996. A folklore survey of some plants of Bhopal district forests, Madhya Pradesh, India, described as antidiabetics. *Fitoterapia.* 67 (5): 416-421.
- 21) Manandhar, N.P. 1994. An ethnobotanical survey of herbal drugs of Kaski district, Nepal. *Fitoterapia.* 65 (1): 7-13.
- 22) <http://www.aggarwaloverseas.com/HerbalDetail.aspx?ProductID=283>, dt. 04.08.2008.
- 23) Inomata, S., Umishio, K., Kobayashi, K., Satake, M., Sekida, S. and Takano, A. 2003. *Matrix Metalloprotease Activity Inhibitor and Skin Care Preparation*. Shiseido Co. Ltd. (Pat no. JP2003201212 dt. 18.07.2003; <http://v3.espacenet.com>, dt. 20.08.2008).
- 24) Lai, Z. and Huang, X. 2008. *Pharmaceutical composition comprising a combination of Chinese traditional medicines*. Beijing Qijieyuan Pharmaceutical Technology Development Co. Ltd. (Pat no. 7381430 dt. 03.05.2008; <http://patft.uspto.gov>, dt. 20.08.2008).
- 25) Duke, J.A. and Vasquez, R. 1994. *Amazonian Ethnobotanical Dictionary*, CRC Press, Boca Raton. p. 181.
- 26) Jain, S. K. 1991. *Dictionary of Indian Folk Medicine and Ethnobotany*, New Delhi, India. Deep Publications, p. 44.
- 27) Coee, F.G. and Anderson, G.J. 1996. Ethnobotany of the Garifuna of Eastern Nicaragua. *Econ. Bot.* 50 (1): 71-107.
- 28) Gupta, M.P., Arias, T.D., Correa, M. and Lamba, S.S. 1979. Ethnopharmacognosic observations on Panamanian medicinal plants. Part I. Q. *J. Crude Drug Res.* 17 (3/4): 115-130.
- 29) Wild crafted herbal products, <http://www.wildcrafted.com.au/Moisturisers.htm>, dt. 22.08.2008.

- 30) Agarwal, R.K. and Agarwal, A. 2004. *Herbal composition having antiallergic properties and a process for the preparation thereof*. Bangalore, Natural Remedies Pvt. Ltd. (Pat no. 6730332; <http://patft.uspto.gov>, dt. 23.08.2008).
- 31) Morimoto, C. and Dang, N.H. 2006. *Compositions for cancer prevention, treatment, or amelioration comprising papaya extract*. (Pub no.WO/2006/004226 dt. 12.01.2006; <http://www.wipo.int/pctdb/en/wo.jsp>, dt. 23.08.2008).
- 32) Anis, M. and Iqbal, M. 1986. Antipyretic utility of some Indian plants in traditional medicine. *Fitoterapia*. 57 (1): 52-55.
- 33) Alam, M.K. 1992. Medical ethnobotany of the Marma tribe of Bangladesh. *Econ. Bot.* 46 (3): 330-335.
- 34) Selvanayahgam, Z.E., Gnanevendhan, S.G., Balakrishna, K. and Rao, R.B. 1994. Anti snake venom botanicals from ethnomedicine. *J. Herbs Spices Med. Plants*. 2 (4): 45-100.
- 35) Panthong, A., Kanjanapothi, D. and Taylor, W.C. 1986. Ethnobotanical review of medicinal plants from Thai traditional books, Part 1: plants with anti-inflammatory, anti-asthmatic and antihypertensive properties. *J. Ethnopharmacol.* 18 (3): 213-228.
- 36) Nagaraju, N. and Rao, K.N. 1990. A survey of plant crude drugs of Rayalaseema, Andhra Pradesh, India. *J. Ethnopharmacol.* 29 (2): 137-158.
- 37) Girach, R.D., Aminuddin, Siddiqui, P.A. and Khan, S.A. 1994. Traditional plant remedies among the Kondh of district Dhenkanal, Orissa. *Int. J. Pharmacog.* 32 (3): 274-283.
- 38) <http://www.ayurvedicure.com/bhringraja.htm>, dt. 21.08.2008.
- 39) <http://www.tropilab.net/ecliptatincture.htm>, dt. 21.08.2008.
- 40) Mehrotra, R., Katiyar, C.K. and Gupta, A.P. 2000. *Hepatoprotective compositions and composition for treatment of conditions related to hepatitis B and E infection*. Dabur Research Foundation, Ghaziabad. (Pat no. 6136316 dt. 24.10.2000; <http://patft.uspto.gov>, dt. 21.08.2008).
- 41) Pushpangadan, P., Pal, M., Dixit, B.S., Banerjee, R. and Rao, Ch.V. 2007. *Herbal dye and process of preparation thereof*. CSIR, New Delhi. (Pat no. 6136316 dt. 24.10.2000; <http://patft.uspto.gov>, dt. 21.08.2008).
- 42) Wasuwat, S. 1967. *A list of Thai medicinal plants*. Research Report no.1, project 17 ASRCT, Bangkok. p. 22.
- 43) Siddiqui, M.B. and Husain, W. 1990. Traditional antidotes of snake poison. *Fitoterapia*. 61 (1): 41-44.
- 44) <http://www.herbalcureindia.com/herbs/holarrhena-antidysenterica.htm>, dt. 04.08.2008.
- 45) Fitzgerald and Jamesina, A. 1999. *Methods for the prevention and treatment of gastrointestinal disorders*. The Procter & Gamble Company. (Pat no. 5932564 dt. 03.08.1999; <http://patft.uspto.gov>, dt. 20.08.2008).
- 46) Reddy, M.K., Viswanathan, S., Thirugnanasambantham, P. and Kameswaran, T. 1993. Analgesic activity of *Leucas aspera*. *Fitoterapia*. 64 (2): 151-154.
- 47) Singh, V.P., Sharma, S.K. and Khare, V.S. 1980. Medicinal plants from Ujjain district Madhya Pradesh - Part II. *Indian Drugs Pharm. Ind.* 5: 7-12.
- 48) http://www.hariniherbal.com/herbal_steam_bath.htm, dt. 21.08.2008.
- 49) Rathore, A., Juneja, R.K. and Tandon, J.S. 1989. An iridoid glucoside from *Nyctanthes arbortristis*. *Phytochemistry* 28 (7): 1913-1917.
- 50) Dixit, R.S. and Pandey, D.C. 1984. Plants used as folk-medicine in Jhansi and Lalitpur sections of Bundelkhand, Uttar Pradesh. *Int. J. Crude Drug Res.* 22 (1): 47-51.
- 51) Lupin Herbal, <http://www.lupinworld.com/herbal/deepactos.htm>, dt. 21.08.2008.
- 52) Chattopadhyay, S., Achari, B., Poddar, A. and Kumar, A. 2007. *Extracts from Nyctanthes arbortristis for the treatment of Leishmaniasis*. CSIR, New Delhi. (Pub no. WO/2007/042902 dt. 09.04.2007; <http://www.freepatentsonline.com>, dt. 22.08.2008).
- 53) Pushpangadan, P., Mehrotra, S., Rawat, A.K.S., Khatoon, S. and Govindarajan, R. 2006. *Safe, eco-friendly, health protective herbal colours and aroma useful for cosmaceutical applications*. CSIR, New Delhi. (Pat no. 20060115505 dt. 01.06.2006; <http://appft1.uspto.gov>, dt. 22.08.2008).
- 54) Sahu, T.R. 1984. Less known uses of weeds as medicinal plants. *Ancient Sci. Life.* 3 (4): 245-249.
- 55) Spring, M.A. 1989. Ethnopharmacologic analysis of medicinal plants used by Laotian Hmong refugees in Minnesota. *J. Ethnopharmacol.* 26 (1): 65-91.
- 56) Sebastian, M.K. and Bhandari, M.M. 1984. Medico-ethnobotany of Mount Abu, Rajasthan, India. *J. Ethnopharmacol.* 12 (2): 223-230.
- 57) Hwang, Shie-Ming. 2001. *Process for preparing an anti-viral medicinal product from plant extracts*. Sage R&D, Columbus, USA. (Pat no. 6214350 dt. 10.04.2001; <http://patft.uspto.gov>, dt. 25.08.2008).
- 58) Tsai, Hsiu-Hsien, Hwang, Shie-Ming, Kung, Pai-Chu. 1998. *Use of plant extracts for treatment of HIV, HCV and HBV infections*. Sage R&D, Columbus, USA. (Pat no. 5,837,257 dt.17.11.1998; <http://patft.uspto.gov>, dt. 25.08.2008).
- 59) Prajapati, N.D., Purohit, S.S., Sharma, A.K. and Kumar, T. 2007. *A Handbook of Medicinal Plants*, Jodhpur, India. Agrobios, Sec-II: 543-544.
- 60) [http://pharmaceuticals.indiabizclub.com/catalog/123280~oils_\(atharva_nirgundi_siddha_tail\)~pune](http://pharmaceuticals.indiabizclub.com/catalog/123280~oils_(atharva_nirgundi_siddha_tail)~pune), dt. 04.08.2008.
- 61) Pushpangadan, P., Rao, Ch.V., Govindarajan, R., Ojha, S.K., Rawat, A.K.S., Reddy, G.D. and Mehrotra, S. 2008. *Anti-arthritic herbal composition and method thereof*. CSIR, New Delhi. (Pat no. 7338674 dt. 04.03.2008; <http://patft.uspto.gov>, dt. 25.08.2008).

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