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Scouted by
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Herbal mosquito repellent

STUDENT AWARD THIRD

Leena Talukdar (16) is from Morigaon, Assam. She is in the 11th standard. Throughout her school life, Leena has always excelled in academics. She has represented her school at various science fairs. She had won the Best Affiliated Science Fair Award for her model of a Cold Storage System at the Intel Science Talent Discovery Fair held at Mumbai, 2003. An all-rounder, Leena has always taken part in various extra-curricular activities such as skits, drama, quiz, recitation and painting, winning prizes at the school and district levels. Leena aims to be a computer engineer and her dream is to study in one of the IITs. After her father's death, her mother has been her constant supporter and inspiration for all that she has done. Leena's mother is an employee of the Lakhimi Gaonliya Bank, Assam. She has a younger sister who studies in the 2nd standard.

Sushanta Mahanta (16) is also from Morigaon, Assam and is in the 11th standard. A very shy girl, Sushanta rarely takes part in extracurricular activities. However she takes keen interest in science related activities and takes part in various science fairs. Besides this mosquito repellent Sushanta has also developed a dantamanjan (toothpaste) by using indigenous plants like neem, soura, bhut aera, etc., which was exhibited in a National Level exhibition held by NCSC at MIT, Pune. Sushantawants to be a doctor and advises young innovators to have faith in themselves and to keep trying. Her mother is a lecturer in English at the Morigaon college and her father is an ex MLA and a social worker. She has an elder sister who is in the 2nd year of her graduation.

Genesis Jag is the Assamese system of burning mixtures of cow dung, plants and garbage etc., in heaps so as to purify cowsheds. The most common way among the villagers to make a *Jag* is to make a heap where paddy straw, dried garbage, paddy husk and some medicinal plants are piled up and then burned. Usually the following medicinal plants *Bihlongoni*, *Neem*, *Bahaka*, *Aakakhilata*, *Meteka*, *Makhi-lati*, *Maralia*, *Gundhua* -*Ban*, *Pachaliya*, *Tulsi*, *Palas*, *Citranella* etc., are used in the *Jag*. It is generally made in front or behind the house or near the cow shed. The *Jag* serves two purposes—it is a conventional way of getting rid of the garbage as well as a means of repelling flies and mosquitoes from the cow shed.

Though the villagers have been using *Jag* traditionally, they are not particularly aware of the usefulness of *Jag* and no scientific studies have been done on it.

So when the opportunity arose, Leena and Sushanta who were studying in their eighth standard at Muhila home Model School, Morigaon, decided to study the effect of *Jag*, and particularly of the plants used in it, for repelling mosquitoes. So they undertook a project under the "National Children Science Congress, 2001" with the theme of "Indigenous Scientific Knowledge for a better tomorrow." Leena and Sushanta selected a subject under the heading of "Health and Hygiene" which directly comes under

the focal theme. The subject of their project was "Study on the use of medicinal plants, as mosquito repellent in Assamese society with special reference to Jag." The main objectives of their project were to examine whether the medicinal plants used in Jag have any effect to repel mosquitoes and to see whether these medicinal plants can be used inside the house.

After selecting the subject, their teacher (guide), Bhagya Bhanu Goswami, advised them to select a village. They selected "Sapmari", a very backward village, 10 km away from Morigaon town. The majority of the villagers are poor peasants. Out of the 120 families of the village, they selected 50 for the survey and circulated a questionnaire among the villagers. From the survey they were able to find out that traditionally all the people of Sapmari are accustomed to using *Jag* and they also found out which plants were used in the *Jag*.

After obtaining the information they wanted, they experimented with coils produced from the various medicinal plants mixed in different proportions and found that about 90% mosquitoes can be repelled by using these plants. The team concluded that the coils produced from *Flemigia Strobilifera* plant, locally Makhioty is very effective in repelling mosquitoes and is comparable to the repellents that are currently sold in the market. The other results of the study were that the use of dry leaves (powdered) instead of raw leaves in *Jag* will produce less smoke and that these medicinal plants could be used as an alternative for coils, mats etc.

To check the effect of the smoke that comes out from the bowl, they applied a little Vaseline on a tissue paper and then kept it over the smoke for five minutes. In order to prove the effectiveness; they made a comparison between their home-made sticks and the ready-made coils. They took each one of them and burnt them in two separate rooms to see which one is more effective and also to see how much they burn in five minutes. They also contacted the director of Regional Research Laboratory (R.R.L) Jorhat, to find

out how to keep the coil burning for a long time as currently the coil only burns for a short period. NIF has filed a patent application for this.

The method for preparing the repellent

At first the leaves of the medicinal plants are dried in the sun for five days. After drying the leaves, they are ground into powder. The dhuna is also ground into powder and one teaspoon each of the powders is mixed. This mixture is put over a layer of coconut fibre in a bowl and then lighted with fire.

The essential ingredients of the formulation namely *Shorea robusta*, *Polygonum glabrum* and *Flemigia strobilifera* are powdered and mixed with binders and fillers to increase the efficiency of the formulation. The formulation may be made in various physical forms such as mosquito repellent coils, sticks, solutions, emulsions etc. Perfumery oils may also be added to the formulation. The appropriate amount of the respective ingredients will vary and may be readily determined by a person, skilled in the process, at the time of making the formulation in its different physical forms.

Advantages

The formulation is safe, eco-friendly, cheap, easy to use and has maximum repellence against mosquitoes. In addition these home-made herbal repellents are less harmful to our health than the coils available in the market. It can be prepared at home as it does not require any heavy infrastructure and investment as compared to coils and mats. A mosquito repellent incense stick prepared by this formulation burns for nearly four and a half to five hours with its effect lasting for three hours.

Relevance

Mosquitoes are known to transmit many diseases such as malaria, dengue, yellow fever, filariasis and Japanese encephalitis. Approximately 40 million people in India suffer from mosquito borne diseases annually. But the widespread use of mosquito repellents and insecticides in public health programmes has caused severe

environmental pollution and potential health hazards. The introduction of new and more toxic and rapidly disseminating mosquito repellents/pesticides into the environment has necessitated accurate identification of their potential hazards to human health. Many of them are extremely toxic to mammals/and or other non-target organisms. Thus one realises the need for a safe and eco-friendly mosquito repellent based on herbage.

Contribution to society

Leena and Sushanta feel that there is a need to create greater awareness about the usefulness of *Jag*. In view of the potential demand, they see a need for some small scale industry to be established for producing

these repellents. This could also address the problem of unemployment to some extent. These students also consulted the District Industry Officer, in this regard, and he praised their effort (project) and assured them that he would seriously consider their suggestions regarding the establishment of some small scale industry. To ensure widespread use of these herbal repellents, Leena and Sushanta took the initiative for organising meetings with the Gaan –Buras (chief of the village) of Sapmari and Charaibahi villages and held discussions with them on the usefulness of *Jag*. A large section of the total population of these two villages said that they had benefited by following their suggestions. What is all the more remarkable is that these initiatives have been taken by two young girls of just 16 years.