From palm leaf to database

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Across a table piled with medical texts at India's Council of Scientific & Industrial Research (CSIR), a group of doctors discuss treatments for diabetes. But the texts are not documenting cutting-edge diabetic research. Rather they are copies of 1,000-year-old medical manuscripts from India's three major ancient systems of medicine Ayuverda, Unani and Siddar. Contained within them are verses in Sanskrit, Tamil and Urdu on how to diagnose and treat diabetes with medicines made from natural ingredients.

Thousands of medical treatments contained in these texts are used extensively in India, particularly in rural areas. The texts are trusted by patients because they were written by doctors with extensive clinical practice thousands of years ago and have been tested by centuries of use, says Dr Sonika Verma, an Ayuverdic doctor at CSIR.

So valuable is the knowledge within the texts that Dr Verma, along with hundreds of colleagues, has now turned her hand from practising traditional medicine to protecting it. She is participating in a government-led project, the Traditional Knowledge Digital Library (TKDL), which is expected to become a crucial weapon against biopiracy, or theft of traditional medical knowledge, when it is opened to the outside world.

The TKDL is an electronic database that is being filled with medical knowledge that had previously been buried in the ancient texts. Rows of doctors at the TKDL headquarters in Delhi comb texts for instructions on how to treat patients, recipes for creating drugs from medicinal plants and other ingredients, translate them into English and enter them into the database. By the end of the year more than 150,000 different treatments will sit in a central repository at CSIR.

More than 2000 patents are granted on treatments based on Indian traditional knowledge worldwide every year, says Dr VK Gupta, head of the IT division at CSIR. That's biopiracy, he says.

"The process of drug discovery has become very expensive so people have rediscovered India and our knowledge systems but they haven't done it legitimately," he says.

The problem is that patent examiners in Europe and the US have no idea whether a particular discovery was made one or 1,000 years ago, because they do not have access to ancient texts.

The spur to develop a database came when the Indian government was forced to spend $1m overturning US and European patents on the spice turmeric for wound healing and seeds from the neem tree for their fungicidal effect, uses that are centuries old. By offering access to the TKDL in five international languages - including English, German and French - to patent offices worldwide, the Indian government believes that many patent applications will be rejected without the need for such expensive trials.

The TKDL is of immense interest around the world. Many countries, from Mongolia to Mali, have traditional systems of medicine they want to protect. These systems are the main sources of medicine for 2 billion people with little access to allopathic drugs, the World Bank says.

A host of nations, including Pakistan and Cambodia, have already consulted with the creators of TKDL on building their own databases. Sri Lanka is already converting text from palm-leaf manuscripts, with help from the World Bank.

In Africa, too, databases are becoming hugely important because they will be the first records of some systems of medicine.

"Unfortunately our history has not been documented like the Chinese and Indians. Most of it is oral, and a lot of our knowledge has been lost," says Nchele Lentsoane, a traditional medicines specialist at South Africa's department of health. The government is gathering information from interviews with the country's traditional healers. Similarly, knowledge on herbal treatments for intestinal parasites, hypertension and bronchial pneumonia has been collected from healers in Ethiopia.

But protecting knowledge is not only driven by a desire to prevent outsiders profiting from what is already in the public domain, but to ensure that communities who created the knowledge can also profit from drugs derived from it. Many countries, including India, are trying to decide who should be allowed to access these databases. It is hoped that indigenous medicinal experts may have a first-mover advantage over foreign companies in creating cheap treatments.

The idea is to encourage experts to turn a medicinal plant that has been used to great effect by one community into affordable herbal remedy that could be sold to larger numbers of people who cannot afford western medicines, says John Lambert, a traditional health specialist at the World Bank. "The vast majority of people in Africa can't afford to buy aspirin," he adds.

There are lots of other advantages to promoting the use of such medicines. The increasing trade is likely to have a huge impact on an already healthy market in medicinal plants, says Lambert. The Ethiopian market alone is worth $74m, the global market in excess of $60bn, the WHO says. In addition, a boost in demand for such treatments will in turn mean more income for the rural poor, who collect medicinal plants.