

Of course, as pointed out by Dharmapalan, there may be one or two shortcomings. However, considering the overall health of higher education in India, every institution has the responsibility to take these acid tests. NAAC has made it mandatory for accredited colleges to establish a quality advisory committee and an internal quality assurance cell to monitor qualitative growth of the institution. Accredited institutions are expected to submit annual quality assurance reports.

I do agree that several libraries in our state-affiliated colleges run without librarians and are understaffed. Similarly, the departments too suffer for want of teaching

faculty. But, NAAC cannot be blamed for this situation or for commercialization of education. NAAC is only an assessing cum accrediting body and has no power regarding the filling up of vacancies. It is the duty of the State Governments to fill up the vacancies, as without adequate teaching faculty no institution can perform its role effectively.

Apart from all this, accountability is needed in every field of activity. Agmark, ISI (BIS), CRISIL, ISO, FPO, etc. are there to evaluate, standardize and accredit products and producers of different sorts. In these days of globalization, it is meaningless to say no to accreditation of higher

educational institutions. Of course, accreditation is an evolutionary process requiring frequent revisions of evaluation methods and monitoring mechanisms. From our experience, we feel that NAAC is moving in the right direction.

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Can Habur Limestone curdle milk?

Rajasthan has a fascinating array of rocks and minerals, one of which is fossil-rich Habur limestone (also referred to as Abur limestone¹), named after the village Habur (27°19'N : 70°33'E). This rock is considered of lower Cretaceous–Aptian age¹, which makes it 125–112 million years old². The brown coloured, ferruginous clay-bearing limestone is rich in small fossils that give it a unique, eye-catching calligraphic texture (Figure 1). It is because of this exceptional feature that this stone finds prideful place amongst valuable décor-stones from Rajasthan. Narrow and small exposures in remote desert areas add to its

value because of the 'rarity factor'. It is erroneously believed that Emperor Akbar obtained this stone from Arab countries to be used in the Fatehpur Sikri Fort, because of God's own handwriting on it! The myth still persists.

Recently, a sample of this limestone was sent to us to find out what makes it curdle milk, as reported by people in the villages of Jaisalmer area, Rajasthan. Local people use this stone for curdling milk instead of adding curd culture. Samples of this 'magical stone' are gifted to close friends and relatives in the region! The aim of this correspondence is to dispel any myth or attempt to spread wrong and superstitious information about this rock. Being ferruginous and with small fossil content, the

limestone contains numerous small cavities and is more porous than other stones of the area (Figure 2). Its unique and rare appearance adds to the legend woven around its supposed magical properties. This stone must have been used for curdling milk, similar to the use of dried yeast for baking dishes. Obtaining curd culture in the sparsely populated desert area must have been a problem in the region. Therefore, keeping the culture in a suitable receptacle must have been an ingenious solution to the problem, which in due course of time has become a myth. The bacteria in the pores of the limestone are activated when the curd-soaked limestone piece is put in warm milk, which results in the curdling of milk.

Humans learned to make curds at least 3000 years ago³, but the earliest curd-making method may not be to the liking of many a reader. Curd is now made by adding common strains of bacteria to milk. Complex protein chemistry is involved in the curdling of milk⁴; in households a portion of the previous day's curd is used as culture. Normally 4 to 5 h at +40°C is needed to form curds. Calcium ions form cross-links between the hydrophobic portions of the milk proteins to form larger curds⁵. But it is highly unlikely that calcium from Habur limestone has any significant role, if any, in curd-forming. In several parts of Rajasthan a small piece of curd-soaked muslin cloth is used as starter culture for curdling milk. The dry and hot climate of Rajasthan ensures longer 'shelf-life' for the ingenious curd cultures in which the fermenting

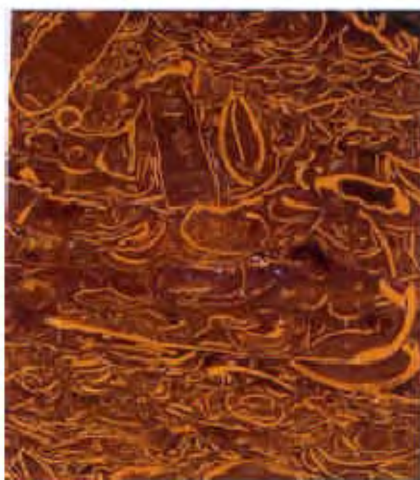


Figure 1. Fossil-rich ferruginous Habur limestone displaying unique calligraphic texture. Sample width = 6 cm.

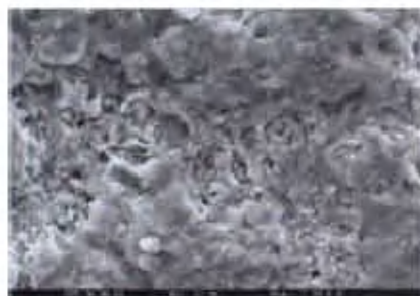


Figure 2. SEM photomicrograph of curd-soaked Habur limestone chip displaying pores and micro-cavities that provide suitable sites for curd-forming microorganisms. Two white spheres ($\sim 3\ \mu\text{m}$ each \uparrow) and 'crust' (\rightarrow) are of curds. Bar = $3\ \mu\text{m}$.

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microorganisms are activated when the cloth or stone is put in warm milk. In case any readers know of any other geo-myth, please share it with others by sending it to i2i@geologydata.info.

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Malaria millennium development goals, treatment costs and generics

Malaria is endemic in many developing countries, particularly in the tropical and subtropical regions. The full extent of the epidemic cannot be measured because many cases of malaria are not clinically diagnosed or reported. The World Health Organization (WHO) estimates that 300–500 million cases occur each year; this leads to more than one million deaths¹. Almost 90% of all cases occur in Sub-Saharan Africa; children are the most affected and malaria may account for as much as 25% of child mortality in this region. The economic burden of epidemics such as malaria on families and communities is enormous. Estimates suggest that malaria slows economic growth in Africa by about 1.3% a year². Goal 6 of the Millennium Development Goals emphasizes on reducing morbidity and mortality due to malaria, tuberculosis and HIV/AIDS². Accordingly, deaths due to malaria should be halved and the year 2015 is the deadline for halting malaria spread. A recent estimate revised the number of malaria cases up to 500 million in Africa. This clearly indicates that various programmes, such as Roll Back Malaria initiated by WHO, are not producing the desired results.

One of the neglected issues in the discussion on achieving the goals related to malaria is treatment costs and the role of generic drug manufacturers. Greenwood *et al.*¹ report the direct cost of malaria treatment as US\$ 2–5 per person per event. We conducted an analysis of retail costs of treatment of a single episode of malaria in India using data from an Indian pharmaceutical manufacturers' index (*Indian Drug Review*, Mediworld Publications, New Delhi, 2005). According to this publication, the mean retail cost of various anti-

malarial drugs in Indian rupees is: chloroquin 6.73, primaquin 44.24, sulphazoxazole-pyrimethamine 8.36, quinine sulfate 208.32, mefloquin 219.05, proguanil 157.50, artether 246.99, artesunate 246.90, artemether 223.80, and doxycycline 117.60. Recently, however, combination therapies have been recommended for malaria control and eradication³. These combinations include artemisinin-based drugs along with conventional antimalarials. In India, retail costs of such combinations are chloroquin–primaquin 50.97, quinine–primaquin 252.56, sulfazoxazole–pyrimethamine–artemisinins 247.59, quinine–artemisinins 447.55 and mefloquine–artemisinins 458.28. This translates into US\$ 5–10 per person per treatment at retail prices and US\$ 3–7 at wholesale prices. This amount is not different from the older and largely ineffective non-artemisinin-based therapies used in Africa¹. Malaria mortality in India has fallen by 85% in the last five years, whereas the various programmes in Africa do not report any significant improvement. This clearly implies that in the African region people still use old medicines to counter malaria. This may be due to the fact that large multinational pharmaceutical companies use these less developed countries to dump their outdated drugs. On the other hand, in India the drug policies coupled with positive approach of pharmaceutical industry have improved affordability and availability of new drugs.

The World Trade Organization (WTO) and the World Bank can also play an important role in the control of prices of drugs. World Bank has projected an additional US\$ 1 billion over a period of five years for prevention of malaria, of which Africa would get the largest share. While

in India, they have decided to spend a total sum of US\$ 200 million over a period of five years for the same project. An important responsibility of WTO is in stopping the malaria epidemic, but the debate is whether or not WTO is the best place to enforce intellectual property rights. From an economics point of view, free trade is good because it offers gains to all trading partners by reducing domestic prices of goods and services they import. Unfortunately, the Trade Related aspects of Intellectual Property Rights agreement cannot guarantee such a positive outcome. Most of the developing countries, especially the poorest one, will not be able to use or contribute to development of major drugs and the costs of new pharmaceuticals are bound to increase beyond their reach. Indian pharmaceutical industry can play an important role in this scenario.

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