

waterpoints

The commercialization of ceramic filters

Access to a nearby water source does not by itself guarantee that people will drink safe water. Many studies show that unsanitary handling during transportation from a public water point or contamination in storage containers or tanks at home results in unsafe water. This is also true in urban piped-water supply systems where, although chlorine is often added, by the end of the distribution system the quantity of chlorine is often too low to be effective.

User studies show that most families reject as unpractical alternative solutions like SODIS, sand filtration or home chlorination. The main problem with alternative treatment systems in the rural areas is maintenance, quality control and availability of the components. In the urban setting, aesthetic or self-esteem arguments also hinder their introduction; people do not want a 'rural-looking' system in their homes.

In Brazil this problem has been tackled with simple ceramic filter units that have become the standard. A range of simple products is on the market, all of them using standard ceramic filters that are simple, cheap and highly reliable with just a little care. Because all systems use the same standard candles, these consumables are interchangeable, which stimulates the market and distribution.

Ceramic filter elements are made in the shape of a hollow candle and come in different lengths and diameters. They are made from clay that is baked in a special way to produce sub-micron pores that can stop bacteria and proto-

zoa. The clay tube or candle is then glued to a plastic or metal base with a threaded spout on the lower side.

As an option, the inside of the candle can be filled with granular activated carbon for removing odours and removing dissolved organic chemicals from the water supply. For additional safety, to stop bacteria growing inside the moist candle, a silver coating can be added to the inside of the clay tube or to the activated carbon.

Every system needs a certain amount of maintenance, and ceramic filters are no exception. Depending on the quality of the incoming water, algae or silt may build up on the outside of the candles, so they need regular cleaning with a soft brush. With time, the thickness of the candle diminishes and the candle needs to be replaced – this is necessary about once every six months.

A fragile part of the candle is the glued connection between the candle and the base. Experience shows that particularly the cheap candles from India easily break here when they are put in or taken out. A loose or cracked base creates a shortcut of unfiltered water to the lower bucket.

When the ceramic candles are locally available, people can also make their own, 'home-made' filter system. A good example is the Kisii filter, developed in 2002 in Kenya and now popular; it uses a quality Brazilian ceramic candle in two transparent containers with a tap. Because the containers are transparent, the use and maintenance is also easier than in the commercial non-transparent filter systems that are available on the market.

Independent laboratory test results show a strong correlation between pore

space and the LRV values (log reduction value) of bacteria and protozoa, (see Table 1). It has been shown that Brazilian-type grade B candles will stop 99.9 per cent of all bacteria and protozoa. It is important that the tap and both buckets are well sealed to avoid any shortcuts or leakage. The grade B filters require only a low family investment and one filter can produce up to 25 litres per day for at least six months – less than US\$1 per 1000 l of safe drinking water.

It is clear that the success of the Brazilian filters could only be accomplished with a standard quality product, produced in large quantities, to profit from economies of scale. How can this concept successfully be transferred to other continents like Africa? It may not yet be appropriate to start production in Africa, but maybe at a later date.

For the moment, the main concerns are (1) to create awareness on the part of users and (2) to establish distribution channels for the candles. Awareness is vital; once a family understands the use of the filter system, they start to appreciate it, and drinking only filtered water becomes a part of their daily life.

Most critical for success and impact is to have an adequate distribution network of the replacement items like the filter candles and the tap, which should be available in a local town. The complete water filter units may be bought in the larger towns.

At the moment ceramic candles are becoming available in developing countries through the larger supermarkets and shops that sell domestic appliances. But these outlets do not penetrate into the rural areas or the small towns. There are two existing networks that

Table 1 Filter grading scheme, adapted from Firstwater website¹

Quality grade	LRV value	Pore space (micron)	Inner protection bacteriostasis	Quality control	Rel. output (litres/day)	Unit price (US\$)	Cost per family/week ² (US\$)
A	6+	0.2	Activated carbon + colloidal silver	Very good	10–25	5–10	0.4 (1 filter)
B	4–5	0.5	Activated carbon + colloidal silver	Good	10–25	2–5	0.2 (1 filter)
C	2–4	0.75	None	Reasonable	5–10	1–2	0.15 (2 filters)
D	2–3	1.0	None	Absent	2–4	0.5–1	0.10 (3 filters)

1. www.firstwater.info

2. Based on average family consumption of 100 litres of purified water per week, using the filter for six months.



The Kisii filter with a Brazilian ceramic candle

penetrate the country, however: the pharmacies and the water companies.

Every small town in Africa has a pharmacy. When the filter candles are sold through the pharmacies, the relation between water and health becomes even clearer. A promotional (subsidized) message from a poster or calendar campaign could support the introduction of ceramic water filters.

NGOs who want to start introducing the concept of ceramic filters can obtain filter candles at a reduced price from Firstwater (www.firstwater.info).

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Scaling up zinc treatment in Bangladesh

Research has shown that zinc provides a very effective treatment for diarrhoea, especially among children under five years of age. Zinc treatment reduces the severity and duration of diarrhoea as well as the likelihood of future episodes of diarrhoea and the need for hospitalization. Zinc treatment can save a child's life both as a treatment for diarrhoeal illness and by preventing future infectious illnesses.

In addition, zinc treatment seems to have a positive impact on pneumonia, which is another of the most common causes of death of children living in developing nations. Therefore, zinc treatment holds tremendous potential as a global public health intervention.

Studies conducted at the Centre for Health and Population Research, Bangladesh (ICDDR,B) from basic to applied research, have helped to build an evidence base for integrating zinc treatment into current child health practice and policies. This is supported by the WHO recommendation for the use of zinc in the treatment of acute or persistent diarrhoea.

Zinc is a micronutrient found in foods rich in protein such as red meat, poultry, nuts and dairy products and is essential for human growth and protection against illness and disease. Many people living in developing nations, such as Bangladesh, do not have access to sufficient amounts of zinc-rich foods. This results in zinc deficiency, which can lead to growth failure and increased susceptibility to illness and death, especially among young children. Zinc deficiency leads to diarrhoea, and during diarrhoea, the human body loses zinc, just when it needs it most.

This is why ICDDR,B and its partners are engaged in the SUZY (Scaling up zinc treatment for young children with diarrhoea) project, which aims to provide zinc treatment for diarrhoea on a large scale to the entire under-five-year-old population of Bangladesh. It has been estimated that zinc treatment could save the lives of 30 000 to 75 000 children per year in Bangladesh alone. If successful, zinc treatment may be rolled out to other countries and save many more lives.

The SUZY project, which has received funding by the Bill and Melinda Gates Foundation, will involve, in addition to further research: innovative solutions for the production of zinc tablets, ways to promote the use of zinc and the establishment of a sophisticated distribution system.

Nutriset is a French company specializing in the production of nutritional products for emergency and disaster situations. Nutriset developed the formula for the dispersible zinc premix; it is free of metallic taste and has a vanilla taste. The premix technology will even-

tually be transferred to local Bangladeshi pharmaceuticals. In the long-term, it is planned to transfer the entire technology for the production of the zinc premix to a local company in Bangladesh so that the production of the premix, the conversion into tablets and the packaging of the tablets in opaque blister packs will be located in Bangladesh. Currently, Nutriset and ICDDR,B are looking for a local partner who is interested in this technology and able to produce the zinc tablets to the required standards.

A large-scale research project is currently underway to ask critical questions required for a marketing campaign, including: What are people currently doing to treat diarrhoea and how much does it cost? What beliefs do they have about diarrhoea? Results of the formative research will be used for the development of a targeted marketing campaign.

ICDDR,B and its partners are working to establish an innovative distribution system for the zinc tablets. This will involve partners in NGOs, the Ministry of Health and Family Welfare (MOHFW) and the private sector. Currently training manuals are in the development process and a training schedule has been developed to provide training to all those who will be involved in the distribution process.

SMC (Social Marketing Company) is well known for its work on scaling-up Oral Rehydration Solution (ORS) throughout Bangladesh and has an extensive network of sales officers and sales promotion officers covering the entire country. They distribute products such as ORS and condoms to licensed and unlicensed providers all over Bangladesh. This includes physicians, allopaths, homeopaths, drug sellers and pharmacists. This network will be available for the distribution of zinc tablets as well.

Zinc tablets will also be available via the facilities of the Ministry of Health and Family Welfare (MOHFW), and via the NGO Service Delivery Program (NSDP) depot-holders. The USAID NSDP covers rural and urban Bangladesh and has been estimated to service as high as 15% of the population.

GLIMPSE 26:1, Centre for Health and Population Research, Bangladesh, <http://202.136.7.26/activity/index.jsp?activityObjectID=563>