



African Microbicides Advocacy Group

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Why women should NOT use Lemon or Lime Juice as a microbicide

Some people say that women can use lime or lemon juice to protect themselves from HIV. Is that true?

No. Women in many cultures have used lemon or lime juice for contraception and vaginal hygiene purposes for centuries. Studies in Nigeria and elsewhere show that some women also believe that lemon and lime juice might help protect them from HIV infection. New research findings, however, demonstrate that rather than helping, these juices can cause damage that could make it easier for HIV to enter the body. Washing out the vagina with either 100% or diluted lime or lemon juice may increase a woman's risk of getting infected with HIV if her partner is HIV positive.

What research shows that lime or lemon juice in the vagina could increase HIV risk?

Three studies have shown this:

Dr. Christine Mauck of CONRAD (a research institute in the US) did a study enrolling 48 sexually abstinent women volunteers. She divided the women into four groups: those using 100% lime juice ("neat" juice with no water), 50% (half water, half juice), 25% (one part juice, three parts water) and one group using plain water. Each group inserted their assigned test fluid twice daily for six consecutive days during two menstrual cycles. In one cycle, it was inserted via a douche and, in the other, via a modified tampon soaked in lime juice.

All the women were carefully checked for vaginal infections, irritation and other problems before and after the study and were treated for any problems they had. The result showed that some women got small but serious abrasions (injuries) in the walls of their vaginas after using 50% and 100% lime juice. The women who used 25% juice or plain water didn't get these abrasions. So the juice had a **dose-dependent effect** – meaning the likelihood of damage increases as the concentration of juice increases. Among the women using 100% lime juice with no water, more than 65% experienced genital irritation, 50% experienced deep epithelial abrasions and more than 70% reported experiencing pain.

Carol Lackman-Smith of the Southern Research Institute in the US did a laboratory study comparing the cytotoxicity (cell-damaging effect) and anti-HIV activity of lemon and lime juice to that of the spermicide nonoxynol-9 (N-9). She tested these three substances on cervical explant tissue (human cells obtained from routine hysterectomies and kept alive in lab cultures) to find out what impact they might have on the same kinds of cells in the human body. She found the amount of cell damage caused by lemon and lime juice was similar to the damage caused by N-9, a product dropped from consideration as a microbicide in 2000 when it was shown capable of increasing women's vulnerability to HIV infection if used frequently.

Lackman-Smith also looked at how much lemon or lime juice was needed to stop HIV and found that it was the same concentration (50% or greater) that also caused cell damage. She concluded that, when the juice is diluted to a point where no cell damage occurred, it also had little or no effect on HIV.



Robin Shattock (at St. George's Hospital, London) and **Gustavo Doncel** (CONRAD) also did lab studies on lemon and lime juice. Dr. Shattock showed that lime juice inactivates HIV more effectively than lemon juice. He also showed that a 25% concentration of lime juice could cause cell damage in tissue samples from the penis. Dr. Doncel showed that even a 25% concentration could damage vaginal cells. Both found that, to inactivate HIV in semen, one had to expose it to a 50% concentration of lime juice for 30 minutes.

So what does all this research mean?

This research suggests that, in real life use (in the vagina along with semen), a 50% concentration of lime juice is needed to stop HIV. **BUT** a concentration of 50% or higher is also likely to cause damage to the vagina – and possibly the penis. This damage could make it easier for HIV infection to occur.

Therefore, as the Economist magazine wrote on 29 April, 2006, “**as a microbicide, lime juice is safe when it is ineffective and effective when it is unsafe.**”

What messages should we be giving to women about lime and lemon juice?

Using lime or lemon juice to try to protect against HIV is risky, and may actually increase a woman's risk of becoming infected. Scientific studies show that lime and lemon juice do not meet the standards of safety and effectiveness (clinical trials) that must be required of any microbicide.

Even though they are natural substances and readily available in many places, they are more likely to increase a woman's risk of becoming infected than to decrease it. We must caution women against using these juices just as we now caution them against using N-9 for HIV prevention – because it doesn't work.

Are “Natural” Microbicides possible?

Dozens of other candidate microbicides are currently in the research pipeline, including several derived from “natural substances” such seaweed or the oil of the Indian Neem Tree. But all potential microbicides—whether derived from naturally occurring substances or manufactured ones—have to go through a rigorous testing process to find out whether they are safe for women to use and whether they work. One of these is Carraguard, a product made from the seaweed gel carrageenan. It has been proven to be safe for vaginal use and is now in large-scale effectiveness trials in South Africa to see if it reduces HIV transmission.

Just because something is natural doesn't mean it is safe. It is not advisable to use an available, natural product in the hope that it may protect you or because someone tells you that it works. If it turns out to be unsafe – as lime and lemon juice have – using it could actually increase your risk of getting HIV.

When will the first proven microbicides become available?

More than 50 product leads are now being tested to see which are safe and effective for regular use. Three of these are in large-scale effectiveness trials to see if they actually reduce HIV risk when used. If one of the candidates that are currently in advanced clinical trials proves to be effective, a microbicide could be ready for distribution in a handful of countries within 2 to 3 years. If the current set of products does not prove effective, the time horizon will be longer (although there are several second-generation leads already in human testing).

If none of them work, we will continue to wait as the next wave of candidates, those now being tested for safety, goes through effectiveness testing. While this research is going on, the microbicide community is working hard to accelerate development and ensure that a safe, effective product – once proven – gets into the hands of all who need it as quickly as possible.