Eucalyptus oil inhalation as a possible therapy for COVID-19 **April 2020**

The suggestions here are largely speculative, and are not medical advice from a health care professional. Such advice should be sought before trying anything different. The ideas suggested have a particular emphasis on people in developing countries, but are also helpful to people in the developed world. In developing countries it may not be possible to get good health care, and finances are limited, so people have to be resourceful and need practical and achievable solutions to problems. In this context, even partial imperfect solutions now are better than later superior solutions (such as waiting for a vaccine).

There have been no specific scientific trials on eucalyptus oil and its possible effects on SARS-CoV-2, but in the absence of these at present, I think it is better to try things based on existing research (on influenza and SARS for example), rather than simply doing nothing while people get sick, or even die one by one, waiting for the results of specific trials or a vaccine. Even though there is such limited knowledge and much uncertainty at present, the suggestions made here are not just wishful thinking but are based on scientific research into the virucidal properties of eucalyptus and other plant emitted volatile organic compounds.

It should be relatively easy and quick to do *in vitro* studies on the inhibitory effects, or otherwise, of eucalyptus oil and other essential oils, at various dilution rates, on SARS-C0V-2. Hopefully this will be done, and the results made known, as soon as possible. Other oils from other plants may prove to be more effective than eucalyptus oil, including perhaps tea tree oil, but I am interested in eucalyptus oil because it is widely available, not very expensive, and even breathing in the vapours of crushed eucalyptus leaves cupped to your face may work, which could be the only option available for many people in developing countries (eucalyptus trees are common in many developing countries in warmer climates). Crushed leaves could be kept in a resealable plastic bag for later use for days, or a tissue with drops of oil in a plastic bag, which could be kept in a pocket. Crushed leaves can also be placed in the foot of a stocking and swirled around in a bowl of very warm water, to create vapours to inhale. There is little or no cost to any of this. Incidentally, eucalyptus trees recover well and quickly from losing all their leaves as this frequently happens in bush fires in Australia. More trees could also be planted.

If ginger and/or lemongrass are effective against COVID -19, these plants also have the advantages of being widely available, and grow quickly and easily, especially in Zai holes (see the pages on Zai holes on my web site Reforestation.me).

Many essential oils are poisonous if ingested, even in small quantities, for humans and pets, so they should be stored in a safe place, and may not be safe for children or pregnant women. Some people may react negatively to inhaling some essential oils, and the vapours may be poisonous to some animals.

Eucalyptus oil inhalation – a possible protocol

Stage 1. In this stage people are not infected, and working on the assumption that eucalyptus oil contains a variety of phytoncides, then inhaling the vapour of a few drops of eucalyptus oil diluted in a cup or bowl of very warm water will increase the activity and number of natural killer cells in the body, so that the immune system is effectively boosted to cope with whatever infection comes along, or may already be present (Li 2007) This could be through direct inhalation, but also vapour in homes, dispersed with a nebuliser or fan (but not if pets are inside).

The phytoncide immunity boosting effect may simply be the immune system responding to foreign substances entering the body, and so it may not make a great deal of difference which phytoncides are used. If this is so, then other volatile organic compounds emitted by coniferous trees, herbs, lemongrass, etc., may also be effective, however eucalyptus oil has the advantage of being tried and tested for many decades, while other untested oils/vapours could result in allergic or other adverse reactions in some people. Caution is advised.

It should be noted that the phytoncide immunity boosting effect will work regardless of whether eucalyptus oil or another phytoncide is effective in killing this particular virus.

Inhaling the vapour of eucalyptus oil diluted in water has virucidal action and may kill some or most of the virus particles in some or all of the air ways (not proven yet with SARS-CoV-2). Perhaps preventatively when virus particles enter, and shortly after if they have already entered. Therefore it may be a good idea to inhale the vapours both before and after entering confined spaces where other people are present. If the infection starts with a smaller dose of virus particles because some or most of them have been inactivated, it would normally take longer for the virus numbers to build up, which allows more time for the immune system to respond, and this is likely to result in a less severe infection. This could mean the difference between a mild rather than a severe infection, or the difference between a severe case rather than death.

About four drops of eucalyptus oil to a cup of very warm water could work as an initial dose. To help concentrate the vapour, a person can cup their hands around the top of a cup, and take five to ten deep breaths through both the nose and mouth. Alternatively, a bowl can also be used with a towel over your head to concentrate the vapours. If tea tree oil is available, it may be just as effective or perhaps more so, then perhaps two drops of each. Tea tree oil is likely to be more expensive and is less widely available, and *Melaleuca alternifolia* is not commonly grown.

One session a week should be more than sufficient to induce the phytoncide immunity boosting effect (see Li 2007, where the effect lasted up to 30 days).

Stage 2. In the very early stage of infection, eucalyptus vapour could perhaps keep the number of viral particles on the surfaces of the airways down to a minimum. Inhalation could perhaps be up to three times a day, if this can be tolerated. Again, caution is advised.

Stage 3. The anti-inflammatory properties of eucalyptus could just possibly reduce inflammation in the lungs and elsewhere in the body, which could reduce fluid build up in the lungs, and therefore there may be less respiratory distress, but at this stage of the disease a person should be in hospital, where doctors can decide if there may be any benefit to this. Perhaps eucalyptus oil could be added to oxygen breathing apparatus.

None of this is tested and proven specifically with COVID-19, but anecdotally people all around the world have had good health outcomes with inhaling eucalyptus oil vapour, for many ailments, including assorted viruses, for many decades, with very few people reacting badly to it, so it may be worth trying in case it does some good as a therapy against COVID-19.

It appears that people with existing health issues are more likely to experience a more severe case of COVID-19, or even die. This being the case, even if eucalyptus oil has no direct antiviral action whatsoever on SARS-CoV-2, it may still result in better health outcomes if it alleviates certain other health conditions, i.e. reduces comorbidities.

Other potential uses of eucalyptus oil against COVID-19

Eucalyptus oil has potential in nebulisers and fogging systems to thoroughly disperse through air spaces, and onto surfaces and into nooks and crannies, as a sanitizing agent to kill viruses, bacteria and other pathogens. Some essential oils may also repel insects such as malaria-carrying mosquitoes. This has application (and is already used in some cases) in confined spaces such as homes, shopping centres, submarines, buses, aged and other care facilities, cruise, merchant and war ships, hospitals, prisons, planes, doctors' waiting rooms, trains, etc.

Eucalyptus oil could be alternated with other chlorine and hydrogen peroxide disinfectants to kill as wide a range of pathogens as possible, but the oil has the added advantages of being a phytoncide, and most people think it smells nice. It could be mixed with tea tree oil. The cost of the oils may be higher, but given the seriousness of this pandemic, that should be one of the lowest considerations. People may also be more inclined to use an airline, or go on a cruise ship, or visit shops, where it is advertised that they use eucalyptus oil, with its additional benefits.

Eucalyptus oil would probably be helpful to sanitize face masks in hot water, without rinsing, and then dried. Perhaps the oil may help to kill some of the pathogens which may land on the outer surface of the mask, plus the wearer would be breathing in phytoncides. It may also have application in disinfecting other personal protective equipment, where this is in short supply and has to be recycled.

If a combination of non-pharmaceutical interventions such as hand washing, with supplements of vitamins and minerals and improvements in diet and lifestyle, and inhaling eucalyptus oil as a phytoncide and possibly virucide, reduces the spread and severity of COVID-19 to something more like the ordinary seasonal flu, then people can get back to work, or get a new job, along with perhaps physical distancing and face masks, to salvage economies around the world.

David Clode B. App.Sc. (Hort.). Melbourne University.

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