

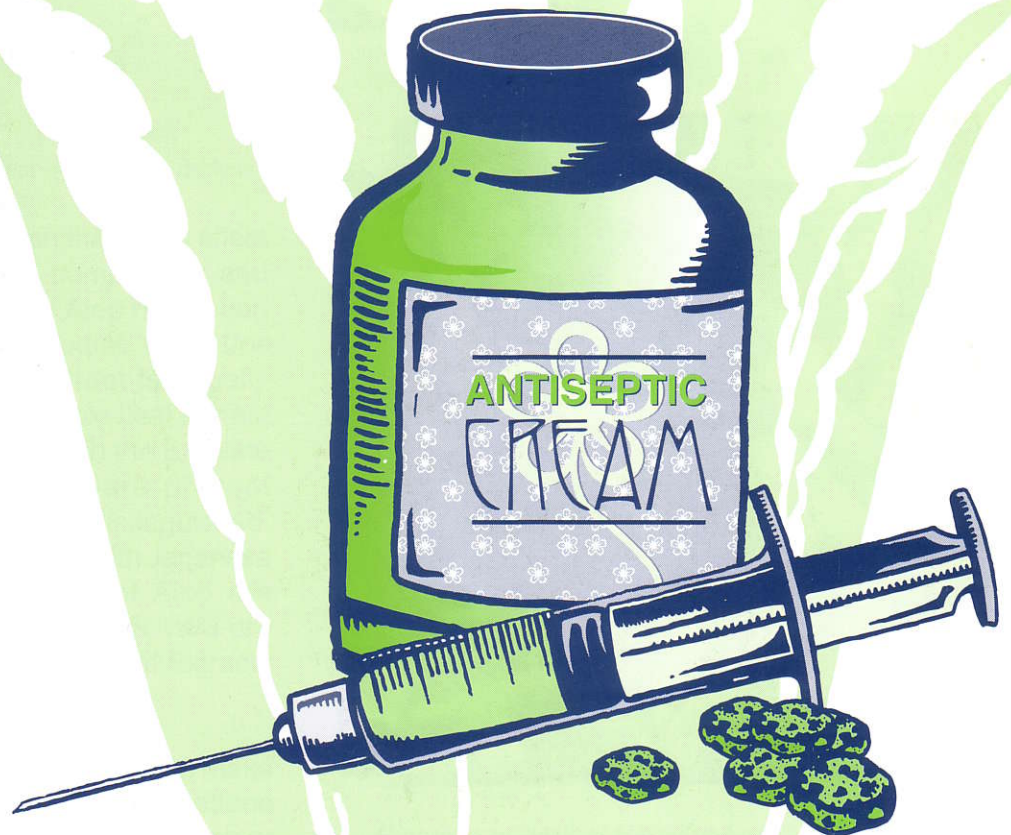
ALOE VERA

Aloe Against Infections

By Dr. G. Lawrence Plaskett B.A., Ph.D., C.Chem., F.R.I.C.

Aloe vera has been tested against a variety of infections, viral, bacterial and fungal. The exudate of Aloe (aloin) has been confirmed again and again as having direct anti-microbial effects, killing invading pathological organisms. However the principal benefits of Aloe with

regard to infective agents comes from aloin-free or de-aloinized extracts, which work by strengthening the body's own defences. This newsletter closely examines these functions of Aloe.



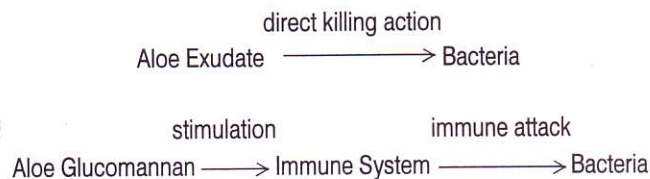
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Introduction

The point has already been made in Newsletter No1 that Aloe, by supporting and stimulating the immune system, greatly augments the ability of the body to resist bacterial and viral infections. This point was made in relation to such Aloe products as Gel and Whole Leaf Extract which contain the glucomannan of Aloe and in which the exudate fraction of Aloe ("Aloin", or "Phenolic" fraction) is only present in very low concentrations or has been removed in processing. It must be emphasized that when Aloe is used in this way, the effect being exerted upon the invading organisms is indirect. The glucomannan is, in itself, by no means capable of killing micro-organisms and can only produce an indirect effect by stimulating the immune system to destroy them. Indeed, glucomannan is almost certainly vulnerable to bacterial degradation itself and will not survive a bacterial fermentation of the Aloe extract containing it.

On the other hand, the components of the "Aloin", or "Phenolic" fraction have been shown, through quite a number of studies, to have a direct destructive action upon bacteria. We therefore have two ways in which these differing components of Aloe may act against bacteria and as it is important for the reader to draw this distinction clearly in the mind, this is represented diagrammatically below.

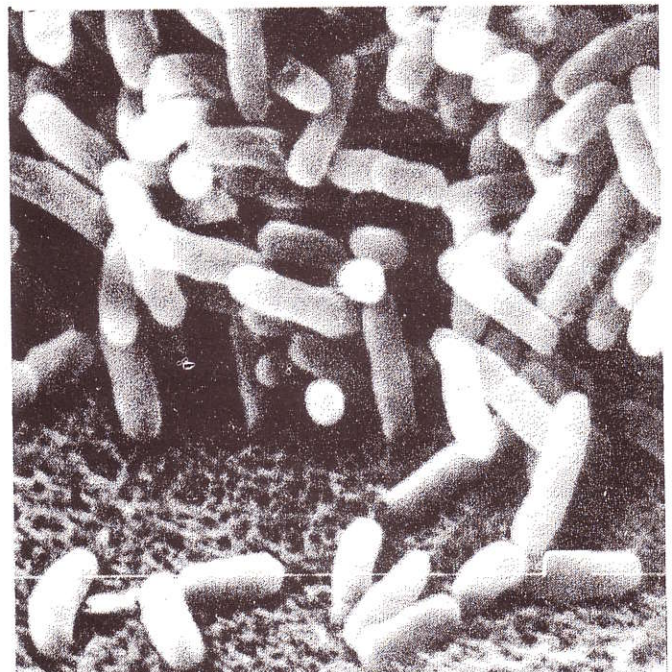


One can only distinguish between these two effect in studies in which the Exudate compounds and the glucomannan components of Aloe have been effectively separated. In any studies with *Aloe arborescens* the Whole Leaf Extract is usually used, and similarly, if *Aloe vera* Whole Leaf Extract is used without carbon filtration, both the Exudate materials and the glucomannan are present together and their actions cannot be distinguished. This seems to be most often the case with Japanese work on the anti-bacterial effects of Aloe are investigated, where species other than *vera* are usually employed, especially Whole Leaf Extracts of *Aloe arborescens*.

Some work reported in the literature omits to make it perfectly clear whether the Aloe preparations being studied contain Exudate or glucomannan or both. This is true of the work of Heggers et al (1979),

in which clear anti-microbial effects are reported.

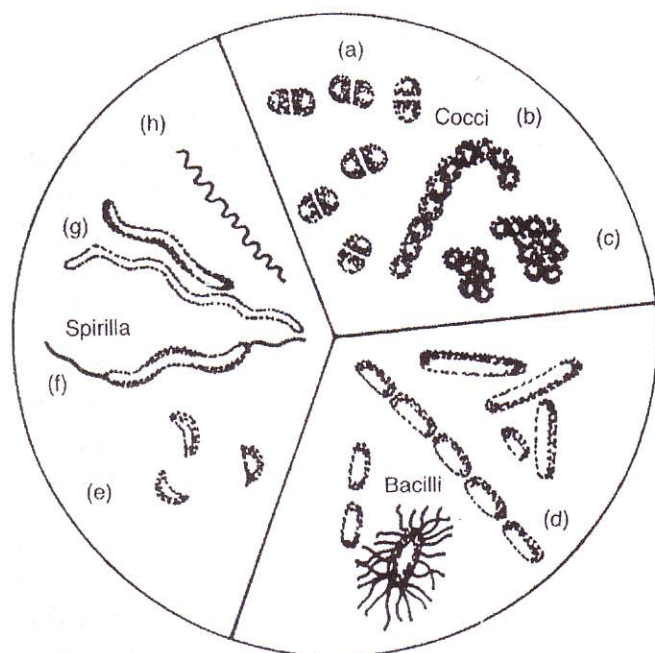
To help the reader conceptualize the microorganisms involved in infections, suitable illustrations of bacteria and viruses are provided amongst the text.



Pictures of typical Bacillus type, rod-shaped bacteria.

The Bacteriostatic / Bacteriocidal effects of *Aloe* Exudate

Lorenzetti et al, in 1964, tested leaves of *Aloe vera* for activity against several bacterial types. The material used was the Exudate fraction, that is to say, they cut the leaves and allowed the juice to drain out. This material was effective against *Staphylococcus aureus* - an organism present in purulent discharges - but only when it was quite fresh, or when steps were taken to preserve it by heating (presumably to inactivate enzymes that were destroying the activity) followed by freeze-drying. Some species of the bacterial genera *Salmonella*, *Streptococcus*, *Staphylococcus* and *Corynebacterium* were inhibited by these freeze-dried extracts, though some other species of the same genera were not inhibited.



A variety of different bacterial types.

Bruce, in 1967, also did tests for anti-bacterial activity on the Exudate of *Aloe vera*. The results showed considerable activity against gram-positive bacteria and against human tubercle bacillus - the organism of tuberculosis. The results with *Aloe vera* showed more anti-bacterial activity than with other species of *Aloe* and was detectable even when the juice was diluted 1,600 fold. This work appeared to show, not surprisingly, that the anthraquinone compounds in the juice had the greatest anti-bacterial activity.

Haraguchi et al (1992), in a paper entitled "Action-mode of Anti-microbial Altersolanol A on *Pseudomonas aeruginosa*", demonstrated that an anthraquinone-type antibiotic interferes with the

respiratory chain of the bacterium causing its death by the disruption of its energy sources.

This seems to have been the first clear indication of just how the *Aloe* Exudate materials may work on the bacteria.

Anti-fungal effects of *Aloe vera* Exudate

Work such as that of Soeda, in two papers, both dated 1966, clearly indicates that the Exudate fraction of *Aloe*, or Leaf Extracts containing the Exudate materials, also have anti-fungal action.

Increased Resistance to Bacterial Infections after treatment with *Aloe* Gel or Whole Leaf

Most of the work on this subject has been done using *Aloe vera* Gel, since that has been most widely available in the recent past until Whole Leaf became available. Some of the work did not draw a clear distinction between direct bacteriocidal effect on the one hand and the immune-mediated effect on the other. This was possibly true with the work of Cheney in 1970 and of Robson et al in 1980.

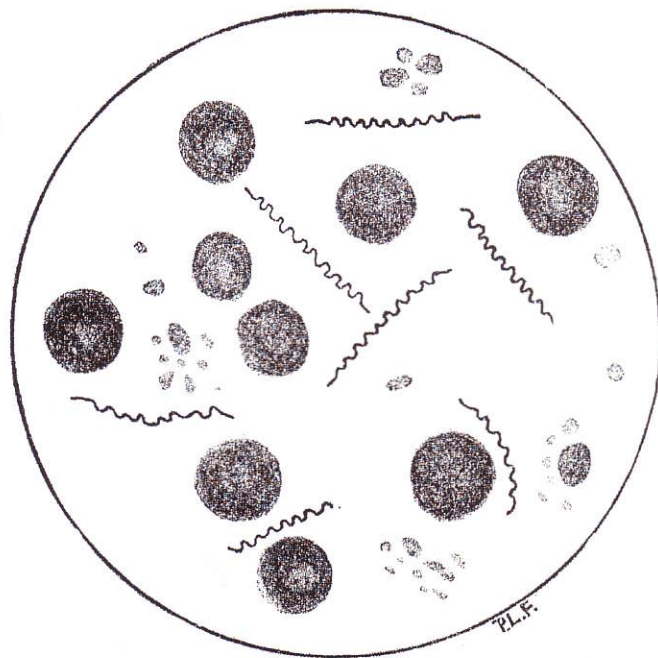


Tubercle bacilli in sputum from pulmonary tuberculosis (stained by the Ziehl-Neelsen method). x 1000

This was concerned with putting *Aloe* Gel onto burns and studying whether the organism which most often infects burn tissues, *Pseudomonas aeruginosa*, was inhibited. Cheney's results were

negative and those of Robson were positive, but in this particular situation there is no way to distinguish between a direct bacteriocidal action and an immune mediated response. Cera et al (1980) also found that there was inhibition of *Pseudomonas aeruginosa* in the burn tissues of the skin of dogs

Based upon other studies with *Aloe vera* Gel, and the fact that the Gel is readily fermented and spoiled by bacterial growth if not Pasteurized and treated with preservatives, its direct bacteriocidal properties do not appear at all strong. Most of the other work with Gel or Whole Leaf Extract makes it clear that an immune mediated is usually involved.



Trep. pallidum in tissue (stained by Levaditi's method). x 1000

Northway, in 1975, used a commercial extract of *Aloe vera* Gel in his veterinary practice to treat a number of external conditions in a total of 67 animals. Part of his conclusion was that there was excellent response in the case of fungal infections and also "in the treatment of mixed bacterial infections".

Solar et al. (1979), of l'Institut Pasteur de Madagascar, wrote a paper entitled "Mise en evidence étude proprietes immunostimulantes d'un extrait isole et partiellement purifie a partir d'Aloe vahombe". The extract, obtained from a species of *Aloe* other than *Aloe vera*, markedly increased the resistance of mice to *Klebsiella pneumoniae*, apparently through the effects on host physiology (by inference, the immune system), rather than an antibiotic or anti-septic effect.

Increased Resistance to Viral Infections after treatment with Aloe Gel or Whole Leaf Extract

There is no doubt that some of the most interesting work in this whole area relates to the way in which use of *Aloe* augments the body's resistance to viral infections. Only a small amount of such work has been reported and, as is so often the case, it leaves one wishing that a great deal more work of this type could be done. The available reports relate to work on cats with the Feline Leukemia Virus (FeLV) and to human infection with AIDS. In some of this work the material used is referred to as "acemannan". The reader is asked to accept this as a synonym for "glucomannan". Really it is a trade name for isolated and dried glucomannan from *Aloe*.

Feline Leukemia Virus

The work with cats is that by Sheets et al (1991) entitled "Studies On The Effect Of Acemannan On Retrovirus Infections: Clinical Stabilization Of Feline Leukemia Virus-Infected Cats." It ranks as a very important paper amongst the whole of the *Aloe* literature. This virus is connected with quite a variety of disease symptoms in cats. These include lymphoproliferative diseases, such as leukemia and lymphosarcoma. In other words, they are neoplasms related to the lymphatic system of the body, or the white cells of the blood. They are also connected with diseases in which cell reproduction and activity levels are adversely affected, for example, immunodeficiency disease in cats and aplastic anaemia. Enteritis may also be involved. In America it is reckoned that about one third of cancer deaths in cats are related to (FeLV). Whilst only about 30% of cats which become infected actually develop clinical disease, this is presumed to be on account of effective immune response. Those cats which develop clinical disease and become viraemic (viruses in the blood) virtually all die from the infection. It is estimated that 40% die within 4 weeks of infection and 70% die within eight weeks. Therefore most infected animals are "put down" to save unnecessary suffering. Therefore, if one is looking for a form of infection that will be a good test of *Aloe*'s immunostimulant powers, then FeLV is quite a severe test.

In the study 44 cats were treated. None of the owners would permit their animals to become controls, due to the hope that *Aloe* acemannan would save them. The dose was administered intraperitoneally weekly at a level of 2mg of the dry solid per kilo of the animal's body weight. The study