

# ALIEN PROPERTY CUSTODIAN

## THERAPEUTICAL USES OF ORGANIC PEROXIDES

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Hydrogen peroxide is one of the oldest antiseptics and of most widespread use in the medical profession. It appears a priori to be the ideal biological antiseptic because of its low toxicity, the substances resulting from its disintegration being water and oxygen, and it is now a matter of common knowledge that it originates in the course of the normal processes of cellular oxidation. Furthermore, the germ-killing activity of hydrogen peroxide is interesting and affects particularly the anaerobe germs, both perfect and imperfect.

This therapeutical activity, however, is hindered by the wellknown fact that hydrogen peroxide rapidly disintegrates into oxygen and water as soon as contacted with living tissues, with the result that its antiseptic activity is short-lived and cannot be used with the profit which might well have been expected from such a composition.

This explains why chemists have thought it advisable to turn their activity upon the class of mineral peroxides (magnesium peroxides, persulphates, perchlorates, etc) which, thanks to their very composition, are not subjected to the action of tissue catalases which destroy hydrogen peroxide. Such peroxides, however, are not biological like  $H_2O_2$  and are consequently impervious to the activating properties of the tissue diastases known as "peroxidases." In other words, their local action on tissues is poor, and their only advantage is their germ-killing power.

I have discovered that by substituting in the formula of hydrogen peroxide (HOOH) one or two hydrogen atoms by an hydrocarbon organic group, one gets compounds which are proof against the action of catalases; thus giving the body the entire profit of the oxygen freed by those combinations.

My experiments bore on the group of alcoyl, oxyalcoyl and aldehydes peroxides answering the general formula ROOH, ROOR' and ROO in which R and R' may be hydrocarbon chains including or not an hydroxyl group HO.

The first terms of this series are represented by the formulae:  $CH_3OOH$ ,  $CH_3OOCH_3$ ,  $OHCH_2OOH$ ,  $OHCH_2OOCH_2OH$ .

We have hitherto used to best effect ethyl hydroperoxide ( $C_2H_5OOH$ ) which is easy to prepare and of low toxicity.

I have ascertained in the course of my experiments:

(1) That hydrogen peroxide thus attached to a radical, and practically unaffected by tissues,

is endowed with lasting properties of local antiseptics.

(2) That its germicidal effect is intensified by alcoyl combinations.

(3) That such products, besides their external antiseptic action, acquire the remarkable property of acting directly upon the intermediate metabolism, i. e. by fixing themselves on blood pigmentation or other substances derived from haematin, take part in physiological combustions and intensify them.

(4) They are directly and totally used by the body and transformed into active oxygen, water and carbon dioxide, which settles the question of elimination by the natural exists.

I claim to be the first to have discovered that those substances can be used with profit in man or animal therapeutics, as after clinical experiments and above propositions. Therapeutical directions can be divided into two groups according to the mode of administration.

(1) Alcoyl, oxyalcoyl and aldehydes peroxides, and particularly ethyl hydroperoxide, suitably diluted in a vehicle, usually water, can be used in the same cases for which hydrogen peroxide is prescribed, with the advantage of a much more lasting action thanks to their remaining unaltered when in contact with tissues (treatment of sores and all external suppurations and inflammations).

(2) Introduced into the body either "per os" or intravenous injection, those substances add to their antiseptic properties that of joining the cycle of biological oxidations, i. e. through their combination with haemoglobine, they allow direct oxidation of a large number of substances carried through the economy and particularly of toxic or microbial waste products weighing upon blood circulation during infectious diseases.

Those substances can therefore be used with profit in numerous cases: in the case of infectious diseases not only against the pathogenous agent itself but also against toxins (intestinal infections, septicaemia, etc.) and toxic products of cellular disintegration.

In sort, alcoyl, oxyalcoyl and aldehydes peroxides have properties of both external and internal character and should be prescribed:

(a) As biological antiseptics.  
(b) As "de-toxicating" agents, i. e. allowing direct action against excess in humours, of metabolites resulting from cellular disintegration or microbial infection.

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