

## ASSESSMENT OF CONTRACEPTIVES BY CONTACT TEST.

By

A. K. ANWIKAR AND P. S. VAISHWANAR

*Departments of Social and Preventive Medicine and Physiology, Medical College, Nagpur*

*Received on January 2, 1960.*

There have been several reports of studies on the evaluation of the spermicidal properties of a large number of pure chemicals and their commercial preparations. Most of the spermicidal tests have been carried out by mixing semen with diluted or undiluted spermicide in known quantities and noting the time required to kill the sperms. Alternatively the assessment of the spermicidal efficacy has been based on the highest dilution of a preparation lethal to sperms in a given time.

Brown and Gamble (1941) have adopted the technique of mixing equal quantities of semen and the contraceptives and graded them according to the time taken to immobilise all the sperms, whereas Baker *et al.*, (1937) have based the spermicidal power upon the highest dilution lethal to sperms within five minutes, using mixture of equal volume of semen and the spermicide.

In recent years Davidson (1953) has suggested that most of the contraceptives consist of a vehicle (ointment, base, jelly etc.) which carries a chemical lethal to sperms, and that the efficiency of such a preparation depends upon its ready release from the vehicle to penetrate into the surrounding medium. He has further pointed out that by varying the dilutions and subjecting them to vigorous mechanical mixing, one is not sure as to how much of the spermicide is released from the base to exert its effect. A spermicide may be firmly locked into its vehicle and it is possible that hardly any of it is released into the surrounding medium. In these circumstances the spermicidal effects of a mechanical mixing procedure may not necessarily indicate the efficiency of a preparation under the conditions in which it is used.

The present study has been undertaken to evaluate the efficiency of the spermicidal preparations by contact test without any mechanical mixing, and thereby eliminating the factor of variation in the area of contact between the semen and the substance under test. The spermicidal property of three standard spermicidal preparations viz. Volpar, Orthogynol and Preceptin was evaluated, and concurrently the tests were carried out on a series of indigenous substances which have been acclaimed as local contraceptives.

## METHOD AND MATERIAL

The technique entails the employment of two microscope slides, one mm. thick through which a cylindrical hole 5 mm. has been bored as devised by Davidson (1953). The slide I is cemented on to another slide of the same dimension and the slide II on to a plane coverslip. Thus the two slides contain shallow cylindrical wells of known dimensions. (Figure 1).

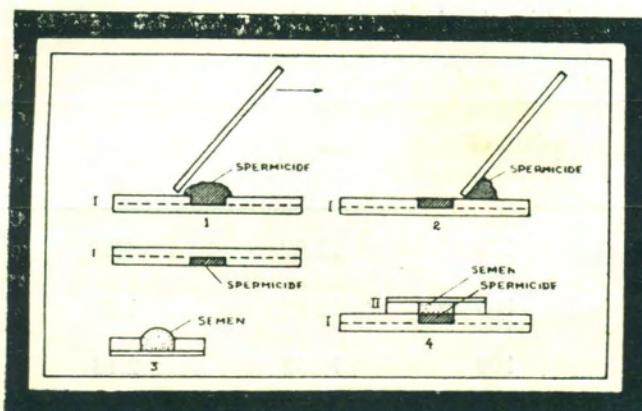


Fig. 1

The contraceptive preparation is placed in the well of the slide I and the semen is filled into the well of the slide II. The slide I is inverted and pressed on to the slide II, so that the two wells coincide exactly avoiding air bubbles in the preparation. The chamber is inverted again so that the semen is uppermost and is placed in the incubator at 37°C till it is examined under microscope. The preparation now provides a plane surface of contact of known area in between equal volumes of semen and contraceptive in a completely enclosed space where the sperms are observed directly under the microscope through the plane coverslide under strong illumination. The observations are repeated at regular intervals and the end point is reached when no motile sperm is discovered in any part of the drop of the semen.

The healthy donors produce the seminal specimen by masturbation and the volume, cell count, motility and morphology are determined as soon as the specimen liquifies. The human semen showing normal figures alone is used for the investigation.

One hundred tests have been performed with each of the contraceptive substances and each of the tests has been made with the semen from a different donor.

## RESULTS AND DISCUSSION

Table I gives the average killing time in minutes for the standard spermicidal preparations viz. Volpar, Orthogynol, and Preceptin, and also the indigenous substances viz. 20 per cent saline, lemon juice and Neem Oil.

TABLE I

*Average killing time in minutes with standard deviation and coefficient of variation*

Spermicide	No. of observations	Mean	S. D.	C. V. (%)
1. Volpar	100	13.62	1.88	14.23
2. Orthogynol	100	12.60	1.70	13.49
3. Preceptin	100	16.52	2.13	12.89
4. 20% saline	100	3.52	0.74	21.08
5. Lemon Juice	100	3.62	0.74	20.16
6. Neem Oil	100	12.58	1.74	13.83

The steady value of coefficient of variation among the spermicides showing higher killing time (viz. Volpar, Orthogynol, and Preceptin) and also among the spermicides showing shorter killing time (viz. 20 percent saline and lemon juice) points out to the consistency of experimental techniques used.

The averages for 20 percent saline and lemon juice are about 3.5 minutes, whereas the average for Neem oil as well as Volpar, Orthogynol and Preceptin varies from 12.58 to 16.52.

The significance of the difference in averages have been further analysed by analysis of variance (Table II) where a significant variation in the average values of these spermicides has been observed. Further it has been seen that 20 percent saline and lemon juice do not vary with one another in their average values but they do differ significantly from the rest. The standard spermicides as well as the Neem oil also vary significantly among each other with the exception of difference of Neem oil from Orthogynol.

TABLE II  
*Analysis of variance*

Source of variation	S. S.	D. F.	M. S.	Obs. F.	Remark
Between spermicides	14807.89	5	2961.58	1166.60	significant
Within spermicides	1509.01	594	2.54		
Total :	16016.90	599		—	—

It has been suggested therefore that the indigenous contraceptives viz. 20 percent saline and lemon juice excel the standard spermicidal preparations in their effectiveness and Neem oil almost equals the spermicidal action of Volpar, Orthogynol or Preceptin. It may be emphasised that the present investigation is primarily a screening of the efficacy of the various spermicidal agents *in vitro*, and that a further work is however necessary for evaluating these substances finally.

A number of other indigenous substances viz. Til oil (sesame oil), Sandal wood oil and Rice paste were also concurrently subjected for contact tests in the present investigations. These substances showed on an average a killing time more than twenty-five minutes and thus they have not to be classed as spermicidal substances, contrary to the local convention.

#### SUMMARY

The contact test without mechanical mixing has been suggested as the method of choice to evaluate the efficacy of the spermicidal preparations.

The steady values obtained through the tests point to the consistency of the experimental techniques used.

The indigenous substances viz. 20 percent saline and lemon juice are more efficient as local contraceptives than the standard spermicidal preparations.

Neem oil is as efficacious a contraceptive as the standard spermicidal preparations.

Rice paste, Til oil and Sandal wood oil can not be classed as local contraceptives.

Further work, however is indicated for evaluating the indigenous spermicidal substances.

#### ACKNOWLEDGEMENTS

Our acknowledgements are due to M/S Johnson and Johnson Private Ltd. Bombay and M/S British Drug House, Bombay for the generous supply of their products for experimentation. We are grateful to Dr. K. L. Sonak, President Kutumb Kalyan Sangh, Vidarbha, Nagpur for the keen interest in the present investigation. Our thanks are also due to Mr. P. Singha for statistical analysis.

#### BIBLIOGRAPHY

1. Baker, J. R., Ranson, R. M., and Tynen, J. (1937): *J. Hyg. Comb.*, **37**, 474.
  2. Brown, R. L. and Gamble, C. J. (1941) : *Human Fertil.*, **6**, 1.
  3. Davidson, H. A. (1953) : *Lancet*, **2**, 432.
-