

JAN - JUNE 88 17

RECORD TYPE : P
SUB TYPE : S
SECURITY CODE :
FUNDING BODY :
ORGANIZATION : ITEL CANADA
GROUP NUMBER : 444
LOCAL PROJECT NUMBER(S) : T-7708;04
PROJECT TITLE : Biological Effects of Tobacco Smoke and
Tobacco Extracts in Short Term Tests
PERSON RESPONSIBLE : BILIMORIA, M.H.
EFFORT : 0.95 * 1987
PROJECT DESCRIPTION : Bacterial tests will be employed to study the
mutagenicity of smoke condensates from ITEL and
opposition brands, as well as new market
entries, to ensure that ITEL products rank
favourably in a comparative study. By
determining the mutagenicity of smoke
condensates and fractions from different
cigarettes smoked under different conditions,
the aim is to identify those parameters which
affect mutagenicity. The effect of additives
on condensate mutagenicity will also be
studied as will smokeless tobacco products.

SCOPE : GROUP
DEPTH : APPLIED/DEVELOPMENT
FUNCTION : PUBLIC AFFAIRS
OBJECTIVE : REGULATORY
CLUSTER : BIOLOGY

DATE REVIEW WRITTEN : June 1988
REVIEW TITLE : Biological Effects of Tobacco Smoke and
Tobacco Extracts in Short-Term Tests.
REVIEW TEXT : 1. Mutagenicity of Commercial Cigarettes :

Our laboratory has been testing current market brands, new market entries and certain experimental cigarettes in anticipation of possible government requirement for mutagenic testing of commercial cigarettes. Such a survey of brands collected world wide might also reveal cigarettes of high or low mutagenic activity and this information might enable us to lower such activity in ITEL products.

Recently, we tested a group of 4 charcoal filter cigarettes, two of which were Swiss brands, the other two being an American blended and Canadian flue cured brand. The flue-cured brand was similar in mutagenic activity to the standard Check cigarette, but distinctly different from the Swiss Maryland and American tobacco blends. The Maryland blend cigarettes showed higher activity than the American blend cigarette. This result suggests the presence of considerable amounts of high mutagenic activity burley tobacco in the Swiss brands, since Maryland tobacco itself was found to be significantly lower than burley in studies reported by the Tobacco & Health Research Institute of the University of Kentucky.

In another group we examined two Indonesian brands viz., Djarum and Kretek, which contain significant amounts of cloves along with tobacco. These clove containing cigarettes were of interest on account of an earlier B.A.T. study which showed that cigarettes containing 30% "Batik" (crushed cloves) showed reduced Ames activity. Included in this study were two non-tobacco cigarettes, viz., Honeyrose and "Ginseng", because many recent studies have shown the presence of antioxidants and other chemicals in plant materials which show an anticarcinogenic activity in animal studies. Our mutagenic studies showed that the two non-tobacco brands were distinctly higher than the two clove-containing cigarettes, which were similar to our Check control. While it is not known which tobacco was used in producing the clove cigarettes, the low activity observed suggests that we should test eugenol for its effect on the mutagenicity of our flue-cured brands. It will also be interesting to see what effect eugenol has in vivo in the rat. Would eugenol modify the mutagen/carcinogen metabolizing enzymes in rat tissues such that it changes its ability to activate smoke condensate in vitro? Studies are planned to answer these interesting questions.

2. Effect of Antioxidants and Other Chemicals on the Mutagenicity of Cigarette Smoke Condensate (CSC).

We continue to screen chemicals, particularly phenolic antioxidants for their antimutagenic effects towards CSC mutagenicity. A preliminary screening has shown that rutin and quercetin are mutagenic towards S. typhimurium TA98 but when tested together with CSC the activity is less than additive. Catechol, resorcinol and chlorogenic acid did not show mutagenicity towards this strain but reduced the mutagenicity of CSC.

Earlier we had shown that sodium selenite reduces the mutagenicity of CSC from Check cigarettes. Recently, Chortyk et al (Environ. Mol. Mutagen, 11, 369, 1988) have reported a similar inhibition, but at much lower concentrations of sodium selenite. In attempting to explain this difference we have repeated our studies using an American blend and a French dark tobacco cigarette and found inhibition at concentrations of selenite similar to those required for the flue-cured cigarettes. Employing a preincubation step too did not change our results. It appears that the order of addition of the components tested might have been responsible for the difference observed. This will be tested in the future. Finally, even more puzzling are the results of Chortyk et al (loc.cit.) which show that CSC, both mainstream and sidestream, show much higher mutagenicity with strain TA1538 than with strain TA98, whereas the opposite results were obtained both at Montreal and Southampton.