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IMPERIAL TOBACCO LIMITED  
RESEARCH & DEVELOPMENT DIVISION  
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THE ASSESSMENT OF ALVEOLAR CO CONCENTRATIONS  
AS AN INDICATOR OF SMOKE INHALATION

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SUMMARY

The monitoring of concentrations of CO in expired air before and after smoking appears to be a viable technique for assessing amounts of CO inhaled by the smoker from various products. Variations in alveolar CO levels of smokers of different products are apparent, but are not necessarily dependent on the cigarette CO yields as determined under standard machine smoking conditions. Similar results were noted by Rawbone and Guillem (1-3) in recent publications using similar CO sampling techniques.

It has been demonstrated herein that one alveolar CO analysis at one specific time during the day, offers limited knowledge of daily CO levels, or of total daily CO uptake. Although Howard and Wald (4-5) have suggested that one COHb sampling could be used for such purposes, it has however, been demonstrated that frequent sampling of alveolar air throughout the working day, before and after smoking yields a more accurate assessment of CO uptake resulting from smoking.

Although based on studies on only two subjects it would appear that CO uptake may be linked with the availability of nicotine to the mouth which, in turn, has caused the smoker to vary depth and duration of inhalation. Thus the amounts of both nicotine and CO delivered to the mouth are important factors in determining the amount of CO which reaches

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the lungs and hence the blood stream. (i.e. one may expect an increased lung CO level with a cigarette of decreased nicotine delivery, assuming both products deliver equivalent amounts of CO).

This technique of measuring lung CO levels, when supported by measurements of nicotine and CO deliveries to the mouth, and of smoking behavioural parameters may, in the future, offer a viable method of assessing the effects of differences in products on total smoke intake.

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