STUDIES ON THE POLLUTION EFFECT OF ORGANIC SOLVENTS USED IN CHEMICAL INDUSTRIES

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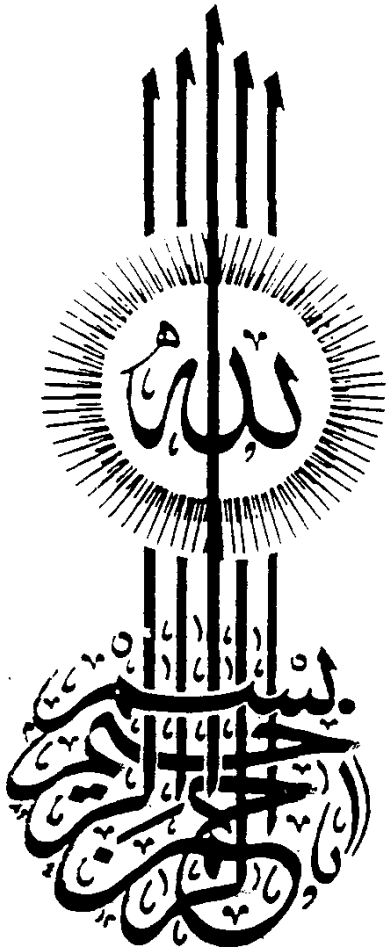

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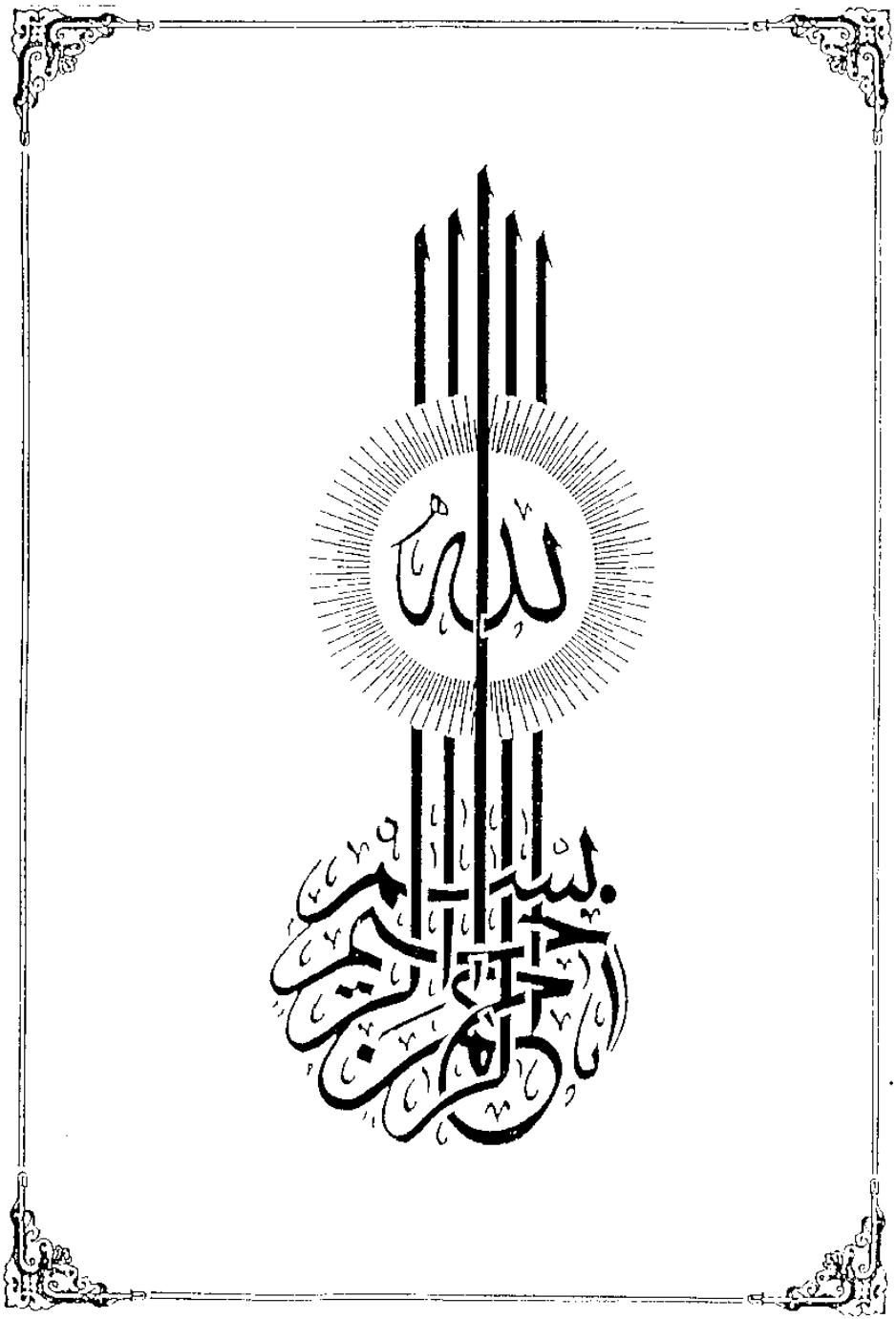

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AIM OF WORK

Workers employed in the manufacture of paints and chemical industries, in which organic solvents are used, are exposed to the hazards of their toxic effect. Such hazards do not only depend on the types of solvents used, but also on their concentrations in the working environment, and possibly on the duration of exposure.

In Egypt, where such industries are newly developed, it is felt that a study of their possible toxic effects on exposed workers is becomming an urgent duty of research workers. This work was undertaken with the aim of obtaining more information about the effect of solvents on workers exposed to them by direct cutaneous contact and probably more important, to their vapours in the working environment. The solvents under investigation are Acetone, Ethyl, Methyl, and Butyl Alcohols, Ethyl and Butyl Acetates, Toluene and Xylene, which are widely used in paints and chemical industries.

Away from studying the toxic effects of organic solvents on laboratory animals and volunteers under controlled experimental conditions, where one solvent was studied at a time, the present work deals with the toxicity of such solvents in situ i.e., in the factory as mixtures of solvents usually present. This is felt to reflect more precisely the impact of these solvents on the workers

under the prevailing conditions and therefore might constitute a practical guide to any measures towards improving these conditions should this become necessary.

INTRODUCTION

Organic solvents have extensive uses in chemical industries. They are not only utilized in the manufacture of paints, varnishes and lacquers, but are also commonly employed in the manufacture of plastics, rubber, artificial silk and leather, extracting oils, fat and medicinal materials from seeds, nuts and bones. Some solvents are used for degreasing and dry cleaning. Chemical reagents are frequently dissolved in organic solvents to facilitate desired chemical reactions. The manufacture of the different types of paints, however, represent the main consumption of these solvents.

A large proportion of the solvents used are capable of dissolving fats, hence they are often referred to as fat organic solvents. Examples of such fat solvents are, Acetone, Ethyl, Methyl, and Butyl Alcohols, Ethyl, and Butyl Acetates, Toluene and Xylene, other solvents are also used such as Glycol Ethers, Methyl Ethyl Ketones and Trichloroethylene. New solvents such as Benzene, Tetrachloroethane and Carbon Tetrachloride have largely been eliminated, due to their hazardous effects. Workers dealing with these solvents, are liable not only to get these substances in direct contact with the skin, but also they are exposed to their vapours in the air they inhale. It is within the scope of industrial medicine to study the side effects of such exposures and to provide the possible means to prevent them or to lower their

incidence to a minimum.

Before reviewing the literature concerning the effect of organic solvents used in painting on exposed workers, it is felt necessary to lay stress on certain definitions and technical terms that will be met within this thesis.

I-DEFINITION AND TERMINOLOGY

1- Air Pollution [1]

It is still an argument to define the term "air pollution". Some definitions consider any foreign matter added to the composition listed in Table (1) at any concentration as an air pollutant. Others consider that air becomes polluted only if these foreign compounds exist in concentration which can cause harmful effect to man or his property.

The American Medical Association defines air pollution as "The excessive atmospheric concentration of foreign matters that may adversely affect, the well being of any person or cause damage to property". Moreover, U.S.A. oregon state defined:"air pollution" as the presence in outdoor atmosphere of substances or contaminants, put there by man, in quantities or concentrations and of duration as to cause any discomfort to a substantial number of inhabitants of district or which are injurious to public healthy, or to human, plant or animal life or property or which interfere with the reasonable comfortable enjoyment of life and property throughout the state or throughout such territories or areas of the state as shall be affected thereby.