HISTOLOGICAL STUDIES ON THE EFFECT OF THE FOOD ADDITIVE [BUTYLATED HYDROXYTOLUENE] ON THE LUNG AND THE LIVER OF MICE

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By

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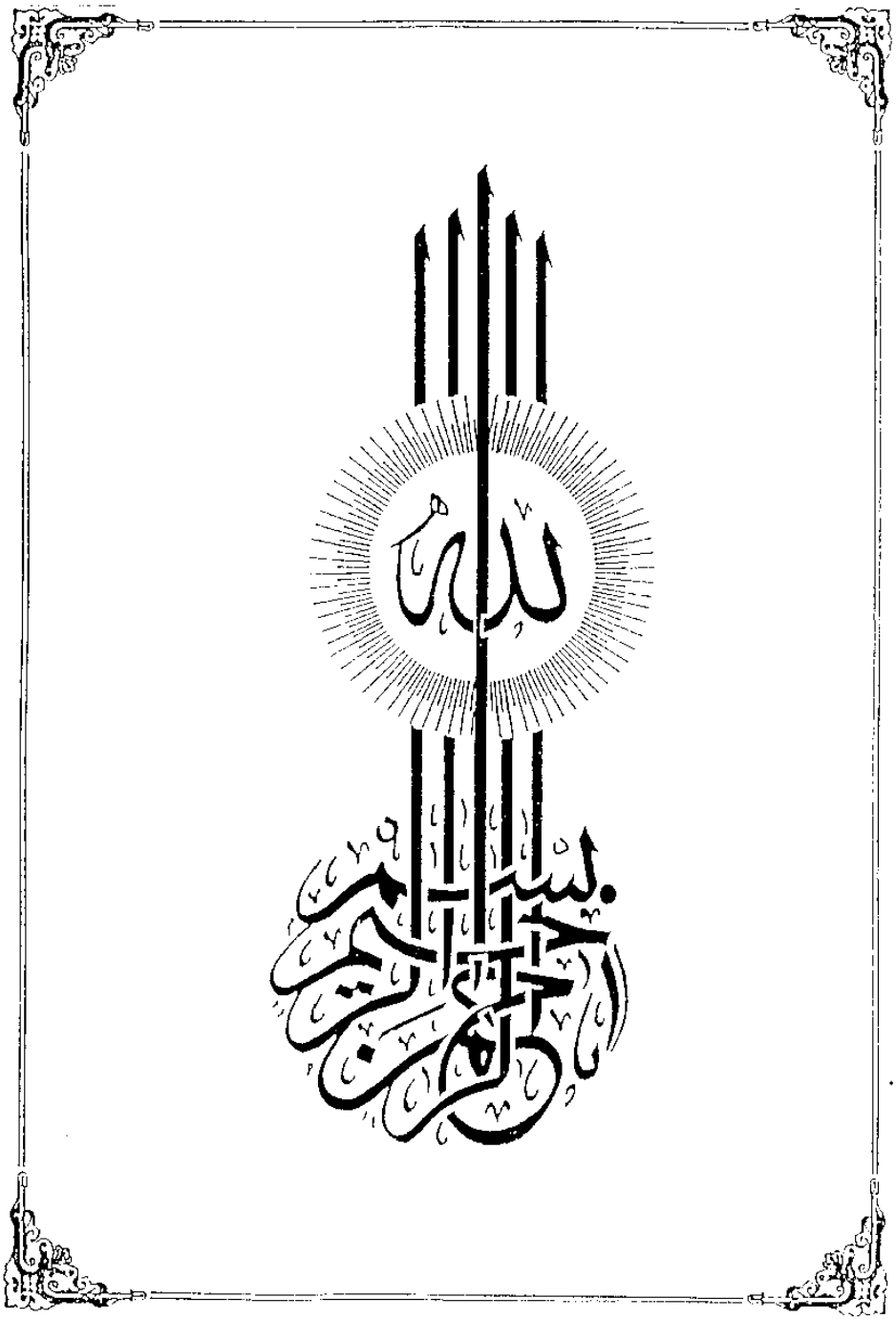

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INTRODUCTION
AIM OF THE WORK

Introduction and Aim of the Work

The use of the food preservative butylated hydroxytoluene (BHT) has changed food production and eating habits. It conferred substantial benefits on man, not only by preservation and increasing palatability of food, but also by affording protection against the pathological effects of reactive oxygen species which are associated with cancer, cardiovascular diseases and aging. However, there have been problems concerning the safety of using BHT (**Parke and Lewis, 1992).**

The hydrophobic molecule of BHT was found to be a potent inactivator of lipid-containing mammalian and bacterial viruses **(Snipes, Person, keith and Cupp, 1975).**

Reimond, (1987) mentioned that BHT was a potent inactivator of lipid-enveloped viruses. He stated that the viral envelop structure was physically disturbed by BHT, thereby interfering with viral adsorption to the host cells. He also mentioned that since the virus responsible for AIDS (HTLV III) contained a lipid envelop, BHT warranted investigation as a potent antiviral agent for AIDS virus.

However, the use of BHT could lead to pneumotoxic effect **(Blumenthal and Malkinson, 1987 and Miller,**

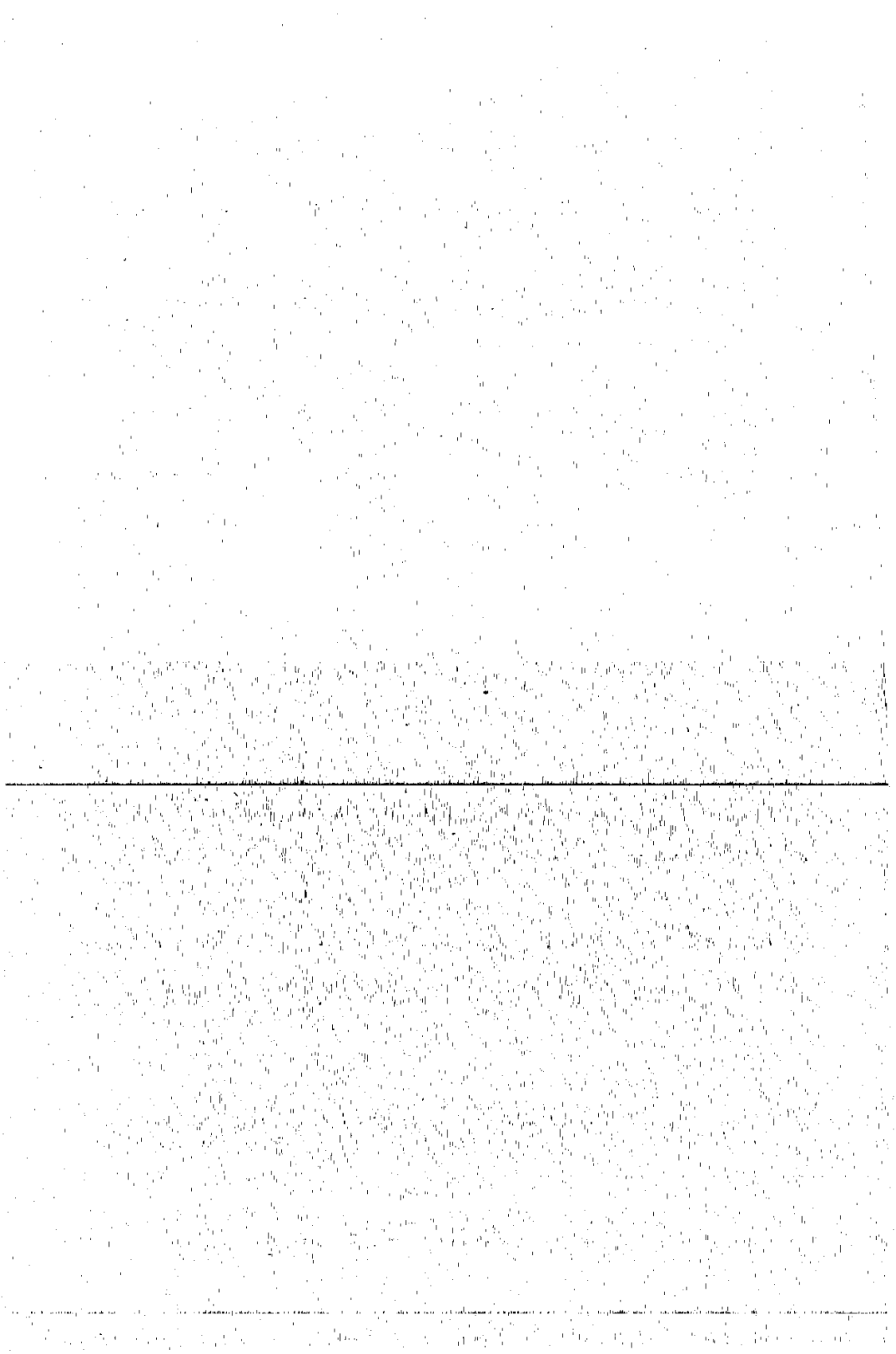
Duwyer, Auerbach, Miley, Dinsdale and Malkinson, 1994). It could also lead to liver affection **(Powell and Connoly, 1991).**

Most available researches dealt with the biochemical effects of BHT on the lung and the liver. However, few investigators discussed the histological changes caused by BHT on these organs.

Aim of the Work

The acceptable daily intake of BHT is exceeded in all age groups, particularly in children (Verhagen et. al., 1990). So, the aim of the present study is to evaluate the possible effects of the abuse of BHT on the structure of the lung and the liver of the mice.

REVIEW OF LITERATURE



Butylated Hydroxytoluene (BHT)

Butylated hydroxytoluene (BHT) is 2,6 di-tert-butyl-p-cresol (C15 H24 O). It is in the form of colourless crystals or white crystalline powder and is odorless or with a faint odor. It is practically insoluble in water, glycerol but it is soluble in alcohol (1 in 4) and in fixed oils (1 in 3). BHT is rapidly absorbed from the gastrointestinal tract and is extensively metabolized and excreted in urine mainly as metabolites. BHT has antioxidant properties and has been reported to have antimicrobial activity. It is employed as an antioxidant in cosmetics and food, particularly to prevent oxidative rancidity of fats and oils in concentration of up to 0.02%. It is also used to prevent the loss of activity of oil-soluble vitamins. In order to improve the efficiency, BHT is frequently used in combination with other antioxidants such as butylated hydroxyanisole (BHA) and with sequestrants and synergists such as citric acid. A temporary estimated acceptable daily intake of BHT up to 125µg/kg body weight was established by the Joint FAO/WHO Expert Comitte of food additives in 1987 **(Martindale, 1989).**

Uses of BHT: A) **As a food additive:**

Kim, Moon, Sapienza, Carp and Pullarkat (1978) stated that BHT was an antioxidant that was widely used in

food because it prevented spoilage by delaying degradation of lipid components. They also mentioned that BHT was a hydrophobic compound that inactivated murine human cytomegalovirus.

Schwope, Till, Ehntholt, Sidman, Whelan, Schwartz and Reid (1987) mentioned that antioxidants as BHT and Igranox 1010 were added to food wrapping material to minimize degradation during processing. They were added at a level of several hundred p.p.m.. During use, the antioxidants migrated into the stored food with the BHT migrating more rapidly.

Gonzalez, Grav, Schemmal, Dugan and Welsch (1992) evaluated corn and fish oil diets with different types and concentrations of antioxidants for oxidation products. Peroxide value and thiobarbituric acid assay were performed on the diets immediately after mixing (0h) and 48 and 72 hr after being fed to mice. The recommended level of antioxidant addition (0.02g/100g oil) and even the addition of 100 times this level (2g/100g oil), decreased the level of oxidation products but failed to totally prevent oxidative deterioration in diet high in fish oil.

Kagan, Serbinova and Packer (1990) added that the pharmacological properties of BHT were attributed to its high