



## GC-MS Study of Organic Compounds in Waste Water of Sanganer Textile Dyeing and Printing Industrial Units

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### ABSTRACT

GC-MS study of two samples of selected sites of Textile dyeing and printing (TDP) industrial units of Sanganer town were performed. The organic pollutants of samples were extracted from  $CH_2Cl_2$  and sent the extracted organics for analysis of GC-MS study. Identified results indicates the presence of several aliphatic halogenated and aromatic pollutants.

Keywords : GC-MS, TDP

### INTRODUCTION

Dyeing industries widely used the organic dyes to color their product. The discharge of dyeing industries like Paper, Rubber, Leather, Cosmetics, Textile, Plastic, Food industries<sup>1</sup> contains high color impurities more than 10,000 dyes are commercially available and world widely more than  $7 \times 10^5$  tons/year of these dyes are produced in the world for the textile industry alone<sup>2</sup> most of these dyes are synthetic and have complex molecular structure that makes them stable and non bio-degradable<sup>3</sup>. The discharge of textile dyeing and printing effluents in to the natural bodies causes water pollutants they creates serious water quality and public health problems such as dermatitis<sup>4</sup>, skin irritation<sup>5</sup>, cancer<sup>6</sup> and mutations<sup>7</sup> and very harmful effect on aquatic life and humans<sup>8</sup>.

In the present GC-MS spectral studies the samples from two units of Sanganer textile dyeing and printing industrial waste water of Sanganer (Jaipur) were collected to find the nature of the used dyes in TDP industries.

### MATERIALS AND METHODS

The samples were collected from the selected sites of different units of Textile dyeing and printing (TDP) industries of Sanganer (Jaipur). The sample were collected into the bottles and brought to the laboratory and extracted with dichloromethane ( $CH_2Cl_2$ ). The extracted masses were dried and sent to SICART, CVM, Vallabh Vidhya Nagar for GC-mass spectral studies.

### RESULTS AND DISCUSSIONS

#### GC-MS SPECTRAL STUDIES

The GC-MS spectra of samples are given in the fig 1 and 2. Identified Organic Compounds and its molecular weight, molecular formula of both samples 1 and 2 are given in the table 1 and 2 respectively. These characteristics are useful for detection of organic compounds<sup>9</sup>.

Table: 1 (Sample-1)

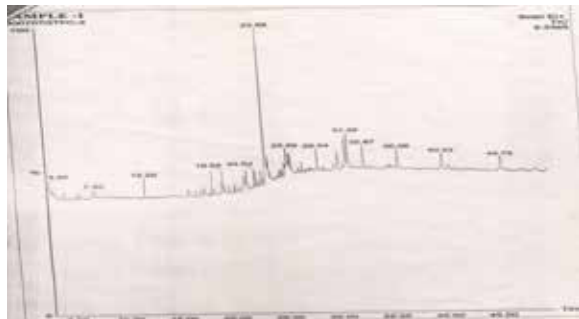
#### ORGANIC COMPOUNDS FOUND IN EFFLUENT SAMPLE-1

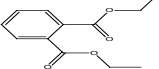
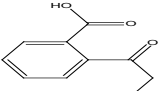
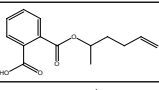
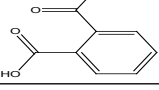
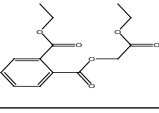
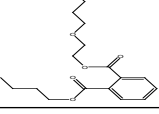
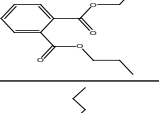
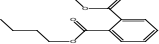
Name of Compound	Molecular weight	Molecular Formula	Structure
Hexachloro ethane	234	$C_2Cl_6$	

1,2,3-Tribromopropane	278	$C_3H_5Br_3$	
Trichloronitromethane	163	$Cl_3CNO_2$	
Carbon tetrachloride	152	$CCl_4$	
1,1,1,3,3,3-Hexachloro2-Propanone	262	$C_3OCl_6$	
1,1,1,2-Tetrachloro ethane	166	$C_2H_2Cl_4$	
Bromotrichloro methane	196	$CCl_3Br$	
Methyl pentachloropropanoate	258	$C_4H_3O_2Cl_5$	
1,2,2-Tribromopropane	278	$C_3H_5Br_3$	

1,1,1,2,2,3-Hexachloro-3,3-difluoropropane	284	C <sub>3</sub> Cl <sub>6</sub> F <sub>2</sub>	
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FIGURE-1

Table:2 (Sample-2)  
ORGANIC COMPOUNDS FOUND IN EFFLUENT SAMPLE-2

Name of compound	Molecular weight	Molecular formula	Structure
Diethyl phthalate	222	C <sub>12</sub> H <sub>14</sub> O <sub>4</sub>	
2-(1-Oxopropyl)-Benzoic acid	178	C <sub>10</sub> H <sub>10</sub> O <sub>3</sub>	
Phthalic acid, dl-(1-Hexen-5-yl)Ester	330	C <sub>20</sub> H <sub>26</sub> O <sub>4</sub>	
2-Acetylbenzoic acid	164	C <sub>9</sub> H <sub>8</sub> O <sub>3</sub>	
1,2-Benzenedicarboxylic acid,2Etoxy-2-oxoethyl ethyl ester	280	C <sub>17</sub> H <sub>21</sub> O <sub>2</sub> N	
1,2-Benzenedicarboxylic acid, 2-Butoxyethyl butyl ester	322	C <sub>18</sub> H <sub>26</sub> O <sub>5</sub>	
1,2-Benzenedicarboxylic acid, dipropyl ester	250	C <sub>14</sub> H <sub>18</sub> O <sub>4</sub>	
Dibutyl phthalate	278	C <sub>16</sub> H <sub>22</sub> O <sub>4</sub>	

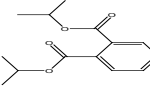
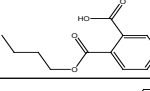
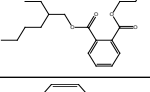
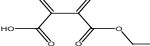
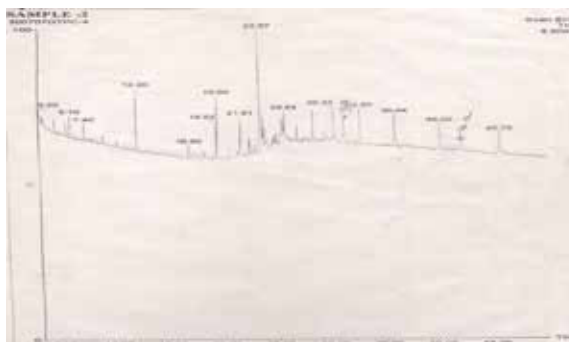
1,2-Benzenedicarboxylic acid, bis(1-Methyl-ethyl) ester	250	C <sub>14</sub> H <sub>18</sub> O <sub>4</sub>	
1,2-Benzenedicarboxylic acid, monobutyl ester	222	C <sub>12</sub> H <sub>14</sub> O <sub>4</sub>	
1,2-Benzenedicarboxylic acid, butyl 2-ethylhexyl ester	334	C <sub>20</sub> H <sub>30</sub> O <sub>4</sub>	
Phthalic acid, Monoethyl ester	194	C <sub>10</sub> H <sub>10</sub> O <sub>4</sub>	

FIGURE-2



The aromatic compounds, aliphatic acids, esters, dicarboxylic acid, heterocyclic and some chloro, bromo, fluoro Compounds are present in both samples. Ester can cause adverse effect on endocrine system which comprises the organ and glands, that secrete hormone. Compounds which are toxic to the endocrine system may cause diseases like diabetes mellitus, hypoglycemia, reproductive disorders and even cancer<sup>9</sup>.

A benzene compound e.g. 1,2-benzene dicarboxylic acid causes skin irritation, redness and pain. Excess inhalation of these compounds may lead to headache and weakness also.

**CONCLUSION:**

GC-MS spectral studies of two samples of selected sites of textile dyeing and printing (TDP) industrial units of Sangner town shows that the presence of various aliphatic halogenated as well as many aromatic esters and carboxylic acid etc. These organic pollutants can cause several diseases like hypoglycemia, skin irritation, headache, reproductive disorders and even cancer. Thus the investigation clearly favours the scientific and logical treatment of TDP waste water before throwing it out.

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