

# Breathe Disease Analyses

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**Abstract**— The objective of this study paper is to detect the volatile organic compounds for early diagnosis of specific diseases. Each person expel different concentration of molecules through breathing, each diseases leaves unique breath print. The present objective work has been carried out using a modern high sensitive breath technique using gas sensor array with all efficiency and all with ease of breath.

**Key words:** Gas Sensor, Volatile Organic Compound

## I. INTRODUCTION

The Diseases breath analyser is a health monitoring system is an early diagnosis of diseases comparatively other detection methods or invasive, expensive, [1] which as time consuming or complex analysis (chemical test) they or found sufficiently painful in procedures. Breath analyser is a human exhaled breath consists of number of different components, such as carbon dioxide, oxygen, nitric oxide and various volatile organic compounds [2] These breath components are either exogenous or endogenous the inhalation is exogenous and exhalation is endogenous which are metabolic process where Metabolic process is a set of life sustaining within the cells of living organisms. Thus change in concentration of these molecules is the indication of presence of diseases or change in metabolism for example acetone is an indicator of diabetes: nitric oxide is indicator of asthma air way inflammation [1] such as elevation in concentration of ammonia in an exhaled human breath is an indicator of renal disease. A breath analysis is usually performed by gas chromatography or electronic nose. It is a real time test will help patient to recover to better stage. [3]

## II. DISEASES MARKER

Each breath of human consists of 1000 volatile organic compounds provide necessary information of certain diseases is known as biomarker or diseases marker.[1] A biomarker may be a chemical substance (molecules) introduced into an organism by food (exogenous) or produced within the body (endogenous).Only endogenous molecules which can be detected and measured in the blood, bodily fluids, tissues, urine, sputum, saliva, human breath, and serves as an indicator of either normal or disease processes in the body.[2]. Biomarker is the toxic metabolite that accumulates as a result of the enzyme deficiency. During initial stage of each diseases release biomarker in our blood streams before symptoms appears in our body. Each diseases essentially leaves a unique breath print, By this breath print (biomarker) we can predict the current health status ,[4] predefine the diseases and future outcomes even when patient still seems healthy. Diseases marker is used for early diseases detection and Diagnosis, Diseases prevention. [1]

### A. For example

S. No	Diseases	Diseases Marker
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1	Diabetes	Acetone, carbon monoxide
2	Tuberculosis	CO <sub>2</sub> , NO, Methyl nitrate
3	Asthma	NO,CO, H <sub>2</sub> O <sub>2</sub> , Nitrite
4	Chronic Cough	NO
5	Bronchitis	NO, H <sub>2</sub> O <sub>2</sub> ,Pent-ane
6	CPD	High level NO
7	Influenza	NO, low Isoprene, low Acetone
8	Lung cancer	Low Methanol, Methyl, Heptanol, Toluene
9	CKD	High Ammonia ,Acetone, Isoprene, Pentane
10	Heart diseases	Methanol

Table 1: Example

### B. Abbreviation

- NO-Nitric Oxide
- CO-Carbon monoxide
- CO<sub>2</sub>-Carbon dioxide
- H<sub>2</sub>O<sub>2</sub>-Hydrogen Peroxide
- CPD-Chronic pulmonary Diseases
- CKD-Chronic Kidney Diseases.

## III. BLOCK DIAGRAM

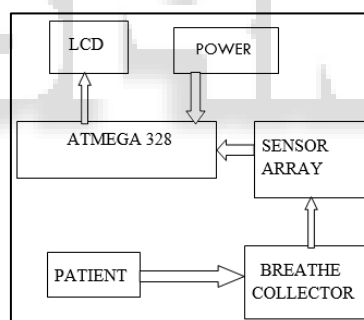


Fig. 1: Block diagram

The whole concept is integrated in a single diagram. The patient breaths into the breath collector like inhaler which is sensed by the sensor array. The sensor consists of 3 array designed to identify respective diseases. The ATMEGA 328 microcontroller is programmed so that it can manipulate a disease for a particular percentage of molecules (voc) present in the breath print. Thus the ATMEGA receives output from the sensor array process it and send it as the input to the LCD display, which later displays the diseases name. The power supply electrifies the whole circuit.

## IV. TECHNIQUE IMPLEMENTED

Various techniques involved in Breath diseases analyses such as gas chromatography, nanomaterial based analyses. There are some drawbacks in these technique. Gas chromatography have only limited application due low sensitivity, bulky to carry the procedure. Nanomaterial analyses used nanomaterial gas sensors such as electrochemical sensors, semiconducting sensors, colorimetric sensor, magnetic

sensor. These sensors are expensive, need trained technicians to carry.

To improve the sensitivity and overcome all the difficulties, an emerging breath diseases testing using alcohol gas sensors (MQ series) utilizes a small heater inside with an electrochemical sensor these sensors are sensitive to a range of gases are used at room temperature carried out, which is real time, high sensitivity, inexpensive compared with previous technique.

#### A. Sensor Array

- MQ135- Ammonia, Sulphide, Benzene, Nitrogen, oxygen.
- MQ3-Alcohol and Acid, (Ethanol, Methanol, H<sub>2</sub>O<sub>2</sub>) Detector
- MQ7 – Carbon Gas, Acetone Detector

#### V. ADVANTAGES

Breath testing offers evaluation of several common disorders, and assessment of VOC exposure.

- Breath analysis is advantageous over blood and urine analysis, as it is less complicated than blood and urine. [1]
- Breath analysis is non-invasive, it does not cause discomfort (or embarrassment) (compared to blood and urine analysis). Within 5 minute we can diagnosis diseases which is real time testing.

#### VI. LIMITATION

Despite many advantages, the major drawback of breath analysis is often the absence of standard analytical methods that can address the variation in results or the accurate quantitation of target compounds. Some methods require sample pre concentration by adsorption (on sorbent traps and coated fibers) or by direct cryofiltration because concentration of many substances ranges

#### VII. CONCLUSION

The objective of this paper is to detect the concentration of molecules in exhaled breath by using gas sensor. From, all the analog voltage values and the responses which are recorded by the sensors MQ135, MQ5, MQ7 gas sensors, hence depending on the concentration of molecule in the exhale breath we can detect diseases in the early stages. By this we conclude that breath analyser is less expensive and less in time span and sure to detect diseases in early stage.

#### VIII. RESULT

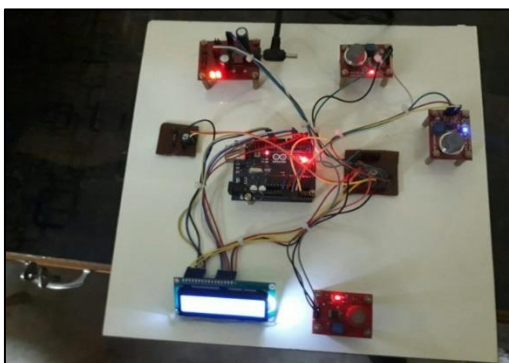


Fig. 2: Output

- Output: Due to the presence of NO, CO, Nitrite in the exhale breath we detect “asthma diseases” in the person.

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#### Web Resources

- [7] [www.futureelectronics.com](http://www.futureelectronics.com)
- [8] [www.electronicsworld.com](http://www.electronicsworld.com)
- [9] [www.sensorimplementation.com](http://www.sensorimplementation.com)