

# Development of Biomedical Instrumental control system for detection of hazard due to exposure of nanomaterials.

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## ABSTRACTS

If you are up to 50years of age and there is suspicion of prostate cancer due to nanoparticles: your doctor may ask you to urinate into a special biomedical device called Uroflometer that measures how quickly urine flowing. A reduced flow often suggest Benign prostatic hyperplasia (BPH) which is a diseases of abnormal proliferation of cells. uroflowmeter are made of mainly passive components. The unit ohms, volt, ampere, Henry meters, meters per seconds e.t.c. A coil of 9000tons (nine thousand) tons of coil of wire is wound round the pipe of 9 millimeter in diameter caring the urine and large magnets is placed across it. The urine flows through the magnet field so that a current of few micro amps is induced in it. this couple to the picking coil which provide indication on the meter or computer. The deflection on the meter is directly proportional to the amount of urine flowing and thus the meter reading is a measure of the rate of flow of urine.

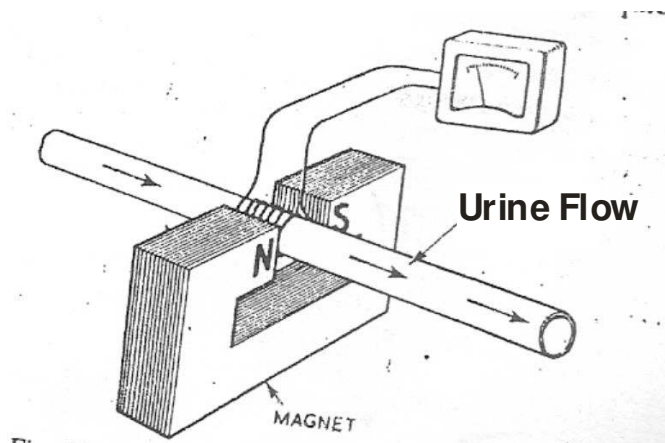
**keyword:** Biomedical device, prostate cancer, coil of wire, pipe, magnet, magnetic field, meter, current, urine, medical doctor e.t.c.

## Introduction

Uroflowmetry is a diagnostic biomedical instrumentation control system administered to check for abnormalities in the amount or flow of a patient's urine[6]. The procedure is straight forward and painless, and simply involves urinating into a pipe device attached to an electronic meter or computer. Doctors commonly use uroflowmetry to check for possible bladder obstructions, kidney problems, prostate enlargements, and urinary tract infections. Unusual test results indicate the need for additional testing procedures, such as x – rays[21] and sample lab analysis. In most cases, a urologist or primary care physician will decide to perform uroflowmetry after conducting a physical exam and asking about a patient's physical symptoms. The test is usually not performed on the same day as the initial evaluation, since certain measures need to be taken to prepare. A physician can explain the procedure and inform the patient what he needs to be taking non- essential medications about 48 hours before the test to ensure accurate results. In addition, people need to drink several glasses of water in the morning of the exam so they will have full bladders.

## MATERIALS AND METHOD

Magnetic induction uroflowmeter are made of mainly passive components. The unit ohms, volts, ampere, Henry, meters, meters per seconds etc. a coil of 9000 turns (nine thousand) turns of coil of wire is wound round the pipe of 9 millimeter in diameter carrying the urine and large magnet is placed across it as the diagram below.



## MAGNETIC INDUCTION UROFLOW METER

### RESULT AND DISCUSSION

The urine flows through the magnetic field so that a current of few micro amps is introduced in it. This couple to the picking of coil which provide indication on the meter or computer. The deflection on the meter or computer is directly proportioned to the amount of urine flowing and this meter or computer reading is the measure at rate of flow of urine.

### The exact velocity measurement

Velocity of urine is the time derivative of displacement and so all the displacement velocity if their signals are processed by passing them through the differentiator circuit. There are, however the main method that I applied to measure velocity directly

Magnetic induction method

If a magnetic field that passes through a conducting coil varies with time  $t$  a voltage is induced in that coil that is proportional to the relationship of given by

$$V = N \frac{d\Phi}{dt}$$

Where  $v$  is the voltage induced in the coil  $N$  is the number of turns in the coil, and  $\Phi$  is the total magnetic flux passing through the coil (the product of the flux density and area within the coil). This a simple way to apply this principle is to attach a small permanent magnet to a pipe whose velocity is to be determined, and attach a coil or computer that will serve as the reference against which the velocity is to be measured. A voltage will be induced in the coil whenever the structure containing the permanent magnet moves and this voltage will be related to the velocity of that movement the exact relationship will be determined by the field distribution for the particular magnet and the orientation of the magnet with respect to coil [1]

The body takes materials from foods and convert them to energy. After the body has taken the food components that its needs, waste products are left behind in the bowel and in the blood. The urinary system helps the body to eliminate liquid called urea and keeps the chemicals. Such as potassium, sodium, nitrates water, nanotoxins like nonotixins from nitrate, potassium, lead, uranium and other nano compounds that swell and develops a growth called

the prostate cancer **as I discovered**. Urea is produced when foods containing protein, such as meat, poultry and certain vegetables, are broken down in the body. Urea is carried in the body stream to the kidneys, where it is removed along with water and other waste in the form of urine, as the prostate cancer is developing.

### **Cancer of the prostate is a hazard due to exposure of nanomaterials**

The prostate is a cluster of small glands about the size a para-rubber seed or a palm nut. It is located next to the bladder and surrounds the urethra. The exact function of this gland is still not clear. However, it is thought that the addition of prostatic secretions to the seminal fluid somehow stimulate active movement of ejaculated sperms during sexual intercourse.

The prostate tissue, like most other body tissues is subject to cancerous growth. However, cancer of the of prostate does not progress the malignant growth of the prostate tends to dormant, and seldom causes symptoms or health problems. The fact that the growths on the prostate gland are malignant is often discovered only during a surgical operation for the such other prostate problem as prostatic hypertrophy (BBH) or enlargement of the prostate.

For the most part of prostate cancer, it stays localized in the prostate and seldom spreads to other body organs. There is risk, however, that if the usually to the bones. Indeed, it the secondary symptoms associated with bone tumor that frequently indicates the presence of primary prostate cancer.

Some people sometimes erroneously take enlargement of the prostate (benign prostatic hypertrophy) to be cancer of the prostate. Both conditions are distinctly different and bear no relationship either in origin, pathology or epidemiology.

Nearly every man over 45 years old has some degree of prostate enlargement. It is a due to nano and aging process. This results from harmless over-growth of normal prostate tissue. Along with this is the development of small gritty nodules which as they accumulate, the size of the gland changes. The size of harmless enlargement matters less than the consistency of the tissue. In some men, however, the prostate gland, which normally relaxes to permit flow of urine from the bladder through the urethra, becomes stiff and inflexible. As the enlarged and stiffened gland grows more rigid and constricts the urethra that it surrounds the muscles of bladder is unable to overcome resistance caused by the rigid prostate; and the flow of urine becomes severally obstructed.

Although the symptoms of benign prostate hypertrophy and prostate cancer are similar, the health status outcome implications are different. With prostate enlargement there is risk of cystitis resulting from retained urine. Also when the outflow of urine is hampered or blocked, pressure with the bladder increases and the kidneys and the ureters may become infected causing pyelonephritis. A third risk that may accrue from prostate enlargement is acute retention or kidney failure.

Both conditions can be treated with prostatectomy. However, it can be partial in the case of benign prostatic hypertrophy. For instance, a prostatic surgical procedure called transurethral resection of the prostate (TURP) is the most common procedure for slightly or moderately enlarged prostate. Here an instrument insert in the penis trims away the excess prostatic tissue. However, when the prostate is very enlarge, the entire prostate and the adjacent structures may be removed, as prostatectomy for cancer, a procedure called radical in prostatectomy.

Again, both of these conditions, prostate enlargement and prostate cancer are different and unrelated. They can even occur independently in the same individual.

## **FACTS ABOUT URINE**

1. Adults pass about a quart and a half of urine each day, depending on the fluids and foods consumed.
2. The volume of urine formed at night is about half that formed in the day time.
3. The normal urine is sterile. It contains fluids, salts, nano particles and waste products, but it is free of bacteria, viruses and fungi.
4. The tissues of the bladder are isolated from urine and toxic substances by a coating that discourages bacteria from attaching and growing on the bladder wall.

## REASONS FOR THE PROCEDURES

Magnetic induction Uroflowmetry is a quick, simple diagnostic screening test that provides valuable feedback about the health of the lower urinary tract. It is commonly performed to determine if there is obstruction to normal urine outflow. Medical conditions that can alter the normal flow of urine include, but are not limited to, the following:

- (i) **Benign Prostatic hypertrophic.** What causes a benign enlargement of the prostate gland that usually occurs in men over age 50. is not yet known. It is believed that it is due to nano particles in the urine. Enlargement of the prostate interferes with normal passage of urine from the bladder. If left untreated, the enlargement of the prostate can obstruct the bladder completely.
- (ii) Cancer of the prostate or bladder tumor.
- (iii) **Urinary incontinence:** Involuntary release of urine from the bladder.
- (iv) **Urinary blockage:** Obstruction of the urinary tract can occur for many reasons along any parts of the urinary tracts from kidneys to urethra. Urinary obstructions can lead to a back flow of urine causing infection, scarring, or kidney failure if untreated.
- (v) **Neurogenic bladder or dysfunction:** Improper function of the bladder due to an alteration in the nervous system, such as a spinal cord lesion or injury.
- (vi) Frequent urinary tract infections.

Uroflowmetry may be performed in conjunction with other diagnostic procedures, such as cystometry and cystography.

There may be other reasons for your doctor to recommend uroflowmetry.

## RISKS OF THE PROCEDURE.

Because Magnetic induction uroflowmetry is a noninvasive procedure, it is safe for most persons. The test is usually done in privacy to ensure that the person is in a natural setting. There may be risks depending on your specific medical conditions. Be sure to discuss any concerns with your doctor prior to the procedure.

Certain factors or conditions may interfere with the accuracy of uroflowmetry. These factors include, but are not limited to, the following:

- (i) Straining with urination.
- (ii) Body movement during urination
- (iii) Certain medications that affect bladder and sphincter muscle tone.

## Conclusion

Magnetic induction Uroflowmeter is a Biomedical instrumentation control system that measures how quickly urine flows. A reduced flow often suggests Benign prostatic hyperplasia (BPH) due to exposure to nano particles.

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