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Highlights

Drain Waste Water Cleaner

Optimization of Magnet System

Discovering Thoughts, Inventing Future

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Optimization of Magnet System for Improvement of Capture Efficiency of Nanoparticles in Magnetic Drug Targeting

By Md. Zahirul Islam, Najmus Saquib Sifat & Abul Hasanat

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Abstract- A simulation of magnetic particles in blood was developed to show the effect of magnetic field in magnetic drug targeting. Blood flow in the vessel follows Incompressible Navier Stoke's equations and magnetic field is created using permanent magnet. Finite element method is used to solve fluid flow and magnetic field Capture efficiency of nanoparticles with respect to different shape of magnet is observed.

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Optimization of Magnet System for Improvement of Capture Efficiency of Nanoparticles in Magnetic Drug Targeting

Md. Zahirul Islam [α], Najmus Saquib Sifat [σ] & Abul Hasanat [ρ]

Abstract- **A simulation of magnetic particles in blood was developed to show the effect of magnetic field in magnetic drug targeting. Blood flow in the vessel follows Incompressible Navier Stoke's equations and magnetic field is created using permanent magnet. Finite element method is used to solve fluid flow and magnetic field Capture efficiency of nanoparticles with respect to different shape of magnet is observed.**

I. Introduction

Nowadays, chemotherapy is the only way for the treatment of cancer affected cells in human body. Less than 0.1% drugs are taken by the affected cells during chemotherapy. The rest of the drugs are wasted. Moreover, physicians always face an upper limit in the treatment dose to avoid damage of healthy cells. This limit obstructs the chance of successful treatment of the tumor cells. By magnetic drug targeting (MDT), we can accumulate more drugs on cancer affected cells by using permanent magnet. At first, nanoparticles accumulate on blood vessels and then diffuse to the cells. Drug released from nanoparticles are introduced by changing some physical parameters. The magnetic liquids such as ferrofluids, biocompatible magnetic nanocarrier, etc., play an important role as drug carriers in the human body. Effectiveness of magnetic drug delivery largely depends on the design of an effective magnet system. Proper magnet system can trap more nanoparticles on the targeted site.

Magnetic drug targeting (MDT) refers to the attachment of therapeutics to magnetizable particles, and then applying magnetic fields to concentrate them to disease locations such as to solid tumors, regions of infection, or blood clots. Usually ferromagnetic particles are directly injected into the circulation of blood by a vein or artery. Particles so injected will circulate throughout the vasculature as the applied magnetic field is used to attempt confinement at target locations. Depending on the vessel into which the particles were injected (vein or artery), MDT will occur before the particles pass through the liver or after the particles pass through the liver, lung and heart. The latter is more common, but reduces the drug amount available that can be attached to the nanoparticles since a large portion of the drug is filtered by the liver and kidney.

In the recent years, Finite Element Method (FEM) has been widely used in biomedical engineering. Creation of recirculation by applied magnetic field is observed [1].Amount of nanoparticles captured can be increased by proper design of magnet system. Using array of magnet rather than single magnet is suggested by several researcher [2].Wedge shape magnet can increase conciseness of recirculation [3]. Array of wedge shaped or rectangular magnet can generate more recirculation [4].In our Study we compare the performance of different type of magnet system with respect to velocity field and volume fraction of nanoparticles within the recirculation zone. We also show the strength of magnetic field and magnetic field gradient for different magnet configuration and their relation with nanoparticles accumulation within recirculation.

II. Mathematical Modeling

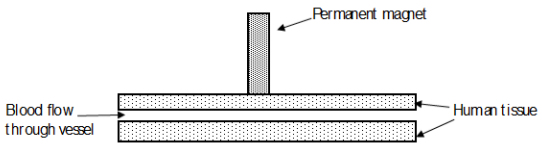

Fig. 1 : Schematic representation of model.

As shown in fig. 1 the model geometry consists of a blood vessel, a permanent magnet, surrounding tissue, and air. Blood enters into the vessel from left side of the figure. Magnetic field generated by the permanent magnet is evaluated by the numerical simulation. This magnetic field generates a volume force on nanoparticles presents in ferrofluids.

Since magnetic field is static, so According to Maxwell-Ampere's law for the magnetic field H (A/m) and the current density J (A/m^2)

$$\nabla \times \boldsymbol{H} = \boldsymbol{J}. \quad (1)$$

Furthermore, Gauss' law for the magnetic flux density B states that,

$$\nabla . \boldsymbol{B} = 0. \quad (2)$$

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The constitutive equations describing the relation between B and H in the permanent magnet, blood vessel, air of the modeling domain are respectively

$$B = \begin{cases} \mu_0 \ \mu_{r,mag} \ H + \ B_{rem} \\ \mu_0 \left(H + M_{ff}(H)\right) \\ \mu_0 H \end{cases} \quad (3)$$

Here, μo is the magnetic permeability of vacuum (Vs/(A·m)); μr is the relative magnetic permeability of the permanent magnet (dimensionless); $Brem$ is the remnant magnetic flux (A/m); and M_{ff} is the magnetization vector in the blood stream (A/m), which is a function of the magnetic field, H.

Defining a magnetic vector potential A such that

$$\boldsymbol{B} = \nabla \times \boldsymbol{A}, \quad (4)$$

$$\nabla . \ \boldsymbol{A} = 0. \quad (5)$$

Combining the above equations gives, for zero currents

$$\nabla \times \left(\frac{1}{\mu_0 \mu_r} \nabla \times \boldsymbol{A} - \boldsymbol{M}\right) = 0 \quad (6)$$

Note that this equation assumes that the magnetic vector potential has a nonzero component only perpendicularly to the plane, $A = (0, 0, Az)$.

An arc tangent expression with two material parameters α (A/m) and β (m/A) characterizes the induced magnetization $\boldsymbol{M_{ff}}(x, y) = (\boldsymbol{M_{ffx}}, \boldsymbol{M_{ffy}})$ of a ferrofluids.

$$M_x = \alpha \ \text{atan}\left(\frac{\beta}{\mu_0} \frac{\partial A_z}{\partial y}\right), \quad (7)$$

$$M_y = \alpha \ \text{atan}\left(\frac{\beta}{\mu_0} \frac{\partial A_z}{\partial x}\right). \quad (8)$$

For the magnetic fields of interest, it is possible to linearize these expressions to obtain

$$M_x = \frac{\chi}{\mu_0} \frac{\partial A_z}{\partial y}, \quad (9)$$

$$M_y = -\frac{\chi}{\mu_0} \frac{\partial A_z}{\partial x}, \quad (10)$$

where $\chi = \alpha\beta$, is magnetic susceptibility.

Blood flow though the vessel can be expressed by Incompressible Navier Stoke's equations

$$\rho \frac{\partial \boldsymbol{u}}{} - \nabla . \eta(\nabla u + (\nabla u)^T) + \rho u . \nabla u + \nabla p = F \quad (11)$$

$$\nabla . \ u = 0 \quad (12)$$

The F term is a magnetic volume force; (Fx, Fy) act on nanoparticles that can be expressed as-

$$\boldsymbol{F}_x = \frac{\chi}{\mu_0 \mu_r^2} \left(\frac{\partial A_z}{\partial x} \frac{\partial \ \ A_z}{\partial x^2} + \frac{\partial A_z}{\partial y} \frac{\partial \ \ A_z}{\partial x \partial y}\right) \quad (13)$$

$$\boldsymbol{F}_y = \frac{\chi}{\mu_0 \mu_r^2} \left(\frac{\partial A_z}{\partial x} \frac{\partial^2 \ \ A_z}{\partial x \partial y} + \frac{\partial A_z}{\partial y} \frac{\partial^2 \ \ A_z}{\partial y^2}\right) \quad (14)$$

On the vessel walls,we have applied no-slip conditions, $u = v = 0$. At the outlet, we can set an outlet pressure condition, $p = 0$. At the inlet boundary, we have specified a parabolic flow profile on the normal inflow velocity according to 4 Um $s(1-s)$, where s is a boundary segment length parameter that goes from 0 to 1 along the inlet boundary segment and Um is the maximal flow velocity. To emulate the heart beat, the inflow velocity follows a sinusoidal expression in time:

$$U_0 = 2U_m \ s(1-s)(\sin(\omega t)) + \ \overline{\sin(\omega t)^2} \ . \quad (15)$$

Selecting the angular velocity ω to be 2π rad/s gives a heart beat rate of 60 beats per minute.

III. Numerical Data

Numerical data used for the current simulation are given below.

Relative permeability, magnet	1
Remanent flux density, magnet	- 2 T (Y-direction)
Magnetic susceptibility, ferrofluid, χ	0.3
Ferrofluid mass fraction in blood stream	0.05
Density, blood	1060 kg/m^3
Density, Nanoparticles	5242 kg/m^3
Maximum flow velocity	0.5 m/s
Heart-beat rate,f	60 [1/min]

IV. Descriptions of Study

We start our numerical simulation with one rectangular magnet. Then array of two rectangular magnet. One wedge shaped magnet and array of two wedge shaped magnet. We compare the result of different simulation. Finite Element Method (FEM) is used to solve the problem.

V. Results

Target of our magnetically drug therapy is to accumulate more nanoparticles on targeted site. Due to pulsating flow behavior of blood under applied magnetic field, nanoparticles create recirculation inside the blood vessel. Within recirculation zone, the concentration of nanoparticles is much higher than other areas. Thus the percentage of particles trapped in the affected region is increased with the introduction of MDT. Effectiveness of magnetic drug delivery largely

system. Proper magnet system can trap more nanoparticles on the targeted site.

The simulation is divided into two important parts. Firstly, only magnetic potential is computed with time independent and stationary state. Secondly, the results of first step are applied to calculate velocity field by Navier Stokes equations in time dependent state.

a) Magnetic field visualization

Required magnetic field is created by permanent magnet. Magnetic field strength decreases as distance from the magnet increase. This decrease in strength create magnetic field gradient.

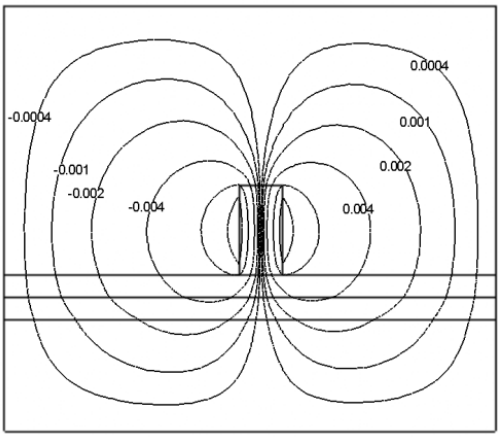

Fig. 2 : Magnetic field due to one rectangular magnet.

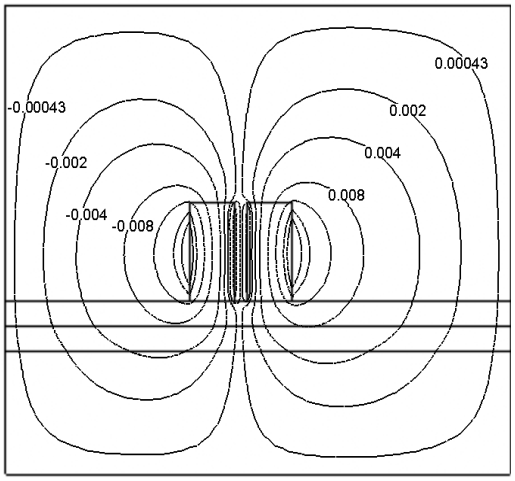

Fig. 3 : Magnetic field due to array of two rectangular magnets.

From fig. 2 and fig. 3, it is clear that strength of magnetic field due to two rectangular magnet array is higher than one rectangular magnet and magnetic gradient is higher for two rectangular magnet.

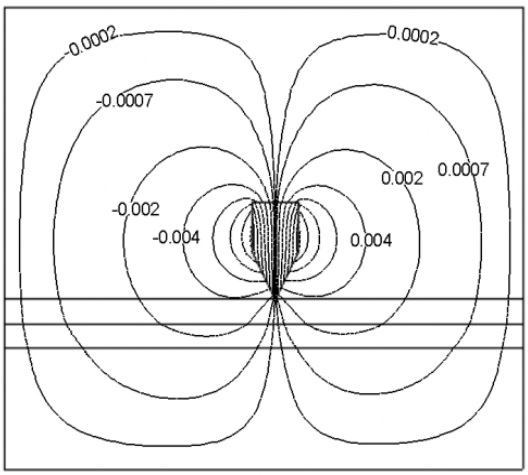

Fig. 4 : Magnetic field due wedge shape magnet.

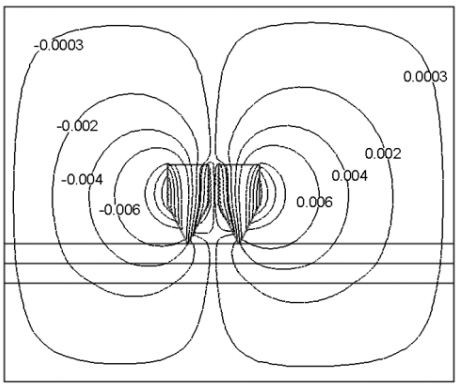

Fig. 5 : magnetic field due to array of two wedge shape magnet.

From fig. 4 and fig. 5, it is clear that strength of magnetic field due to two wedge shaped magnet array is higher than one wedge shaped magnet and magnetic gradient is higher for two wedge shaped magnet.

If we compare two-wedge shape magnet with two rectangular magnet, magnetic field and gradient due to two rectangular magnet is higher than two wedge

b) Velocity field visualization

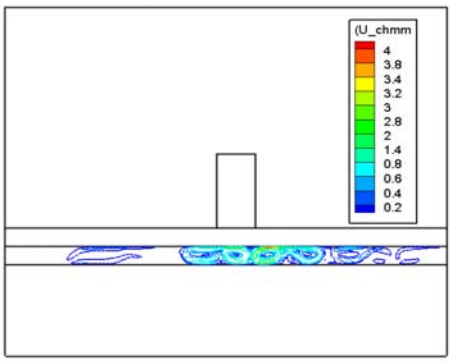

Fig. 6 : velocity field for one rectangular magnet

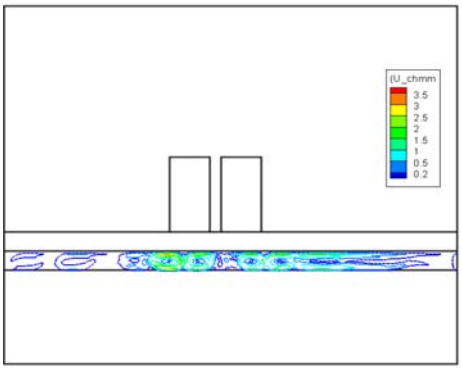

Fig. 7 : velocity field for two rectangular magnet

From fig. 6 and fig. 7, more recirculation is created due to two rectangular magnet arrays than one rectangular magnet.

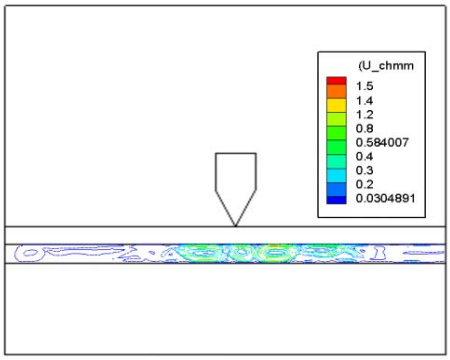

Fig. 8 : velocity field for one wedge shape magnet.

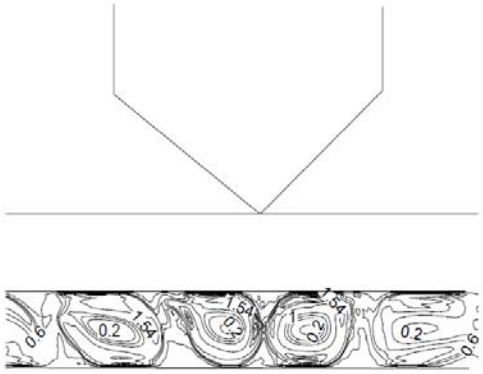

Fig. 9 : Magnified velocity field showing values under the magnet for wedge shaped magnet.

Fig. 9 makes it clear that the velocity in the outer phase of the recirculation for wedge shaped magnet is much higher than a single rectangular magnet. The recirculation is very close under the vertex of the wedge.

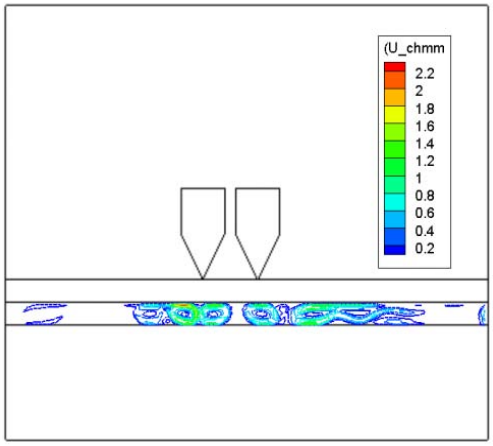

Fig. 10 : velocity field for two wedge shape magnet.

From fig. 8 and fig. 10, more recirculation is created due to two wedge shape magnet array than one wedge shape magnet. Recirculation is more concise due to wedge shape magnet but numerical value of velocity within the recirculation is low. Strength of recirculation due to two rectangular magnets is higher than two wedge shape magnet.

VI Conclusions

Both magnetic field strength and magnetic field gradient has a significant importance in creation of recirculation in magnetic drug targeting. Use of rectangular magnet array can provide better magnetic field strength and magnetic field gradient to improve nano particles capture efficiency. Wedge shape magnet can be used to produce more localized recirculation. Though velocity within the recirculation is decreased due to use of wedge shaped magnet, recirculation zone is more concise in case of wedge shaped magnet. The present investigation concludes that if the cancer cell is in a small area, it would be better to apply single wedge-shaped magnet. On the other hand, if the area is comparatively large then two arrays of rectangular magnet is more useful than two wedge-shaped magnets.

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Quantification and Physical Composition of Household Municipal Solid Waste and People's Attitudes towards its Final Disposal – Chuadanga Municipality, Khulna

By Abdul Muttalib, Ohidul Alam & Mohammed Mozaffar Hossain
University of Chittagong, Bangladesh

Abstract- Rapid growth of population and unchecked urbanization is redoubling the municipal solid waste (MSW) generation piles all over the universe day-to-day. Many studies have already been performed on MSW management in big cities but limited in small scale and new cities. Therefore, we executed a study in Chuadanga Municipality to estimate the bulk of MSWs generation in residential area and their physical composition as-well-as the household's attitudes towards its disposal. A semi-structured questionnaire was outlined and surveyed in 2012 on 30 households from randomly selected wards. Wastes collected from those households were segregated and weighed. This study revealed that on an average 1.015 kg/household/day and 0.22 kg/person/day were found in the study area. Further, food wastes were found the highest (75%) wherein (20.07%) recyclable, (86.50%) degradable, and (14.3%) inorganic. Majority of households (79%) opined that MSW management lies on municipality wherein about 55% of people were unsatisfied with current system.

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Abdul Muttalib [α], Ohidul Alam [σ] & Mohammed Mozaffar Hossain [ρ]

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I. Introduction

Simply Solid waste (SW) or Municipal Solid Waste (MSW) is considered as one of the most immediate and serious environmental disputes in-the-vicinity of its generation and disposal confronting urban local governments in emergent nations. This is the main outcome of rapid growth of population and haphazard urbanization in developing countries (Bartone, 1990). However, MSW is consists of discarded bulk of the households, dead animals, trade, commercial, agricultural, and industrial waste wherein other immense scale waste alike debris from construction site, furniture etc.(Cunningham and Saigo, 1999). A great deal of MSW generation demands extra infra-structure, financial support, technology and manpower etc. So, large volume of wastes generation and its disposal causes the degradation of environment in developing countries (Asraf, 1994) due to dearth-of disposal capacity while industrially developed nations produce a huge quantity of wastes but it's no problem for them. Contrary, developing countries generate less MSW per capita because of their lower purchasing capacity and the consequent lesser consumption (Cairncross and Feachem, 1993). Besides, municipal solid waste management (MSWM) is a multidimensional challenge faced by urban authorities, especially in developing nations suchlike Bangladesh (Sujauddin et al., 2008). Ever growing MSW is aforethought to be one of the most burning and serious environmental obstacles hereto (Alam et al., 2002). One of the precisely agnate consequences of population growth and economic development is the increase of waste piles. The total MSW contribution from such increasing population is huge ample to bring environmental dilemma (Salequzzaman et al., 2001). In Bangladesh, MSW generation in urban areas is expanding proportionately with the growth of its population, economy and living standard of citizens. If the wastes are not fitly handled, stored, collected and disposed of, that it can fabricate a hazardous venture to the environment and human health. Typically one to two-thirds of the generated MSW is not collected in most of the developing countries (WRI, 1996). Consequently, the uncollected waste which is often also accumulated with human and animal excreta is dumped indiscriminately in the streets and in drains, so contributing to flash flooding, breeding of insects and rodent vectors and the spread of germs or diseases (USEPA, 1995). However, MSWM encompasses all demeanors relevant to waste generation, on-site handling and storage, collection, transportation, reuse and recycling and final disposal. Now-a-days, it is a multi-disciplinary approach based on engineering principles and also involves economics, urban and regional planning, social sciences, and other disciplines. Due to dearth of financial resources, institutional weakness, ill-timed choice of technology and want of public awareness about MSWM, it has rendered unsatisfactory services in Bangladesh. Therefore, a considerable chunk of work has been accomplished on MSWM in Bangladesh (Rashid, 1996; Sarker et al., 2006; Sarker, 2001; Akhter et al., 1999; Rahman, 2000; Bhide, 1990;Hoq and Lechner, 1994)wherein a little attention has been paid to perform study on residential MSWM (Sujauddin et al., 2008; Rahman et al., 2013; Salam et al., 2012). As a result, household solid waste (HSW) management has

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emerged as one of the supreme mission, especially in cities and municipalities of Bangladesh. Besides, mass people perceptions of wastes management and informal recycling related works is very limited (Ivy et al., 2015; Matter et al., 2013). So, the present investigation is an attempt to explore the volume of MSW generation, its physical composition, and overall management system Chuadanga Municipality (CM).

Chuadanga district is one of the smallest districts in Bangladesh but its population size is increasing day-to-day. With the growth of population, MSW generation and management has become a major urban concern in CM. But there is no study has been done yet concluding this important issue. Where in, a major fraction of generated MSW comes from household activities. So, we conducted this study on HSW to explore generation rate, physical composition and its management system in CM. This study shows that on an average 1.015 kg/household/day and 0.22 kg/person/day MSWs generate from households in the study area. Amidst the various types of wastes it was discovered that, food wastes (vegetables) were the highest (76%). In addition, findings of this study will support to compare with big cities as well as it will give significant information to policy makers about increasing rate of MSW in small and new cities in Bangladesh.

II. Methodology

a) Selection Of The Study Area

The experiment was accomplished in Chuadanga Municipality of Bangladesh. It resides of 9 wards amidstMukti Para, Court Para and Puraton Hospital Para under ward No. 3; and Gulshan Para, Cinema Hall Para and Thana Council Para under ward No. 9 were chosen randomly (details are shown in Fig.1) for conducted this study. And from each para 5 households were selected randomly for surveying.

b) Literature Review

For gathering sufficient knowledge about conducted study on MSW in Bangladesh, an extensive survey was done on the available and relevant literature (both published and unpublished) to capture better sensitive information to design more efficient experiment. Aside from, a depth enquiry into miscellaneous documents, reports, journals and publication have also been wrapped-up to obtain required propaganda link with MSW generation, quantification, physical composition and their disposal and associated impacts on environment.

c) Identification And Categorization Of MSW

All the gathered MSWs were segregated and carefully noticed to find out the physical compositions. It was found that MSWs has various constituents which were categorized into 9 groups in CM zone on the basis of their physical features. These were – (1) vegetable and food waste; (2) paper, book and printed material; (3) packaging materials; (4) plastic, rubber and polythene; (5) textile, rags and jute; (6) glass and ceramic; (7) can, jar, tin and metals; (8) wood, leaves; and (9) miscellaneous (dirt, stone).

d) Reconnaissance Survey

At first, a reconnaissance field scrutiny was performed in-order-to investigate the up-to-date process of MSW disposal system in the study area and to diagnose the manifold problems originated due to the absence of appropriate MSW collection and disposal systems. Based on the surveillance survey, the whole experimental area was classified into three distinct socioeconomic groups on the substructure of the household's monthly earning: Low socioeconomic group (LSEG) (monthly income $<$ Tk. 15000), Middle socioeconomic group (MSEG) (monthly income between Tk. 15,000 and Tk. 30,000), Upper socioeconomic group (USEG) (monthly income above Tk. 30,000).

e) Questionnaire Survey

Based on gathered knowledge and experiences from surveillance scrutiny, we framed a semi-structured questionnaire. It was designed with the reference to people's attitudes about existing MSWM program and how it is besmirching environment, their gauge of awareness, nature and caliber of disputes, they encounter problems due to the absence of systematic MSW collection frequency and disposal including their suggestions for upgrading a sustainable MSWM model for CM to resolve current problems.

f) Data Collection

For data collection, 15 households were selected at random from each of the targeted area. Thus a total of 30 households were surveyed in the study area. From each household, data on daily MSWs generation was collected. In the interim the questionnaire scrutiny, 5 similar size polythene bags were supplied to each household to store their produced wastes of different 5 days. Aggregated wastes from each poly bags were weighed and recorded. Then the wastes within each bag were segregated into several types which were weighed distinctly and recorded too. The same task was accomplished for each of the five days for each of the 30 households. In addition, the questionnaires were included a number of attitudinal questions aimed at examining household awareness and attitudes toward the urban MSWM and final disposal scheme.

g) Data Processing And Analysis

All the data collected from miscellaneous sources above mentioned was carefully sorted and then only the decisive and required propaganda were set aside for compilation and analysis to avoid unexpected bulk of the paper. Intensive care was taken with respect to the applicability, reliability and validity of information.

After sorting and compilation, the data were analyzed by utilizing MS-excel sheet version: 2007, SigmaPlot12 and SPSS software version: 18.

Fig. 1 : Study area location map - Chuadanga Municipal (Banglapedia, 2008).

III. Results And Discussion

a) Fundamental Info Of Chuadanga Municipal

Chuadanga (Sadar) Municipal is tiny municipal in size in Bangladesh which is placed in Chuadanda District of Khulna division. It was settled in 1984 and covers 289.59 sq km areas along a population size of 278,726. The increasing trend of population is very fast and current density is 962 per sq km (BBS, 2011). As a result, the ongoing MSW generation rate is 61.32 ton/day which will be doubled after 10 years seeing eminent pressure of population. The municipal has its own MSW management department which is not sufficient to handle such an ever growing immense quantity of wastes dearth of proper technology and sufficient fund. Likewise, there is no availability of skilled manpower too. Again, from (table 1), it is detected that in our experimental area, the apical percentage was marked in the family which consists of member ranging between 3 and 4 and its allotment is (50%) and the lowest percentage was identified in the family which formed of member limits between 1 and 2 and its chunk is almost (3%). The size of family member accommodating 5 to 6 is almost (37%) that is almost 4 times higher than the family encompassing member 7 to 8 that constitutes of (10%) only.

Table 1: Waste generation rate (WGR) in kg/household (hh)/day with respect to family size.

Family size	No. of families	Percentage (%)	WGR(kg/hh/day)
1 – 2	1	3.3	0.65
3 – 4	15	50	o.95
5 – 6	11	36.7	1.17
7 – 8	3	10	1.29
Total	30	100	4.06 (avg. =1.015)

Further, from (table 2) it is crystal clear that the contribution of average family age which ranges 31 to 40 is almost (57%) that is about two times superior to than the age ranges 41to 50 constituting about (27%). The class of the average family age ranging 20 to 30 is (10%) and the age ranging 51 to 60 is (6.6%). Thus, waste generation rate varies in-relation- to the age of the people.

Table 2 : Waste generation rate in kg/hh/day with regarding to the average age of the family members

Average age	No. of families	Percentage (%)	WGR (kg/hh/day)
20 – 30	3	10	1.16
31 – 40	17	56.7	1.24
41 – 50	8	26.7	0.97
51 – 60	2	6.6	0.69
Total	30	100	4.06(avg. 1.015)

b) Household Solid Waste (Hsw) Generation

The average waste generation by the family size 7 to 8 is 1.29 kg/day, the family size 5 to 6 is 1.17 kg/day, the family range 3 to 4 is 0.95 kg/day and the family dimensions 1 to 2 is 0.65 kg/day (table 1). It is very luminous that the extensive no. of family, the huge magnitude of waste production. Infinitely the waste generation varies with relation to the family size. But waste generation rate (kg/hh/day) is highest in those household having average age 31 to 40 is 1.24 kg/day, second highest is 1.16 kg/day propagated by those family having average age 20 to 30. Besides, family having average age 41 to 50 generates 0.97 kg/day and the minor generation rate is 0.69 kg/day in those family having average age 51 to 60 (table 2). So, it is crystal clear that the waste generation rate varies with reference to the age of the inhabitants and number of family members. Thus MSW generation rate and volume not only depends on economic growth rather it also depend family size.

Contrary, (Fig. 2) reveals that the MSW generation rate per household per day increase from lower socio-economic group to upper socio-economic group in a sequential stratification. The figure displays that MSW generation rate is lesser in lower socio-economic group and supreme in upper socio-economic group figuring out 0.77 kg/hh/day and 1.21 kg/hh/day proportionately wherein in middle socio-economic group 1.07 kg/hh/day. However, the average MSW generation rate is 1.015 kg/hh/day. Therefore, it is transparent that the MSW generation rate varies with the economic status or solvency and living standards of family. From table (1, 2, 3) it is clear that MSW generation rate from households in the urban areas mainly depends on family size, age of family members and economic status of family including living standards or style.

Table 3 : MSW generated by an individual family per day in different households in CM

Socio-economic group	No. of person studied	WGR(kg/person/day)
Lower socio-economic group	35	0.19
Middle socio economic group	43	0.21
Higher socio economic group	59	0.26
Total	137	0.66 (Avg. =0.22)

Both of the (table 3) and (fig. 2) represents that the MSW generation rate in kg/person/day is rising up gradually from lower socio-economic group to upper socio-economic group. Further, it is observed that MSW generation rate is maximum in upper socio-economic group and minor in lower socio-economic group, figuring out 0.26 kg/person/day and 0.19 kg/person/day respectively. Contrary, the waste generation rate in middle socio-economic group is 0.21 kg/person/day. So, it is stark clear that the MSW generation rate differs with the livelihood of the people. Finally, it is realized from the study that per person and per family waste generation quota per day verify depending on the age of family members, family size and economic condition.

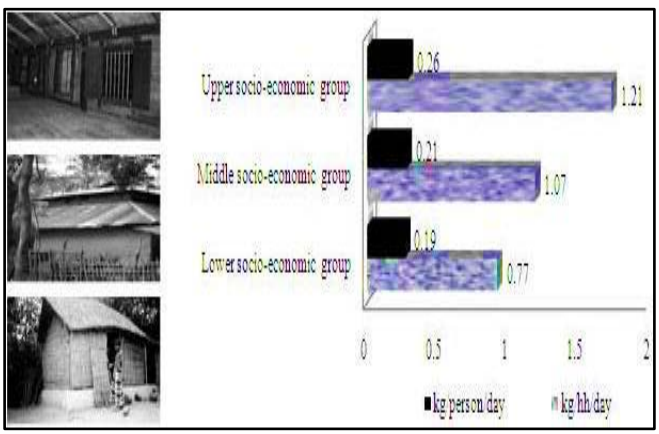


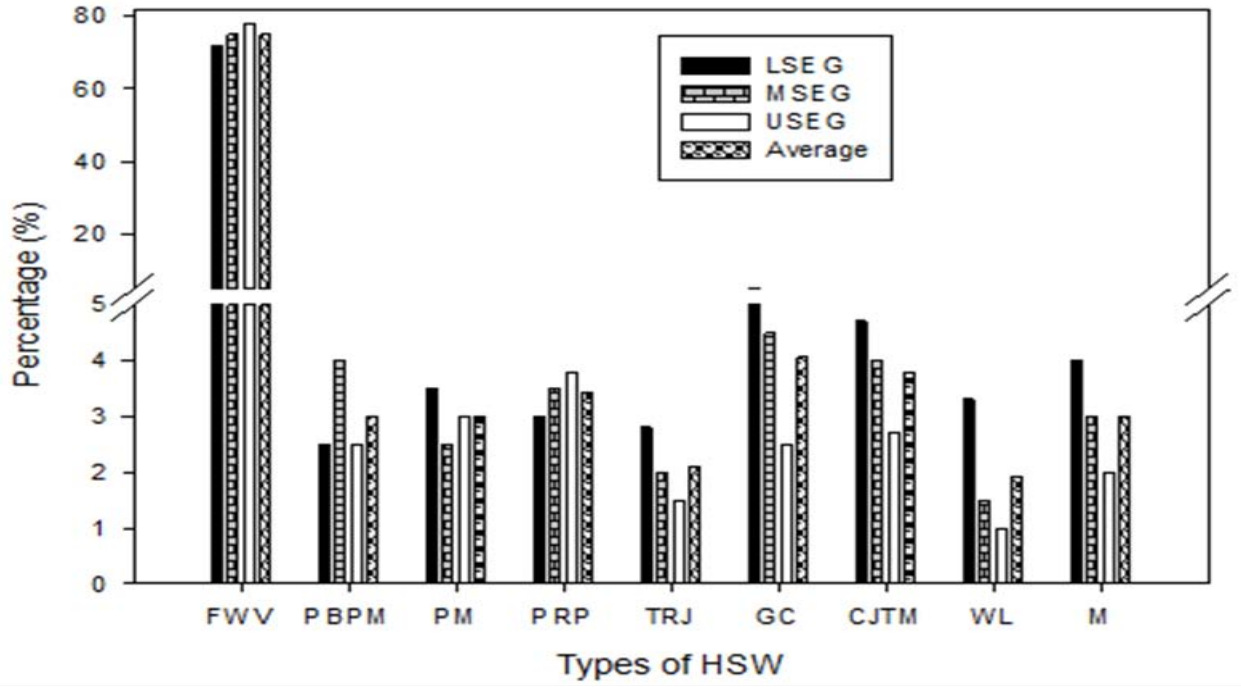
Fig. 2 : MSW generation rate in different socio-economic group in kg/hh/day and kg/person/day.

c) Physical Composition of HSW

From (Fig. 3) it is seen that lower socio-economic group (LSEG) discharges 72% vegetable waste, the the second, third and fourth highest volume of waste is glass/ceramic (5.2%), can/jar/tin (4.7%) and miscellaneous (dirt, stone) (4%) respectively. It also represents that the bulk of packaging materials, wood/ leaves, plastics/ rubber/ polythene, textile/ jutes/ rags

and paper/book/printed material are 3.5, 3.3, 3, 2.8, and 2.5 (%) in each types subsequently. Once more from (figure 3), it is found that 75% the maximum volume of waste germinated by middle socio-economic group (MSEG) is vegetable/food waste that is higher than LSEG. And the second highest is glass/ceramic but differ in quantity (4.5%). Likewise the generation rate of other categories of waste varies between (1%) and (1.5%). In addition, (figure 3) discloses that upper socio-economic group (USEG) produces (78%) the apical bulk of vegetable/food waste and that is the highest quantity compared to LSEG and MSEG. But the second major amount of waste germinated by USEG differs from other two types and is plastics/rubber/polythene (3.8%). And other categories of wastes vary from its composition between (1%) and (1.5%) too but comparing to LSEG is more. These tiers of wastes is multi-fold lesser than the composition of vegetable/food waste.

Amid from (Fig. 3), it is stark clear that in case of average HHSW generation the apical quantity of waste generated by household is vegetable/food waste (75%) compared to the rest types of waste. Likewise, the second highest waste is glass/ceramic (4.07%). And the third and fourth supreme waste quantity is can/jar/tin metals and plastics/rubber/polythene (3.8%)and (3.43%) subsequently. From the rest tiers, packaging materials; paper/book/printed materials and miscellaneous (dirt, stone) waste represent 3%. Latter the minor volume of waste is (2.1%) and (1.93%) from textile/rags/jute and wood/leaves correspondingly produced.



(FWV=Food waste, vegetables; PBPM=Paper, books, printed materials; PM=Packaging materials; PRP=Plastic, rubber, polythene; TRJ=Textile, rags, jutes; GC=Glass, ceramic; CJTM=Can, jar, tin, metals; WL=Wood, leaves; M=Miscellaneous)

Fig. 3 : Physical composition of HSW generated from different socioeconomic groups and average.

d) City Dwellers Attitude towards Final Disposal of HSW

(Table 4) reveals that most of the people about (33%) dump their waste close to open place that is 2 times higher than dumping to the waste collector which is almost (17%). Very nearly (27%) of people discharge their generated waste in covered dustbin and almost (17%) of people release their waste in the vicinity of the drain side that is the same percent of people who supply their waste to the waste collector (scavengers/waste pickers/tokai). And minor percent of people dump their waste to the lagoon/lake side is about (8%). It is transparent that the tendency of throwing waste towards the open lands is higher than that of any other disposal channels. Waste dispose to waste collector and in covered dustbin is inferior than that of disposing close to open field is the consequent of unfair management of municipality. More dustbins and man powers are required in the municipal zone aimed to regular collection and secured disposal. At least one bin is needed in per half km area. Then it will provide more facilities to discharge wastes into dustbins as well as to increase collection efficiency.

Table 4 : Frequency and cumulative frequency in (%) with respect to MSW disposal system

Disposal system	No. of family	Frequency (%)	Cumulative F. (%)
Open dump	10	33.3	33.3
To waste collector	5	16.7	50
Throwing into drain	5	16.7	66.7
Throwing beside pond	2	6.7	73.4
Covered dustbin	8	26.6	100

Besides, (table 5) indicates that (55%) of people are unsatisfied and (25%) of people are satisfied with the MSW management service providing by municipal authority. Wherein about (15%) of people's view is to the MSW management as poor and only (5%) people diagnose it as a good service. From this investigation, it can be said that conspicuously the present condition of MSWM system in our study region is poor. As a result, it is unavoidable to upgrade the current management system as quick as possible of municipal area for ensuring sound health of people as well as for the better environment. About (79%) people consider this tough task lies on municipal solely. But municipal is not capable to handle such ever growing waste volume because it has to lead some other task at the same time. So, municipal can't pay much attention and investment on wastes management. Therefore, introduce of a private initiative the foremost demand for appropriate management of MSW.

Table 5 : Satisfactory rating about the MSW management by householders

Satisfaction level	Frequency	(%)	Cumulative F. (%)
Good	0	5	5
Poor	9	15	20
Satisfied	9	25	45
Unsatisfied	12	55	100

From the (table 6), it is stark clear that (46.66%) of the people face bad odor from scattered MSW and that is the highest percentage. The second big problem, people encounter the presence of disease vector that is about (26.67%). Likewise (16.67%) of the people face the dispute of blockage of drainage flow and a minor quantity (10%) of the people face the problem that the waste in the vicinity of road. This study reveals that majority (%) of people face problems due to the exiting MSW management system.

Table 6 : People's view about the problems occurred from scattered MSW management system

Problems	No. of family	Percentage	Cumulative (%)
Bad odor	14	46.66	46.66
Waste beside road	3	10	56.66
Blockage of drain	5	16.67	73.33
Disease vector	8	26.67	100

From the study, it is clear that most of the inhabitants in our investigation area suffer from bad odor and presence of disease vector dilemma that is threatened to their sound health. Further, people face the obstacles of blockage of drainage flow which is responsible for flash flood and waste beside the road in as-much-as dearth of dustbin and overall MSW management system in municipal area. Consequently, to ensure sound health and better environment for the people of municipal area, the municipal authority should upgrade the current management process.

Table 7: Frequency of HSW collection by municipal authority

Collection day	Frequency	Percentage (%)	Cumulative (%)
Daily	2	6.67	6.67
Alternative day	5	16.67	23.34
Every two day	8	26.67	50.01
Irregular	15	50	100.01

(Table 7), reveals that about half (50%) collection of waste is performed on irregular basis by the municipal authority. Nevertheless, daily basis is hardly found which (6.67%). Worthwhile every two days collection frequency is (26.67%) whereas alternative day

collection level is only (16.67%). Amid the findings, it is crystal clear that the current management system with-regarding-to the collection of MSW is very unfair by municipal authority.

e) Recycling Potentiality Of Generated HSW And Employment Opportunity

(Fig. 4) shows that in our study area, (79.93%) wastes is consists of non-recyclable waste which is about 4 times higher than recyclable waste consisting of (20.7%). This huge large volume of non-recyclable wastes requires fair collection and disposal procedures. In contrary, a significant quantity of recyclable wastes is needed to recycle for the better environment. In recyclable waste, shown in (figure 4) the highest quantity is seen as glass/ceramic and the lowest value is found as textile/rags/jute figuring out, (4.07%) and (2.1%) accordingly. On the other hand, in non-recyclable waste comprising of (75%) vegetable/food waste is the prime level of waste. Meanwhile, a little quantity of waste is wood/leaves and miscellaneous (dirt/stone) that figured out (1.93%) and (3%) subsequently (fig. 4).

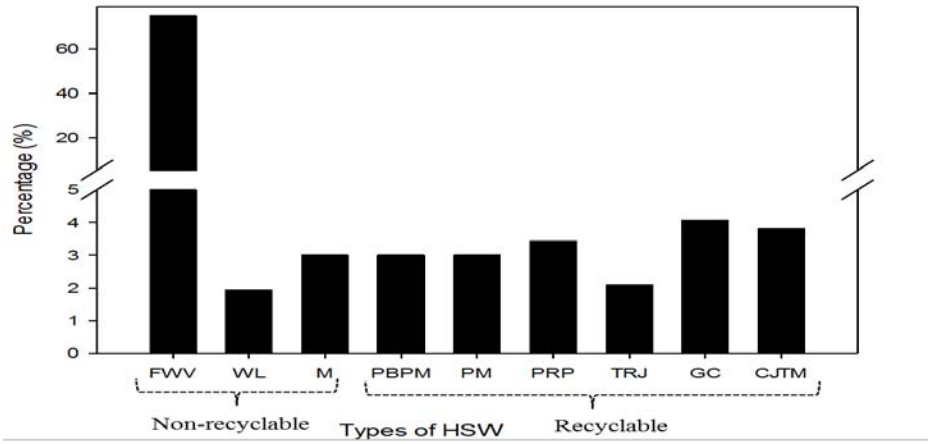


Fig. 4 : Percentage (%) of physical composition of recyclable and non-recyclable MSW.

Nevertheless (fig. 5) reflects that degradable waste is almost 6 times inferior to non-degradable wastes figuring out, (86.50%) and (13.50%) respectively. The degradable wastes that are degraded in natural process which is not concerned, it demands only fair disposal. But a bit amount of non-degradable waste is in highly concerned with the environment. Therefore, it is highly needed to recycle for reuse as-far-as possible. In non-degradable waste, the supreme part is glass/ceramic which comprised of (4.07%). And the quantity of can/jar/tin metals and plastic/rubber/polythene is (3.8%) and (3.43%) in sequence (fig. 5). Furthermore, (fig. 5) displays that in degradable waste, the maximum volume of waste is vegetable/food waste which consists of (75%) which is multi-fold than the other types of wastes varies between (1%) and (2%). These types of waste represent almost similar value in case of organic and non-organic MSW too (fig. 6).

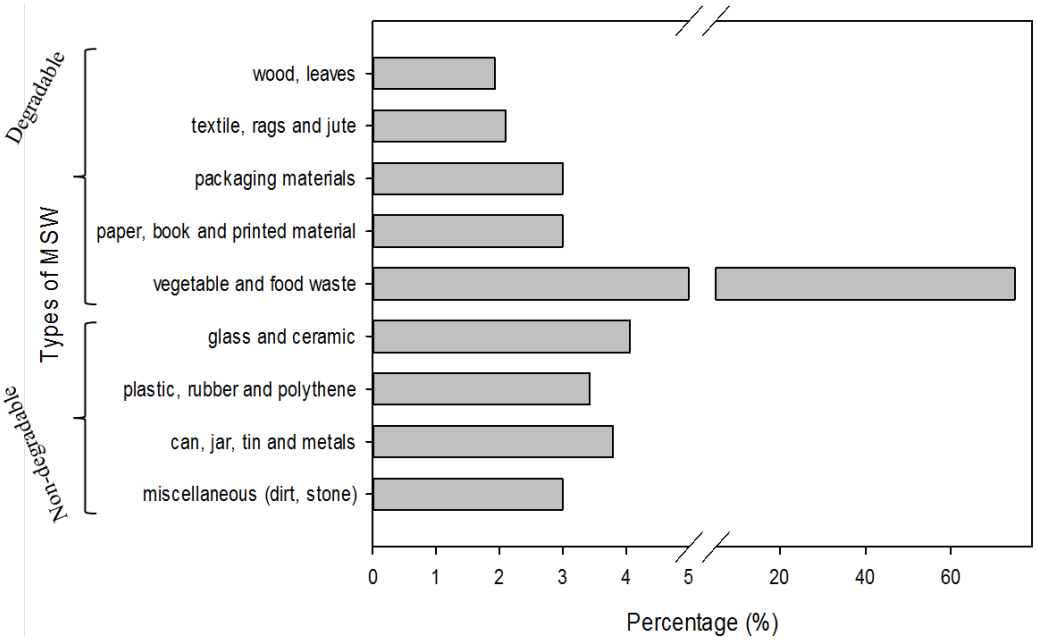


Fig. 5 : Percentage (%) of physical constituents of degradable and non-degradable MSW.

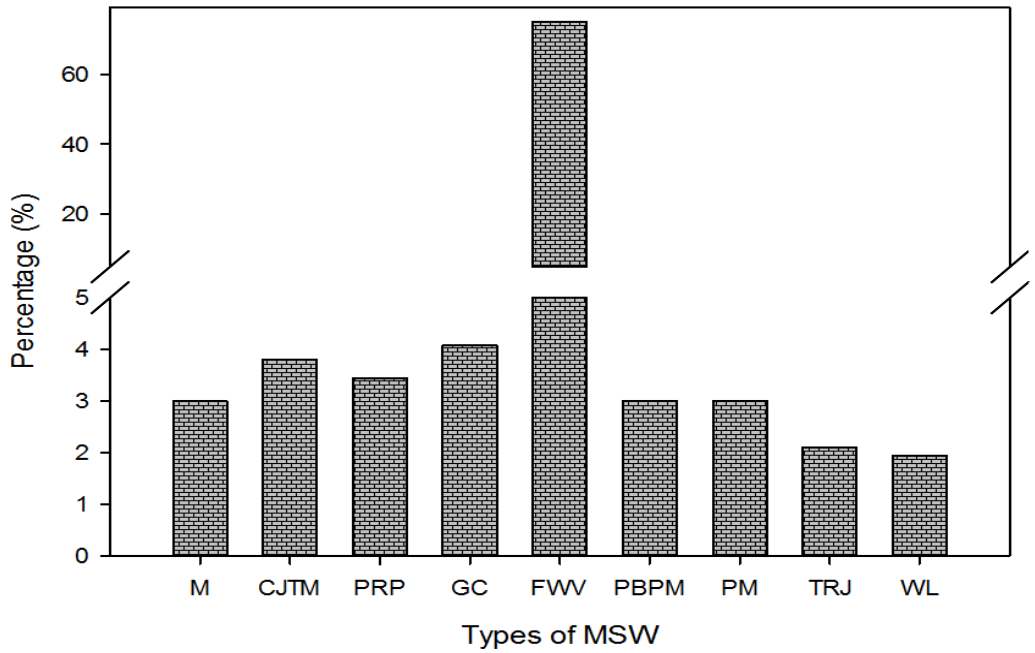


Fig. 6 : Percentage (%) of physical elements of inorganic and organic MSW.

Finally, from (fig. 6) it is crystal clear that consisting (85.7%) of organic waste is almost 6 times than inorganic waste which is comprised of (14.3%). Organic wastes can be converted into organic manure by composting which is viable to environment. So it is needed to convert organic waste into organic manure for better and sustainable environment. But on the other hand, the inorganic wastes can't be converted to such products. It only can be recycled to other products or raw materials. So, it is compulsory to recycle the inorganic waste to ensure friendly environment and to save cost. In inorganic waste, consisting of (4.07%) the apical value of waste is glass/ceramic waste. And the other types of wastes can/jar/tin metals, plastic/rubber/polythene and miscellaneous are consisted of (3.8%), (3.43%) and (3%) subsequently (figure 6).

IV. Discussion

Bangladesh is a tiny country in size but it possesses a myriad number of populations. As a result of high pressure of more population, its natural

resources availability is reducing rapidly and it has become urgent to diagnose alternate way of goods supply (Bhuiyan, 2010; Huda et al., 2014). Meanwhile,MSW generation quantity is rising up. Akin such scenarios are also found in every cities of the world but it is no matter for first world countries because they possess sufficient amount of fund and technology including skilled manpower. But in emergent nations like Bangladesh has neither fund nor technology even lack of skilled man power. Consequently, we aren't affording to manage such ever growing waste and so it is liable to degrade or pollute our city environment. However, this study reveals that on an average (20.7%)of the generated MSW is recyclable by utilizing this quantity; we can produce products and can reduce pressure on acquisition of raw materials from natural sources. In Bangladesh, there are a lot of floating people and by employing them with low wages; we can recycle this valuable MSW. Likewise, it will create an employment opportunity and supply of raw materials won't be stopped. In addition, through biological process about (75%) vegetable/food waste, we can convert into fertilizer, gas, electricity and fish feed (Moqsud et al., 2011; Zurbr¨ugg et al., 2005; Hasan et al., 2012; Huda et al., 2014). It is also good solution for MSW management because products made from wastes is cheap and it remains under buying capacity of poor people. A few pilot projects have already been implemented in Bangladesh on recycling of MSW but none of them have become fruitful yet dearth of fund and technology.

In case of large-scale municipal or city manifold experiments have been accomplished by native and foreign researchers. Meanwhile, a few pilot projects have also been implemented by national and international NGO but none in such municipal still. Hardly found a few studies of such municipals in Bangladesh which are not sufficient for taking proper steps and formulating policy (Ahmed and Huq-Hussain, 2011; Majumder, 2012; Moqsud et al., 2011). In that case our study can help the regarding authority or organizations. Likewise, recycling business of MSW is not so strong in such category of cities in Bangladesh. Even most of the generated wastes are disposed in unclosed land which is liable for environmental contamination. Apart from, we are losing a great deal of resources dearth of awareness and profuse fund along with technology. Therefore, to confirm appropriate utilization of such ever growing pile of wastes resources, growing awareness amid mass people is very significant. Otherwise, we will fail to reassure resource extraction from these wastes. Likewise, the government should introduce a source segregation system which is mandatory for every wastes generator. Contemporarily, in some big cities this has already commenced partially but not strictly up-to-date. Hence it has become unfruitful.

V. Conclusion

Bangladesh is one of the densely populated countries of the world. Moreover, the population is increasing day-to-day. With the increase of population the SW generation rate is also rising up which is the major concern for sustainable environment. Most of the cities and towns areas are threatened to ever growing such uncontrolled volume of MSW. CM is one of the smallest towns in Bangladesh where a significant quantity of MSW generates by the sundry population increasing day by day. Most of the people dump their generated waste towards the open places whereas a few numbers of people dump their waste in dustbin properly. During the household survey, most of the householders complain about existing MSW disposal problem and they blame that the Municipal authority have no responsibility and there is no fixed dumping sites where they can dump their waste. A little number of dustbins is fixed in CM area that is not in appropriate location for maximum householders to dump. As a result, they discharge their generated waste on nearby open place, road side or drain side that is now going to be a potential threat of environmental pollution. Likewise, a few number of the householders who can empty their waste in dustbin that is not collected regularly by Municipal authority, as a result people face problem paradigm bad odor, presence of disease vector that is threatened to the people's health as well as the sound environment. So, it is crying need to consider about the MSW disposal and overall management system of CM area.

The recycling of MSW is very important concept about the MSW management program for the up-to-date aspect of CM since the extensive segment of total household waste is recyclable. This recyclable waste is not degradable through natural process that is deadly harmful for the environment. So, to recycle such types of waste is more necessary for sustainable environment. There is no recycling factory in CM area but some people or boys namely 'Tokai' and 'Scavenger' collect this valuable MSW and sell to the scrap shop or vhangary (the person who trades in waste) and finally this sorted waste is supplied to big factories in Dhaka for recycling or exporting.

VI. Acknowledgement

Concluding this investigation, we would like to express our deepest gratitude to Conservancy Department of Chuadanga Municipal for providing us required data and guidelines for directing this study and special thanks go to those persons who directly or indirectly helped us to make it fruitful.

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Drain Waste Water Cleaner

By Prof. Nitin Sall, Chougle Mohammed Zaid Sadique, Prathmesh Gawde, Shiraz Qureshi & Sunil Singh Bhadauriya

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Keywords: *wastewater, primary treatment, secondary treatment, BOD, COD, TOC, etc.*

GJRE-J Classification : *FOR Code: 091599*

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Drain Waste Water Cleaner

Prof. Nitin Sall [α], Chougle Mohammed Zaid Sadique [σ], Prathmesh Gawde [ρ], Shiraz Qureshi [ω] & Sunil Singh Bhadauriya[¥]

Abstract- Wastewater is defined as the flow of used water from homes, businesses, industries, commercial activities and institutions which are subjected to the treatment plants by a carefully designed and engineered network of pipes. This type of wastewater is classified and defined according to its sources of origin. Typically 200 to 500 litres of wastewater are generated for each person connected to the system every day. The amount of flow handled by a treatment plant varies with the time of day and with the months of the year. The processes reviewed here include both those that remove pollutant dirts in wastewater and those that vanishes them. Using a wastewater treatment technology that removes, rather than destroys, a pollutant will give a treatment remains. At wastewater treatment plant, this flow is treated before it is allowed to be returned to the environment. There are no holidays for wastewater treatment, and most plants operate 24 hours every day of the week. Wastewater treatment plants works on critical point of the water cycle, helping nature protects water from the excessive pollution. Most treatment plants have primary treatment and secondary treatment. A short description about the primary treatment which includes screening whereas secondary treatment involves activated sludge, trickling filters etc. and also to measure removal of the carbon in the wastewater treatment processes can be done by TOC(Total organic carbon), BOD(Biochemical oxygen demand), and COD(Chemical oxygen demand) is also explaned here.

Keywords: wastewater, primary treatment, secondary treatment, BOD, COD, TOC, etc.

I. Introduction

The Maharashtra floods refers to the flooding of many parts of the Indian state of Maharashtra including large areas of Mumbai city located on the coast of the Arabian Sea, on the Western coast of India, in which almost 1,094 people died.

It occurred one month after the June 2005 Gujarat floods. Large numbers of people were stranded on the road, lost their homes, and many people walked very long distances back home from work that evening.

The floods were caused by the heaviest, ever recorded 24-hour rainfall of 944 mm (37.17 inches) which lashed the metropolis on 26 July 2005, and continued for the next day. 644mm (25.35 inches) was received within the 12-hour period between 8am and 8pm.

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The rainfall continued for the next week. The highest 24-hour period in India was 1,168 mm (46.0 inches) in Aminidivi in Lakshadweep on 6 May 2004 although some reports suggest that it was a new Indian record.

Keeping in mind the natural calamities and Swachh Bharat Abhiyaan we have made this project. As this project is very compact as compared to other municipal machineries used to drain out the wastes. As the big machineries causes traffic jams on the roads and highways, but by using this we can easily remove waste easily and without causing any traffic jams.

II. Theory and Concepts

a) Definition

Wastewater is defined as the flow of used water from homes, businesses, industries, commercial activities and institutions which are subjected to the treatment plants by a carefully designed and engineered network of pipes. There are large no. of machines used for removing out the wastes from drains.

b) Problem statement

Every dynamic spring is subject to these constraints where variation of forces and alignment takes place. To find a solution for the problem of water logging due to plastic, thermocol, metal, etc. To treat problems like malaria, typhoid, etc. caused due to water accumulation.

c) Past researches

By doing some research in the past we can say that it is seen that major factors that affect the strength of the machine are design parameters, material selection, raw material defect, and surface imperfection. It is seen that design parameters i.e. operating modes, operating temperature, and imperfections, as we seen as temperature increases the strength of material decreases.

III. Drain Waste Water Cleaner

a) Working of machine

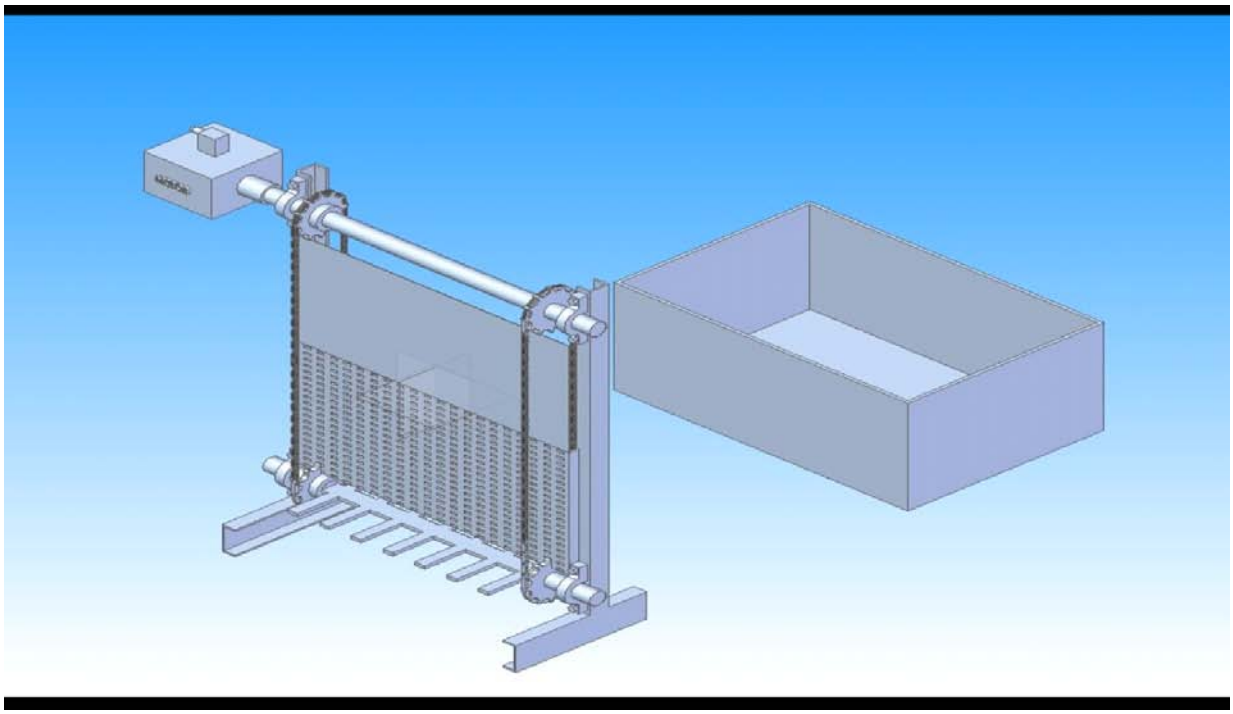

Figure 2 : Cad model of drain waste water cleaner

b) Objectives

The main objective of this project to minimize or overcome the problem which can faced in manual machine. Also increased the dumping rate of waste. And help to operator do easily work.

The purpose of selecting drain waste water cleaner machine are is follow-

- Simplicity of Design and Control.
- This type of machine are easy to operate and less time consuming.
- Evaluate the effectiveness of alternative drainage design and operational practices, to reduce nitrate-N losses from drained agricultural lands.
- Assess the impact of various soil and crop management practices on reducing nitrate-N loadings to subsurface drains.
- Assess the need for further research in other aspects of water quality from drained agricultural lands, including the emerging issues of pathogens and phosphorus from manure applications.
- Develop drainage guides and other extension materials, and work with state and federal action agencies, to assist in implementation of improved design and management practices for subsurface drainage systems

c) Advantages Of Machine

- Low-cost drain-off solution if drains already exist.
- Construction materials are often locally available
- Creates employment (construction and maintenance)
- It is Portable

d) Applications Of Machine

- It can be used in BMC
- It can be used to separate plastic, thermocol from sewage
- It can be used in plastic industries

e) Machine specifications

5 inch sprocket- 4 nag

30 inch chain- 2 nag

AC supply gear motor

speed of gear motor- 20 RPM

Voltage required – 230 volts

0.5 Horse Power

Torque of gear motor- 40 to 50 kg

Upper and bottom diameter of shaft -25mm

4 ball bearing- ID=19mm

Adjustable plate as per required height

Back side waste bin

Lifting mechanism attached on chain

f) Components And Material Selected

The components used in this Darin Waste Water Cleaner are AC geared motor, upper and lower shaft, ball bearings, backside waste bin, adjustable plates,

chain drive. the material used for C.I for frame, for ball bearing the type of bering used is pillw block ball bearing made of C.I, galvanised steel is used for waste bin.

g) Modifications

Our project is simply a drain waste water cleaner machine, which is automatically operated .Following different modification can be done to improve the output and efficiency. we have use a geared motor, adjustable plates, backside waste bin, single plate clutch, springs,. This machine can be placed inside the drainage pipe to remove all the wastes like plastic, thermocol, etc.

Hence by having above modifications above machine can be made a multipurpose output machine, which can be may power driver and automatically operated.

IV. Conclusion

The drain waste water cleaner machine is designed and manufactured by using gear changing and shaft coupling principle. It consist mainly DC geared motor, shafts, waste removal plates, dust bin, bearings, sprocket and chains. Construction materials are easily available, creates employment (construction and maintainence), simple to construct.

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The Liquid-Drop Model of Electron and Atom

By F. F. Mende & A. S. Dubrovin
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Abstract- The liquid-dropmodel of nuclear proposed byBohr and Weizsacker, it was a great success and allowed to explain a number of its properties. This modelis useduntil now.The paper attempts to build a model of the electron dropping admitting finding it, both in liquidandin the condensed state. Using this modelit possible to construct liquid hydrogen atom modeland explain the phenomenon of superconductivity.

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I. Introduction

Phenomenon of the electrization of dielectrics known long ago. With the friction the dielectrics acquire booster charge, in this case the electrons pass from the dielectrics with the smaller dielectric constant to the dielectric, whose dielectric constant is more. Millikan established that with the dispersion in air of oil of his drop the discrete charges acquire. This made it possible to make the conclusion that the charges can have only discrete variable and the measured discrete magnitude of the charge of drops was defined as electron charge. Experience does not give the possibility to establish, from where drops obtained discrete charges. These charges could be obtained with the transformation of oil into the drops in the process of its dispersion.

The discrete charge of drop they could obtain also with interaction with the nozzle of atomized-spray injector, or in the process of interaction with atmospheric air. In air be contained to always vapors of water, and since the dielectric constant of water is great, i.e. molecules could take away charges in the drops of oil. As a result these experiments electron began to consider ball-shaped formation with the specific sizes and the discrete charge. Since was established that the electron has discrete charge and has ball-shaped form, became a question about the special features of its presence in the constitution of atom. The idea of the Bohr orbits of electron in the atom thus was born. This idea assumes that the electrons revolve around the positively charged nucleus, being found in specific orbits. Passage from one orbit to another is accompanied by the emission of the quanta of the electromagnetic radiation, when each quantum bears the specific bundle of energy. These assumptions became the basis of quantum mechanics. But in this model there exist the contradictions, which are not removed to the these rapids. With its electron motion must continuously emit electromagnetic waves, but, moving in the constitution of atom, it does not emit. In addition to this the simplest atom of hydrogen, which consists of the proton and the electron revolving around it, must have magnetic moment, but hydrogen atom of this moment does not have. We must conclude for this reason that the physically substantiated model of the simplest atom, which is hydrogen atom, until there exists.

But problems are located not only with electron and atom of hydrogen. Is not clear nature of structure and proton, or complex nuclei, in which act nuclear forces. It proposed the liquid-drop model of nuclear structure in 1936. Boron in order to explain the long times of life of the excited nuclei of the heavy elements, the generatrix during capture of the slow neutrons [1]. It developed Weizsacker, considering nucleus as the spherical drop of incompressible charged nuclear fluid [2]. The proposed model had large haste, and with its aid it was possible to explain many properties of nuclei and to, in the first place, obtain semi-empirical formula for the nuclear binding energy.

II. The Liquid-Drop Model of Electron and Atom

In the article is examined the liquid-drop model of electron and atom, which assumes existence of electron both in the form the ball-shaped formation and in the form liquid [3, 4]. This model is built on the same principles, on which was built the liquid-drop model of nucleus, proposed by Bohr and Weizsacker.

The electron can be found in the bound state in the constitution of atom, and also in the free state in the form of electron beams or near the incandescent cathode in the electronic devices. In the free state electron to be found also in the conductors, when it can freely be moved into the tele-conductor. But if we consider electron the ball-shaped formation of the specific sizes, then problems here appear. In the superconductive state the depth of penetration of magnetic fields on and currents composes values the strand of several hundred angstroms, while the value of the surface roughness it is measured by microns. The electron velocity in superconductive niobium with the critical magnetic field is about 300 m/s. If electron was ball, then moving along so twisting a trajectory, it due to the inertial forces would destroy surface, but this it does

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not occur. Therefore possible being to assume that located in the composition of conductors, electrons present liquid, and they move according to its laws. When conductor they warm to the high temperature, this liquid similar to water vapor evaporates from the surface of conductor. After exceeding the limits of conductor, vapors of this liquid are condensed into the drops, forming electrons.

Liquid has the surface tension, because of which the drop of liquid acquires ball-shaped form. In this case internally the pressure in the drop is created by the forces of surface tension, which act on the surface. The pressure, created by the surface of drop is determined by the relationship

$$p_\sigma = \frac{2\sigma}{r} \qquad (2.1)$$

where σ - coefficient of surface tension, r - radius of drop.

The electron is had the external electric field, which attempts to tear electron, these force fields on in the direction they are reverse to the forces of surface tension. Their pressure on the surface of electron is determined by the relationship.

$$p_E = \frac{1}{2}\varepsilon_0 E_s^2 \qquad (2.2)$$

where E_s - tension of electrical fields on the surface of electron. The tension of electrical fields on on the surface of electron it is determined by the relationship

$$E_s = \frac{e^2}{32\pi^2\varepsilon_0 r_e^3} \qquad (2.3)$$

where e - electron charge, ε_0 - the dielectric constant of vacuum, r_e - a radius of electron.

Equalizing relationships (2.1) and (2.2) and taking into account relationship (2.3) we obtain the coefficient of surface tension for the electronic liquid

$$\sigma_e = \frac{e^2}{64\pi^2\varepsilon_0 r_e^3} \qquad (2.4)$$

Substituting in relationship (2.4) tabulated data, we obtain $\sigma_e = 1.5\times10^{14}\,\frac{Дж}{м^2}$.

For the comparison let us point out that for the water the value of surface tension is 73 J/m ^{2}, and for mercury it is equal to 487 J/m ^{2}.

A classical radius of electron composes 2.8x10 $^{-15}$ m. Experiments on the measurement of a radius of proton showed that its diameter was equal 9x10 $^{-16}$ m.

If we attempt ourselves to place proton inside the electron, then the fields of proton neutralize the charge of electronic liquid, after converting it into the usual badly compressible liquid. Volumetric drop will begin to be enlarged, being converted into the shell (Fig. 1). This shell will be extended until sets in the equilibrium between the electric forces, which attempt to press sphere and to the elastic forces of the electronic liquid, which prevent this compression. This process will determine the radius of the atom of hydrogen, which is equal 5.3x10 $^{-11}$m. Since the charge of electronic liquid is equal to the charge of proton, electric fields outside the atom will be absent.

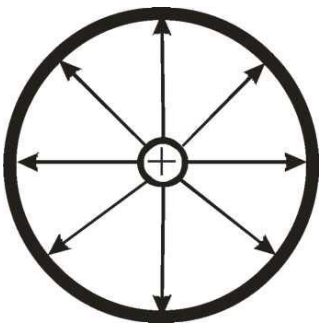

Fig. 1 : The liquid-drop model of atom.

Sufficient conductivity of normal metals extended by theory the Drude model appears. Electrons in the metal are considered as electron gas, to which it is possible to apply kinetic theory of gases. It is considered that the electrons, as the atoms of gas in the kinetic theory, are the identical solid spheres, which move along the straight lines until they encounter with each other. It is assumed that the duration of separate collision is negligible, and that between the atoms it acts no other forces, except the forces, which appear at the moment of collision. Since electron is negatively charged particle, then for observing the condition of electroneutrality in the solid tele- also must be the particles of another type, i.e., the positively charged

ions. Drude assumed that the compensating positive charge belongs to the ions, which it considered fixed.

Despite the fact that gas density of conduction electrons is approximately 1000 times more than the density of classical gas at normal to temperature and pressure, in the Drude model the methods of the kinetic theory of the inert rarefied gases adapt. The basic assumptions of the theory of the Drude consist of the following:

In the interval between the collisions is not considered interaction of electron other electrons and ions even it is considered that each electron moves with the constant velocity along the straight line. Further, it is considered that in the presence of external fields on electron it moves in accordance with Newton's law. In the Drude model, as in the kinetic theory, collisions are the instantaneous events, which suddenly change the electron velocity, and time between two sequential collisions of is called relaxation time. This time enters into the relationship, which determines the conductivity of the metal

$$\sigma = \frac{ne^2\tau}{m}.$$

In this case the connection between the current density in the metal and the tension of electric field takes the form:

$$\mathbf{j} = \sigma\mathbf{E}.$$

It is assumed that the electrons come into the state of thermal equilibrium with the lattice exclusively because of the collisions.

The theory of the Drude satisfactorily describes the phenomenon of the conductivity of metals and up to now successfully it is used in the electrodynamics.

The drop theory, when electronic component in the metal is considered as electronic liquid, changes approach to the determination of the conductivity of metal. Task is converted into the hydrodynamic task along the flow around obstacles of the moving liquid. With the flow of the liquid about the fixed obstacles are two regimes: laminar and turbulent. For each form of flow there is critical Reynolds number, which determines passage from the laminar flow to the turbulent. With the fulfillment of conditions $\mathrm{Re} \le \mathrm{Re}_{cr}$ occurs laminar flow, with $\mathrm{Re} \ge \mathrm{Re}_{cr}$ in the liquid appear turbulences. With the laminar flow of liquid energy losses be absent, and, therefore, is absent resistance. In the turbulent regime, with the diffraction of obstacles in the liquid appear turbulences, which lead to the energy losses. Specifically, by this it is possible to explain the fact that even at temperatures, which are approached absolute zero, the end resistance is observed in metals. But if the obstacles streamlined with liquid accomplish oscillatory or other motions, then this leads to additional turbulences, and, therefore, also to an increase in the resistance. And the greater the amplitude of the fluctuations of the streamlined obstacles, the greater the resistance. This circumstance leads to the dependence of the resistance of metals on the temperature, since. with an increase in the temperature the amplitude of the oscillations of lattice ions increases.

The approach examined can be used for explaining this phenomenon as the superconductivity, which can be the consequence of the passage of the flow of electronic liquid from the turbulent to the laminar.

Superconductors have the critical temperature, lower than which they convert to the superconductive state. This means that with the amplitudes of the oscillations of lattice ions of superconductor the laminar possible flow of electronic liquid is lower than the certain critical value. In the superconductors of the second kind there is a phase of the mixed state, when vortex formations can be created with the way of the imposition of external magnetic field. In this case Abrikosov vortices are formed. With the flow of electronic liquid these vortices begin to move, which leads to the appearance of resistance. The case, when in connection with the presence of the defects of crystal lattice, vortices are attached on such defects, is exponential, in this case the vortices cannot move, and resistance is absent. In the usual hydrodynamics this situation is realized be it cannot.

The liquid-drop model of atom examined transfers a question about the presence of resonances in the atom into the mechanical task. If there is an elastic shell, then it has the infinite number of mechanical resonances. These resonances can be to bear the axial nature, when standing wave has axial symmetry. Are possible also the resonances, when the integer of half-waves is plotted along the equator of sphere. But this system will possess still one type of the fluctuations, which generate the circularly polarized electromagnetic radiation. During the collision with other it will pass the displacement of electron shell on the relation to the nucleus as atoms. As a result this is formed the being varied and simultaneously revolving electric dipole. The emission of this dipole will be received by receiver as the emission of the specific frequency, modulated in the amplitude, and which, therefore, contains the carrier frequency and side frequencies. The totality of such frequencies will compose the radiation spectrum of atom.

The proposed liquid-drop model of electron and atom this thus far only hypothesis, but it has right to existence as the liquid-drop model of nucleus. We attempted to describe only very idea of drop approach to the circumscription of electron, further development of these ideas in addition to of the liquid-drop model of nucleus can lead to the creation of the generalized liquid-drop model of atom.

III. Conclusion

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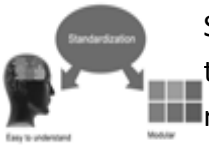

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The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

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Note :

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

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1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

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The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

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- One should avoid outdated words.

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Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

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References

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25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

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27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

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33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

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Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

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To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

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	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

INDEX

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