

## TABLE OF CONTENTS

<b>Chapter</b>	<b>Topics</b>	<b>Page No.</b>
<b>1</b>	<b>Introduction</b>	<b>1-7</b>
	1.1 Working principle	1-3
	1.2 Advantage and Disadvantage	4
	1.3 Types of microbial fuel cell	4-5
	1.4 Factors affecting Microbial Fuel cell	5-6
	1.4.1 PH	5
	1.4.2 Substrate concentration	5
	1.4.3 Temperature	5
	1.4.4 Oxygen concentration at the cathode	5
	1.4.5 Resistance	5
	1.4.6 Reactor configuration	5
	1.4.7 Proton exchange membrane	5
	1.4.8 Types of electrode materials	6
	1.5 Applications of Microbial Fuel Cell Technology	6-7
	1.5.1 Waste water treatment	6
	1.5.2 Powering under water monitoring devices	6
	1.5.3 Power supply to remote sensors	6
	1.5.4 BOD sensing	6
	1.5.5 Hydrogen production	7
<b>2</b>	<b>Review of Literatures</b>	<b>8-9</b>
<b>3</b>	<b>Materials and Methods</b>	<b>10-14</b>
	3.1 Microbial Fuel Cell (MFC) Chamber	10-11
	3.2 Proton Exchange membrane	11-12
	3.3 Electrodes Used	12-14
	3.3.1 Carbon paper electrode	12
	3.3.2 Charcoal electrode	13-14
	3.4 Substrate Used	14
	3.4.1 Slurry and water	14
	3.4.2 Cow dung (dry) and water	14
	3.4.3 Slurry, cow dung (dry) and water	14
	3.5 External Circuit	14
<b>4</b>	<b>Results and Discussion</b>	<b>15-34</b>
	4.1 Voltage generated using mixture of Slurry and water with carbon paper electrodes	15-18

	4.2 Voltage generated using mixture cow dung (dry) and water with carbon paper electrodes	19-23
	4.3 Voltage generated using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes	24-28
	4.4 Voltage generated using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode	29-33
<b>5</b>	<b>Conclusion</b>	<b>35</b>
	5.1 Future work	35
	<b>References</b>	<b>36-39</b>

## LIST OF TABLES

Table No.	Particulars	Page no.
1.1	Advantages and Disadvantages of MFC	4
3.1	Different length, diameter and surface area of the PEM	12
3.2	Different electrodes used	12
4.1	Voltage generated using mixture of Slurry and water with carbon paper electrodes for MFC unit 1	15
4.2	Voltage generated using mixture of Slurry and water with carbon paper electrodes for MFC unit 2	16
4.3	Voltage generated using mixture of Slurry and water with carbon paper electrodes for MFC unit 3	16
4.4	Voltage generated using mixture of Slurry and water with carbon paper electrodes for MFC unit 4	17
4.5	Voltage generated using mixture cow dung (dry) and water with carbon paper electrodes for MFC unit 1	19
4.6	Voltage generated using mixture cow dung (dry) and water with carbon paper electrodes for MFC unit 2	20
4.7	Voltage generated using mixture cow dung (dry) and water with carbon paper electrodes for MFC unit 3	21
4.8	Voltage generated using mixture cow dung (dry) and water with carbon paper electrodes for MFC unit 4	22
4.9	Voltage generated using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 1	24
4.10	Voltage generated using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 2	25
4.11	Voltage generated using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 3	26
4.12	Voltage generated using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 4	27
4.13	Voltage generated using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 1	29
4.14	Voltage generated using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 2	30
4.15	Voltage generated using mixture of Slurry and water with	31

	charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 3	
4.16	Voltage generated using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 4	32
4.17	Two MFC cells connected in series	34

## List of figures

Figure no.	Particulars	Page no.
1.1	The basic MFC Composition	1
1.2	Two most common bacteria used in MFC	2
1.3	A microbial community	2
3.1	MFC unit 1	10
3.2	MFC unit 2	10
3.3	MFC unit 3	10
3.4	MFC unit 4	10
3.5	MFC connected in series	11
3.6	Carbon paper electrodes	12
3.7	Charcoal	13
3.8	Charcoal electrode using starch as binder	13
3.9	Charcoal electrode using lignin as binder	13
3.10	Charcoal with Carbon paper electrode	14
4.1	OCV(mv) Vs Days using mixture of Slurry and water with carbon paper electrodes for unit 1	15
4.2	OCV(mv) Vs Days using mixture of Slurry and water with carbon paper electrodes for unit 2	16
4.3	OCV(mv) Vs Days using mixture of Slurry and water with carbon paper electrodes for unit 3	16
4.4	OCV(mv) Vs Days using mixture of Slurry and water with carbon paper electrodes for unit 4	17
4.5	Comparison of OCV(mv) Vs Days using mixture of Slurry and water with carbon paper electrodes for all the MFC units	18
4.6	OCV(mv) Vs Days using mixture of cow dung (dry) and water with carbon paper electrodes for MFC unit 1	19
4.7	OCV(mv) Vs Days using mixture of cow dung (dry) and water with carbon paper electrodes for MFC unit 2	20
4.8	OCV(mv) Vs Days using mixture of cow dung (dry) and water with carbon paper electrodes for MFC unit 3	21
4.9	OCV(mv) Vs Days using mixture of cow dung (dry) and water with carbon paper electrodes for MFC unit 4	22
4.10	Comparison of OCV(mv) Vs Days using mixture of cow dung (dry) and water with carbon paper electrodes for all the MFC	23

	units	
4.11	OCV(mv) Vs Days using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 1	24
4.12	OCV(mv) Vs Days using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 2	25
4.13	OCV(mv) Vs Days using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 3	26
4.14	OCV(mv) Vs Days using mixture of Slurry, Cow dung (dry) and water with carbon paper electrodes for MFC unit 4	27
4.15	Comparison of OCV(mv) Vs Days using mixture of Slurry, cow dung (dry) and water with carbon paper electrodes for all the MFC units	28
4.16	OCV(mv) Vs Days using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 1	29
4.17	OCV(mv) Vs Days using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 2	30
4.18	OCV(mv) Vs Days using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 3	31
4.19	OCV(mv) Vs Days using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for MFC unit 4	32
4.20	Comparison of OCV(mv) Vs Days using mixture of Slurry and water with charcoal electrodes wrapped in a carbon paper to be used as anode for all the MFC units	33
4.21	Comparison of OCV(mv) Vs Days for MFC connected in series	34