Performance of Solar Cooker with A Round Fin Absorber Plate

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Abstract: ***Solar energy is one of the most ancient sources which is easily available and the root for almost all fossil and renewable types. Special devices have been used for benefiting from the solar and other renewable energy types. This paper presents study; a solar cooker was designed, fabricated and tested. In this research author used round rounded fin absorber plate inside bottom surface of solar cooker and the top coveris tilted at 24.57˚ corresponding to the latitude of site. To provide the tilt, the height of the back side will made 24 cm while it will made 10 cm for the front one. The results of the experimental have been rigorously analyses and showed that the cooking power of a reflector Solar cooker with a round rounded fin absorber plate is 147.24 W and solar cooker is 119.20 W. So cooking power was increased 24%.The time required for heating water up to boiling temperature in both solar cookers was reduced with about 19% when a rounded fin absorber plate was used.***

Keywords: ***solar cooker, reflector mirrors, Round Rounded fin Absorber Plate; Latitude angle.***

I. INTRODUCTION

Solar cookers of various types were the subject of several theoretical and experimental studies all over the world. A. Harmim et al [1] the results of the experimental have been rigorously analyses and showed that the stagnation temperature for solar cooker equipped with a round rounded fin absorber plate was about 7% more than solar cooker equipped with an ordinary absorber plate. The time required for heating water up to boiling temperature in both solar cookers was reduced with about 12%when a rounded fin absorber plate was used. The review covers a historic overview of solar cooking technology, detailed description of various types of solar cookers, geometry parameters affecting performance of solar cookers such as booster mirrors, glazing, absorber plate, cooking pots, heat storage materials and insulation. A.V.Narasimha Rao et al [2] have investigated the effect of keeping the cooking vessel on lugs and also a cylindrical cooking vessel with central annular cavity; they showed by experiments that the cooking vessel with central cavity improves effective heat transfer surface. A. Saxena et al [3] talk to about lot of research work has been carried out in recent past years in the world which clearly shown the utilization of solar energy towards the greatest needs of mankind obviously solar cooking, fuel saving, non-polluting environment and to save and produce electricity. Arezki Harmim et al. [4] have proposed a new shape for the cooking vessel. It is an ordinary cylindrical vessel by which external side surface is provided with rectangular fins along its circumference. Avala raji reddy et al [5] The mathematical model considers a double glazed hot box type solar cooker loaded with two different types of vessels, kept either on the floor of the cooker or on lugs. The performance of the cooking vessel with a central cylindrical cavity is compared with that of a conventional cylindrical cooking vessel. The average improvement of performance of the vessel with a central cylindrical cavity kept on lugs is found to be 5.9% and 2.4% more than that of a conventional cylindrical vessel on the floor and on lugs, respectively. . Negi and Purohit [6] conducted an experimental study of a solar cooker with two non-tracking planar reflectors to enhance solar radiation in the cooker. Amer [7] developed a double exposure solar cooker; in such design the absorber is exposed to solar radiation from the top and the bottom sides. E. Cuce et al [8] is performed in a thematic way in order to allow an easier comparison, discussion and evaluation of the findings obtained by researchers, especially on parameters affecting the performance of solar cookers. . H.-M. Yeh et al [9] A design for inserting an absorbing plate to divide the air duct into two channels for double-flow operation in solar air heaters with round fins attached over and under the absorbing plate has been investigate .M.E.V. da Silva et al [10] presents the general types of solar cookers, theirs basic Characteristics and experimental procedures to test the different types of solar cookers .and talk to about the cooking power. M.A. Karim et al [11] in this study, flat plate, round rounded fin and v-corrugated air heaters were investigated both experimentally and theoretically. Results showed that the v-corrugated collector is 10–15 and 5–11% more efficient in single pass and double pass modes, respectively, compared to flat plate collectors. Nahar [12] experimentally the thermal analysis of a double reflector solar cooker with transparent insulation materiel. Kariuki Nyahoro et al [13] the block is enclosed in uniform layer of insulation except where there are cavities on the top and bottom surfaces to allow heating of a pot from storage and

heating of the storage by solar radiation. A paraboloidal concentrator focuses solar radiation through a secondary reflector onto a central circular zone of the storage block through the cavity in the insulation. The storage is charged for a set period of time and heat is subsequently discharged to a pot of water. P.-W. Li et al. [14] developed for a solar stove heat collection system which uses a giant Fresnel lens. The results of the analysis have been incorporated into the control algorithm which has been implemented in the control system of a prototype solar stove which successfully demonstrated the predicted efficient solar tracking. A review of solar cookers was made by Muthusivagami et al. [15]. S. Kumar [16] presents a simple test procedure for determination of design parameters to predict the thermal performance of a solar cooker. Subodh Kumar [17] the paper presents a simple test procedure for determination of design parameters to predict the thermal performance of a solar cooker. A series of out-door experiments were performed on the double-glazed solar cooker of aperture area 0.245 m2 with a fiber body to obtain two figures of merit, Suhail Zaki Farooqui [18] presented a novel mechanism for one-dimensional tracking of solar cookers along the azimuth has been reported in this paper. The proposed mechanism does not require any external power source, as the required tracking energy is drawn from the gravitational potential energy stored in a spring's. Xia et al [19] are composed of two symmetrical off-axis concentrators and inclined flat reflectors. When the two sides' focal spots just coincide, the concentrated flux distribution presents uniform in the extreme.

II. DESCRIPTION OF THE SOLAR COOKERS

This simple solar cooker consists mainly of an outer box, with and without round rounded fin absorber plate and glass cover fitted at particular latitude angle 24 (at satna). The gap between the rounded absorber plate is filled with glass wool insulation. solar cookers will be constructed using locally available materials as well as local technical assistance. The three internal lateral sides are covered by aluminum foil and on the opposed side to the aperture area a mirror of 62 cm by 62cm is fixed by screws. we shall performed a comparatively experiment simple solar cooker and second time reflector mirror as well as Round rounded fin absorber plate. the absorber plate is made of aluminum painted black. Its upper surface is provided with Round Fins. Round Fins have a length of 5 cm; they are spaced at 4 cm. The attached fins on the absorber plate increase its temperature by radiative absorptance due to different multiple reflections. The temperature improvement of the interior hot air is obtained by the increase in the convective heat transfer plate air surface [1]. The temperature of the absorber plate, temperature of the internal hot air measured at the center of the internal cooker volume. The important parts of a hot solar cooker: the outer box of a solar heater is generally made of galvanized iron. Inner heating is made of aluminum sheets. The inner box is slightly smaller than the outer box. It is coated with black paint so as to easily absorb solar radiation and transfer the heat to the heating (cooking) pots. The insulating material should be free from volatile materials. Reflectors used in the solar cooker to increase the radiation input on the absorbing space and fixed on the inner side of the main cover of the box. They will reflect the radiation entering the box directly to the container and helps to quicken the cooking process by raising the inside temperature of the cooker. A glass lid covers the inner box or tray. It is slightly larger than the inner box and used Round rounded fin absorber plate inside bottom surface of solar cooker and The top cover (Glazing) is tilted at 24° corresponding to the latitude of Satna (the location of the test site). A rubber strip is affixed on the edges of the frame to prevent any heat leakage. the heating container is made of aluminum. These pots are also painted black on the outer surface so that they also absorb solar radiation directly. Four thermocouples at different locations were installed on the solar cooker. These locations are: a) upper surface of glass cover, b) lower surface of glass cover c) water temperature inside the pot and d) absorber plate temperature.

Fig.1.Photograph of the rounded fin absorber plate

Fig.2 photograph of Experimental setup

In this setup we used reflectors; both are having 3 mm thickness. A glass cover made with used two glasses whose have a thickness 4 mm and spacing between them 1.5 cm. For the first solar cooker, the absorber tray consists of an aluminum sheet painted black of a surface of 30 cm by 30cm and 0.08 cm thickness. For the second one, the absorber plate surface is provided with fins made of aluminium painted black. Round Fins are of rectangular

constant cross section (50 cm by 0.08 cm) and have a length of 5 cm; they are spaced at 4 cm. Photograph of this absorber plate is shown in Fig. 1. We used pots of 19 cm diameter and height 60 mm.

2.1 Instrumentation:

For each cooker, the temperature of the absorber plate, the temperature of water in each cooking vessel is also measured by the same type of thermocouple introduced through a small hole at the lid center. Ambient temperature and wind speed measurements were taken by euro lab mini anemometer (accuracy ±3%, range 0.1-25.00 m/s and resolution 0.01 m/s) with thermometer (range 0-50^o C). Solar intensity radiation was measured by precision Pyranometer. A Digital processing meter was used to show the output voltage in mV. mV convert to degree centigrade ,calibrated with the help of hypsometer and also convert to w/m^2 . The temperature measurements were carried out using K type thermocouple range from 0-1100 ^{o}C.

III. EXPERIMENTAL STUDY

The principal objective of this work is a preliminary testing of a reflector solar cooker equipped with a round rounded fin absorber plate. The round rounded fin absorber enhances the rate of heat transfer to the air inside the cooker. A solar cookers have been designed and fabricated; the first one equipped with an ordinary absorber plate and the second one equipped with a round rounded fin absorber plate and reflector .The principal goal of this experimental study is not the presentation of a simple solar cooker whose time of cooking is rather long because it is not equipped with reflectors, but it is about possibility of reducing the cooking time of solar cookers with the help of a simple modification on the absorber plate geometry. A comparative experimental test of heating power of the solar cookers was carried out during the successive days from the 19th and 24st April 2017. Each experiment starts from 9:30 am in the morning .The electrical and electronic parts were tested and calibrated before being used on the various places on both type solar cookers. The experimental work was fully carried out at mechanical engineering Department Aditya engineering college Santa (M.P.) India. First one, we have performed experimental test on conventional solar cooker with load of 1 kg of water takes in pots. Then takes the readings and same procedure performed of reflectors solar cooker with a round rounded fin absorber plate without reflectors and round rounded fin absorbed plate. The temperature probe of the thermocouple was placed in one of the cooking pots with the measuring tip submerged in the water. The temperature probe lead was sealed where it left the pot and the cooker. Then the entire solar cooker was placed in the sun and orientated to receive maximum solar radiation to heat the water contents of the pots. The orientation was adjusted after every 15 minutes. The data recording was continued until the water temperature exceeded 95^{o}C. .The average ambient temperature and the average solar radiation intensity over the time correspond. we used four thermocouple namely as type-1,type-2,type-3 and type-4 for better understanding of during calibration process. In calibration process for round finding calibration factor, we take hypsometer and plate heater for heating of hypsometer and also used DPM. Solar radiation also measured by DPM so there calibration factor 1mV = 122.7 W/M^2 . By the calibration we found that Calibration factors these are show temperature reading equal to 1 mV in table 1.1:

TABLE: 3.1 CALIBRATION FACTOER OF THERMOCOUPLE

S.NO	Name of thermocouple	Used placed	Value in Temperature (^{0}C)
1	TYPE-1	Upper glazing	20.76
2	TYPE-2	Lower glazing	20.89
3	TYPE-3	Absorber plate	21.07
4	TYPE-4	Water in pots	21.12

IV. MATHEMATICAL FORMULATION

4.4.1. Cooking Power of solar cookers:

In order to compare the different types of solar cookers, characteristic values need to be defined. These values are expressions of power. The average heating-power of a solar cooker is calculated as [10]

$$P = \frac{m_w \, X \, c_p X \, \Delta T}{\Delta t} \quad \text{----------} \quad \text{-- (1)}$$

Where m_w is the mass of water in kg is the specific heat capacity at constant pressure in 4186 J/(kg K), ΔT is the temperature difference in K, Δt is the duration of the measurement in s. Usually this power is measured from ambient temperature up to 95 ^{0}C, to avoid uncertainty of the exact boiling-point

V. RESULTS AND DISCUSSION

5.1 Cooking power test:

This Experimental test was conducted at satna (M.P.) India. This experiment is performed on a simple type solar cooker without reflector. The test started dated on 19 and 20 /4/ 2017 with at 9:30 a.m. till the boiling temperature of water in pots is 95˚C. The summary of the result of the

Test is given in Table 5.1 and table 5.2.

Table 5.1: Observation table for Temperature at various point of cooker for heating test on dated 19/4/17

S.NO.	Local Time (HH:MM)	Solar radiation (W/m^2)	Upper glass of glazing tem.($^{\circ}C$)	Lower glass of glazing tem.($^{\circ}C$)	Plate temperature ($^{\circ}C$)	Water temperature in pots ($^{\circ}C$)	Ambient Temperature ($^{\circ}C$)	Wind speed (m/s)
1	09:30	554	36	54	55	26	25	0.24
2	09:45	639	38	69	68	29	25	0.27
3	10:00	671	41	75	77	38	26	0.28
4	10:15	709	46	87	89	43	27	0.26
5	10:30	691	44	82	91	54	26	0.31
6	10:45	739	47	85	94	61	30	0.16
7	11:00	771	50	88	98	65	31	0.30
8	11:15	749	48	88	101	68	30	0.22
9	11:30	821	51	92	109	73	33	0.23
10	11:45	859	52	93	114	81	33	0.29
11	12:00	871	53	97	121	87	33	0.20
12	12:05	876	53	98	122	89	33	0.22
13	12:10	888	53	101	123	90	33	0.24
14	12:15	889	54	102	125	90	34	0.26
15	12:20	896	54	102	125	91	34	0.27
16	12:25	904	54	103	126	92	34	0.25
17	12:30	911	54	104	127	92	34	0.27
18	12:35	911	54	105	128	93	34	0.23
19	12:40	914	54	106	130	93	34	0.22
20	12:45	915	54	107	129	94	34	0.31
21	12:50	922	55	108	130	94	35	0.17
22	12:55	927	55	108	131	94	35	0.22
23	01:00	935	55	109	131	95	35	0.20
24	01:05	936	56	110	132	95	36	0.15
25	01:10	939	56	111	133	95	36	0.21
26	01:15	947	56	111	133	95	36	0.25

Table 5.2: Observation table for Temperature at various point of cooker for heating test on Dated 20/4/2017

S.NO.	Local Time (HH:MM)	Solar radiation (W/m^2)	Upper glass of glazing tem.(^0C)	Lower glass of glazing tem.(^0C)	Plate temperature (^0C)	Water temperature in pots (^0C)	Ambient Temperature (^0C)	Wind speed (m/s)
1	09:30	543	30	41	53	28	28	0.29
2	09:45	559	30	42	55	33	28	0.27
3	10:00	575	31	43	57	36	29	0.29
4	10:15	588	32	44	59	41	29	0.25
5	10:30	597	32	45	62	45	30	0.30
6	10:45	614	33	46	65	49	31	0.24
7	11:00	634	34	47	66	51	32	0.27
8	11:15	659	36	53	69	56	33	0.17
9	11:30	681	38	59	78	62	33	0.19
10	11:45	697	39	62	82	68	34	0.24
11	12:00	723	42	69	88	75	34	0.25
12	12:05	731	44	74	93	78	34	0.27
13	12:10	749	45	79	103	81	35	0.28
14	12:15	759	46	84	111	83	35	0.29

15	12:20	781	48	86	113	86	35	0.27
16	12:25	799	49	90	118	88	35	0.26
17	12:30	821	51	92	119	90	36	0.25
18	12:35	845	52	95	122	92	36	0.24
19	12:40	869	53	96	126	93	36	0.20
20	12:45	899	54	98	128	94	36	0.27
21	12:50	917	56	101	129	95	36	0.22
22	12:55	925	57	103	131	95	36	013
23	01:00	940	59	105	132	96	36	0.20
24	01:05	948	60	106	133	96	37	0.21
25	01:10	953	60	108	134	97	37	0.22
26	01:15	970	61	109	135	97	37	0.21

The test started on dated 22,26and 28 /4/2017 at 9:30 a.m. till the boiling temperature of water in pots is 95°C. The summary of the result of the test is given in Table 5.3, Table 5.4 and Table 5.5. The boiling temperature attained was 95°C. All experimental data are given in tables;

Table 5.3: Observation table for Temperature at various point of cooker for heating test on Dated 22/4/2017

S.NO.	Local Time (HH:MM)	Solar radiation (W/m^2)	Upper glass of glazing tem.(^0C)	Lower glass of glazing tem.(^0C)	Plate temperature (^0C)	Water temperature in pots (^0C)	Ambient Temperature (^0C)	Wind speed (m/s)
1	09:30	558	34	46	59	26	26	0.6
2	09:45	590	36	51	65	33	27	0.24
3	10:00	625	38	56	72	39	28	0.29
4	10:15	659	40	61	78	43	29	0.25
5	10:30	700	43	67	84	50	29	0.31
6	10:45	734	47	70	91	57	29	0.28
7	11:00	772	49	74	97	62	30	0.30
8	11:15	804	54	78	104	69	30	0.24
9	11:30	840	58	84	112	77	31	0.22
10	11:45	872	62	91	120	86	32	0.17
11	12:00	890	66	98	128	92	33	0.19
12	12:05	891	66	99	131	93	33	0.016
13	12:10	896	67	100	134	94	34	0.21
14	12:15	898	67	101	136	94	34	0.30
15	12:20	900	68	102	139	95	34	0.25
16	12:25	901	69	103	141	95	35	0.26
17	12:30	902	70	104	142	95	35	0.30
18	12:35	903	71	105	143	95	35	0.31
19	12:40	906	72	106	145	95	36	0.32
20	12:45	905	74	108	146	95	36	0.33
21	12:50	909	76	109	148	95	36	0.27
22	12:55	908	77	111	149	95	36	0.25
23	01:00	913	79	114	151	95	37	0.22
24	01:05	913	80	116	154	95	37	0.17
25	01:10	917	82	118	156	95	37	0.19

26	01:15	916	84	120	158	95	37	0.24

Table 5.4: Observation table for Temperature at various point of cooker for heating test on Dated 26/4/2017

S.NO.	Local Time (HH:MM)	Solar radiation (W/m^2)	Upper glass of glazing tem.(^0C)	Lower glass of glazing tem.(^0C)	Plate temperature (^0C)	Water temperature in pots (^0C)	Ambient Temperature (^0C)	Wind speed (m/s)
1	09:30	586	39	55	66	30	30	0.26
2	09:45	605	41	57	69	34	30	0.24
3	10:00	636	44	60	73	39	31	0.27
4	10:15	659	46	62	75	44	31	0.30
5	10:30	699	50	65	78	49	32	0.31
6	10:45	739	54	70	83	54	32	0.22
7	11:00	771	57	75	89	65	33	0.20
8	11:15	779	63	87	97	72	34	0.19
9	11:30	826	66	89	104	78	34	0.12
10	11:45	854	70	94	109	85	35	0.22
11	12:00	871	74	99	116	90	36	0.20
12	12:05	878	75	102	119	91	36	0.26
13	12:10	889	75	104	122	93	35	0.30
14	12:15	891	76	106	126	93	35	0.33
15	12:20	897	78	113	131	94	35	0.16
16	12:25	901	80	117	134	95	37	0.10
17	12:30	907	81	120	137	95	37	0.12
18	12:35	907	81	120	139	95	37	0.13
19	12:40	912	82	122	140	95	38	0.25
20	12:45	915	82	122	142	95	38	0.25
21	12:50	915	83	124	142	95	38	0.17
22	12:55	918	83	125	143	95	39	0.19
23	01:00	923	84	127	144	95	39	0.27
24	01:05	923	85	128	145	95	39	0.24
25	01:10	927	85	129	147	95	39	0.20
26	01:15	927	86	129	149	95	39	0.27

Table 5.5: Observation table for Temperature at various point of cooker for heating Test on dated 28/4/2017

S.NO.	Local Time (HH:MM)	Solar radiation (W/m^2)	Upper glass of glazing tem.(^0C)	Lower glass of glazing tem.(^0C)	Plate temperature (^0C)	Water temperature in pots (^0C)	Ambient Temperature (^0C)	Wind speed (m/s)
1	09:30	574	37	49	63	28	28	0.35
2	09:45	599	39	52	67	33	29	0.26
3	10:00	631	41	54	69	37	30	0.30
4	10:15	679	44	68	74	46	30	0.25
5	10:30	721	46	72	79	54	31	0.17
6	10:45	769	49	76	82	63	32	0.20
7	11:00	801	53	85	91	69	32	0.25
8	11:15	824	55	89	97	73	33	0.14
9	11:30	826	57	94	109	79	34	0.29
10	11:45	870	60	97	118	85	34	0.31
11	12:00	901	61	102	129	92	35	0.29
12	12:05	901	61	103	131	93	35	0.17
13	12:10	904	61	105	133	93	35	0.22

14	12:15	909	62	106	135	94	35	0.32
15	12:20	913	62	108	137	95	36	0.29
16	12:25	912	63	108	138	95	37	0.22
17	12:30	914	63	109	139	95	37	0.31
18	12:35	914	64	109	140	95	37	0.26
19	12:40	917	64	110	142	95	37	0.30
20	12:45	916	65	110	143	95	38	0.13
21	12:50	919	65	111	144	95	38	0.17
22	12:55	919	66	111	146	95	38	0.19
23	01:00	923	66	113	147	95	38	0.26
24	01:05	923	67	113	148	95	39	0.23
25	01:10	926	67	115	150	95	39	0.28
26	01:15	926	67	115	150	95	39	0.20

From above calculation we construct a table and summarize results and select two days for round find percentage of solar cooking power and reduce timing of solar cooking.

Table5.6: Results for heating test on various days

DATE	19/4/17(old)	20/4/17(old)	22/4/17(new)	26/4/17(new)	28/4/17(new)
Mean ambient temperature(^{O}C)	33	36	34	36	36
Initial water temperature (^{O}C)	26	28	26	30	28
Time of water boiling in pots (min)	210	210	170	175	170
Mean solar radiation (W/m^2)	838	760	833	833	845
Temperature of boil water (^{O}C)	95	95	95	95	95
Cooking power (W)	119.20	115.74	147.24	134.74	142.98

And percentage increase of solar cooking power:

$$= \frac{(147.24-119.20)}{119.20} \text{ x } 100 = \mathbf{23.52\ \%}$$

And Time reduces for solar cooking:

$$= \frac{210-170}{210} \text{ x } 100 = \mathbf{19\ \%}$$

Now we saw that results, used without reflector solar cooker dated on 19 and 20 /4/ 2017 and find solar radiation 838 w/m^2 and 760w/m^2 respectively. Also we know that from result on 19/4/17 and 20/4/17 taking a time for the boiling temperature of both 210 minute respectively. And another with used a two reflector type solar cooker with used rounded fin absorber plate dated on 22/4/17,26/4/17 and 28/4/17 and Find solar radiation 833 w/m^2, 833 w/m^2 and 845 w/m^2 respectively. Also taking a time for the boiling temperature 170 min,175 min and 170 minute respectively. So we discussed on 19/4/17 and 22/4/17. After modification of solar cooker we gated a minimum solar radiation on 22/4/17

Table5.7: Data analysis table of heating test of water 5.2 kg dated on 19/4/17

Mean ambient temperature (^{0}C)	33
Initial water temperature (^{0}C)	27
Time of boiling water in pots (Min)	210
Mean solar radiation (W/m^2)	838
Boiling temperature of water (^{0}C)	95

Heating power (W)	119.20

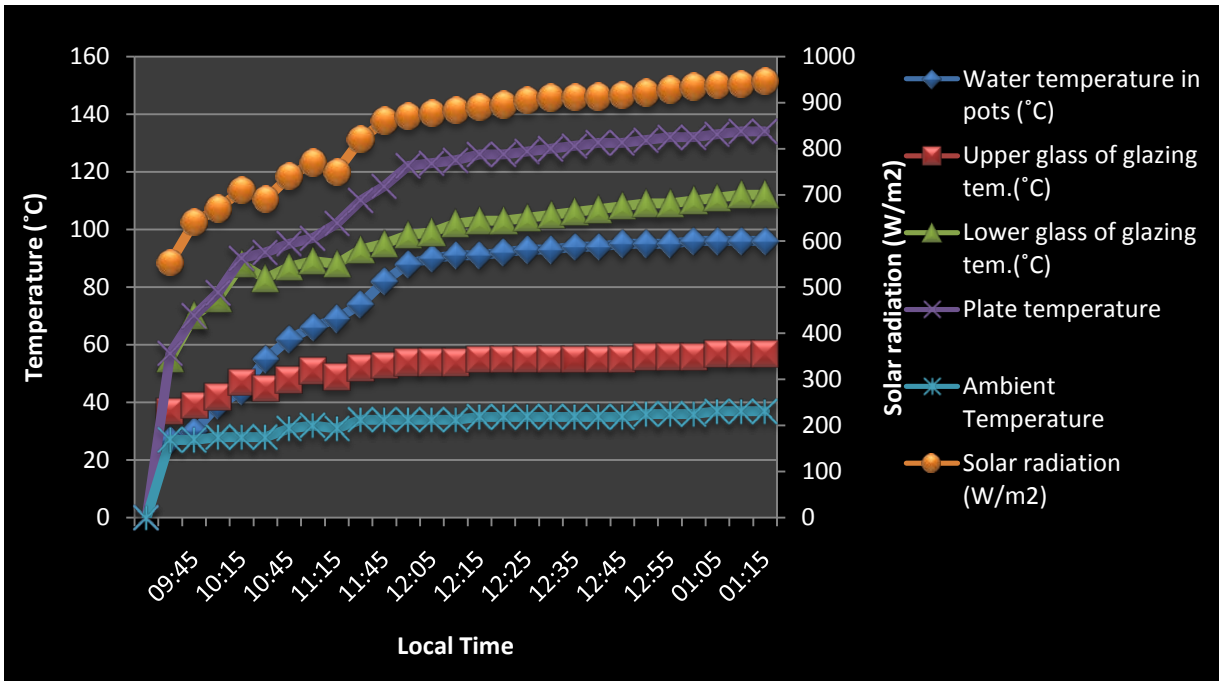

Fig 5.1 Graph between Temperature, Local time and Solar radiation dated on 19/4/17(old Solar Cooker

Table5.8: Data analysis table of heating test of water 5.2 kg dated on 22/4/17

Mean ambient temperature (^{0}C)	34
Initial water temperature (^{0}C)	27
Time of boiling water in pots (Min)	170
Mean solar radiation (W/m^2)	833
Boiling temperature of water (^{0}C)	95
Heating power (W)	147.24

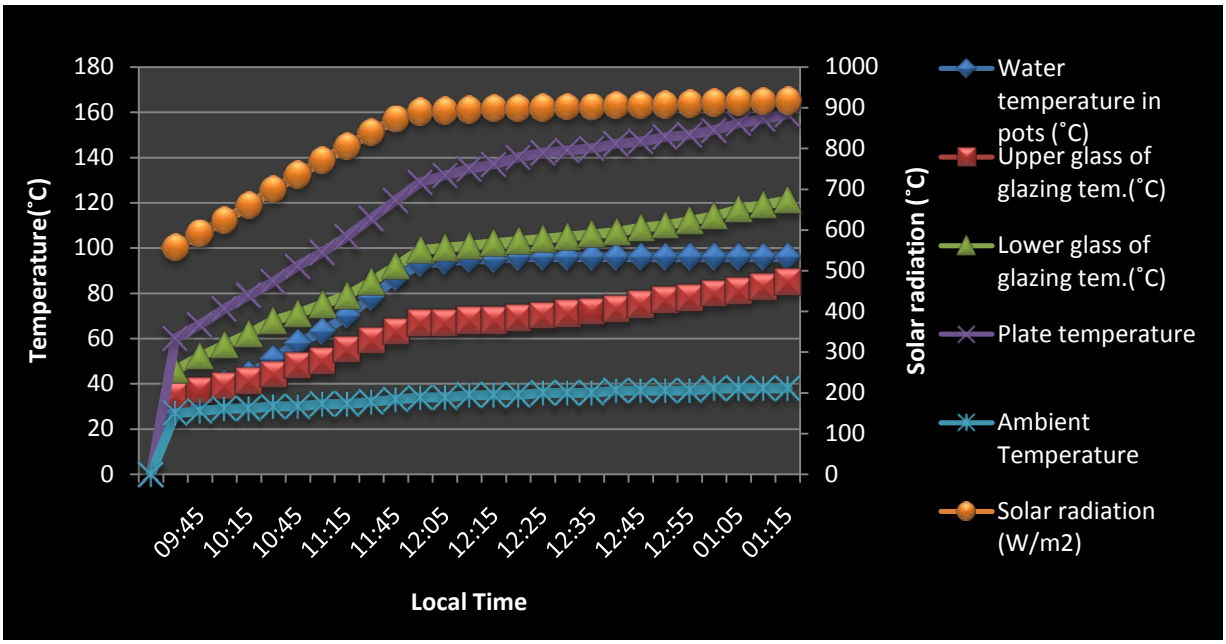

Fig 5.2: Graph between Temperature, Local time and solar radiation dated on 22/4/17 (old Solar cooker)

I concluded these important results whose given information for our reflector solar cooker employed with a round rounded fin absorber plate,

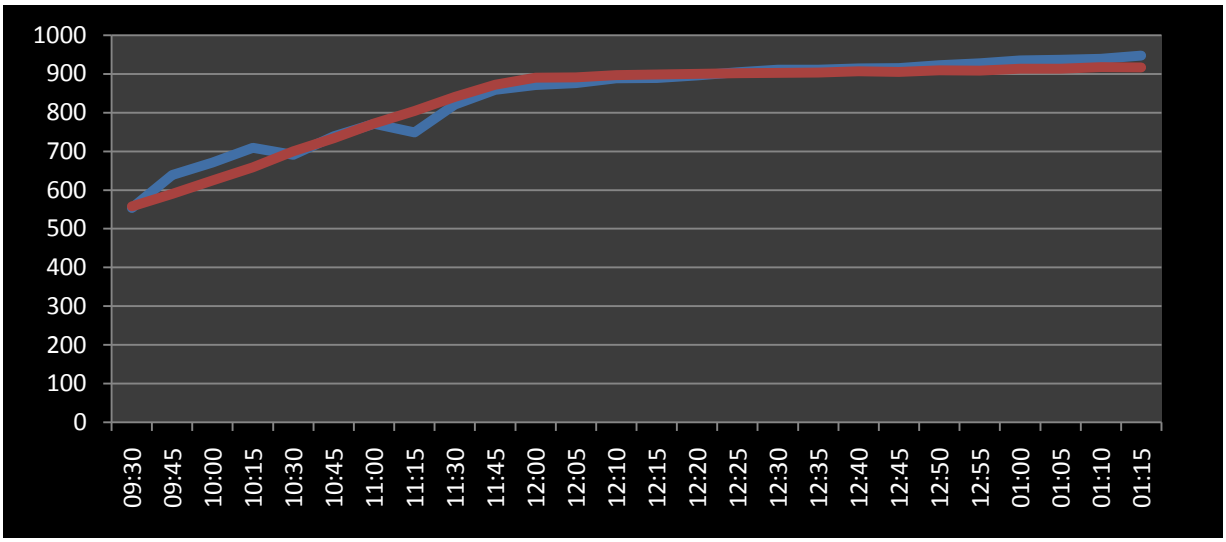

Fig 5.3.Graph Comparison between solar radiations dated on 19/4/17 and 22/4/17 with used simple Solar cooker and reflector type solar cooker with rounded fin absorber plate respectively

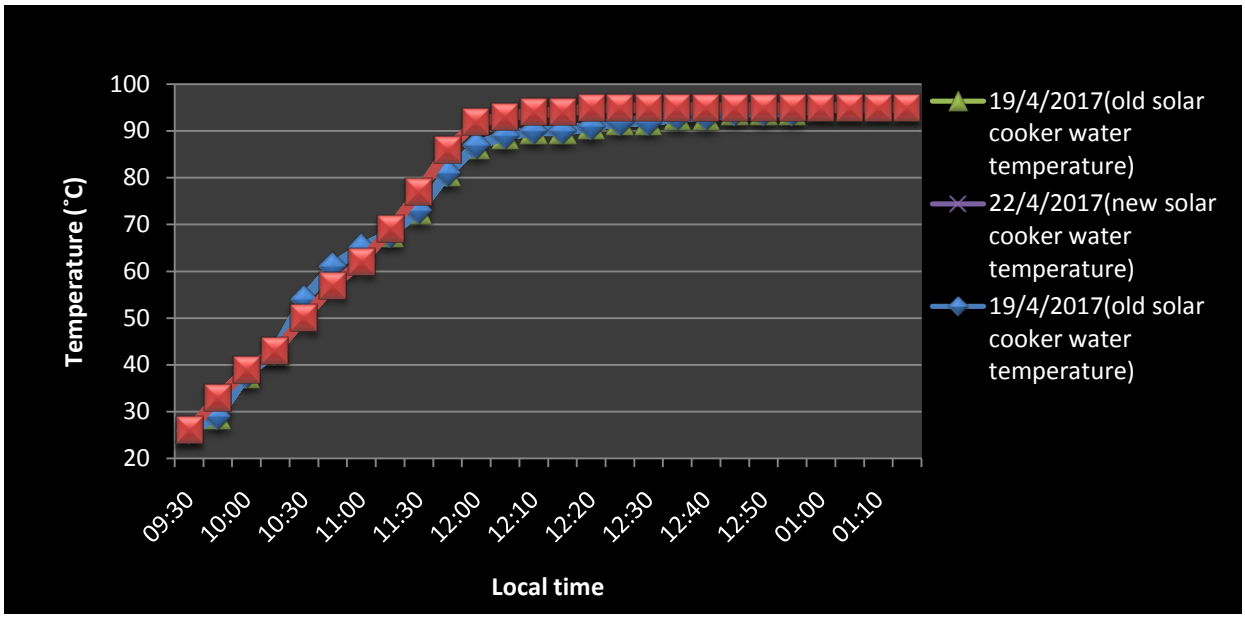

Fig 5.4: Graph comparison between water temperatures dated on 19/4/17 and 22/4/17 with used Simple solar cooker and reflector type solar cooker with rounded fin absorber plate Respective

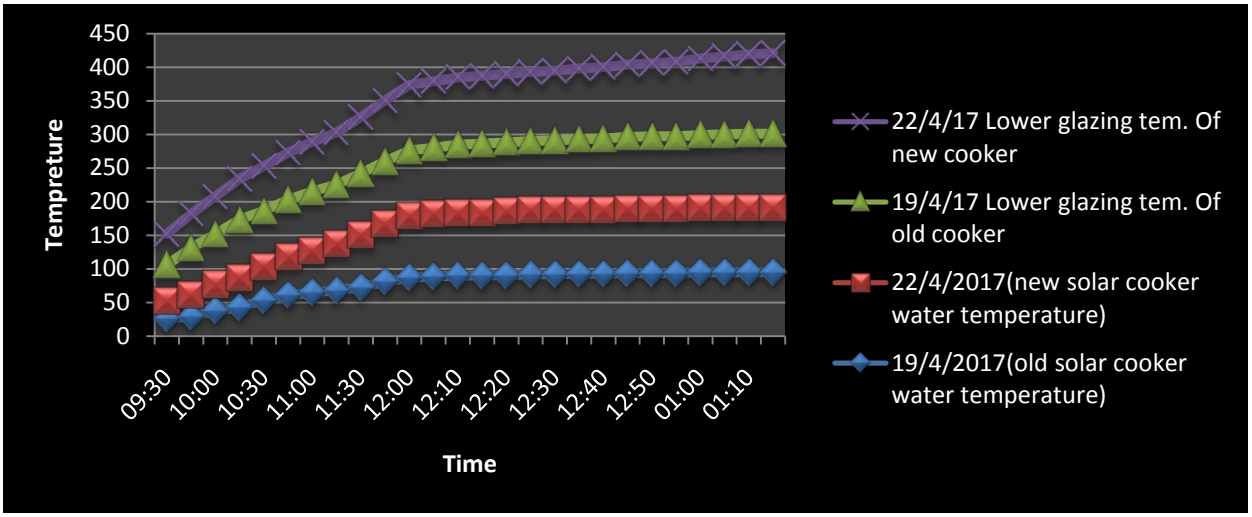

Fig5.5: Graph comparison between lower glazing and water temperature dated on 19/4/17 and 22/4/17 with used simple solar cooker and reflector type solar cooker with rounded fin Absorber plate respectively

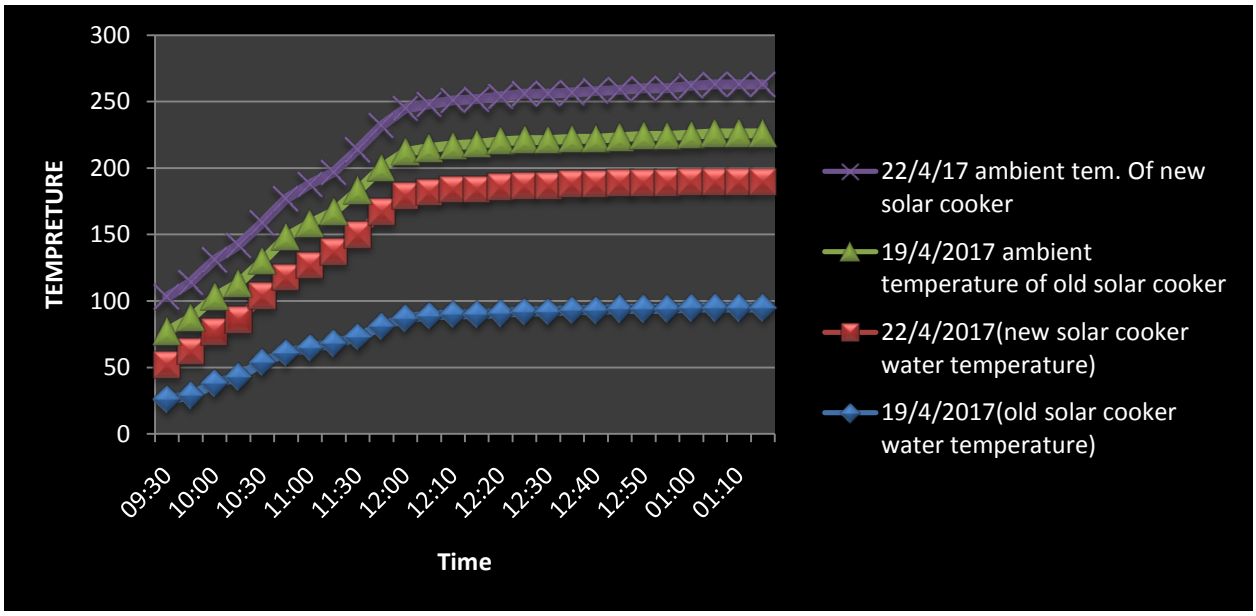

Fig 5.6: Graph comparison between ambient and water temperature dated on 19/4/17 and 22/4/17 With used simple solar cooker and reflector type solar cooker with rounded fin absorber plate Respectively

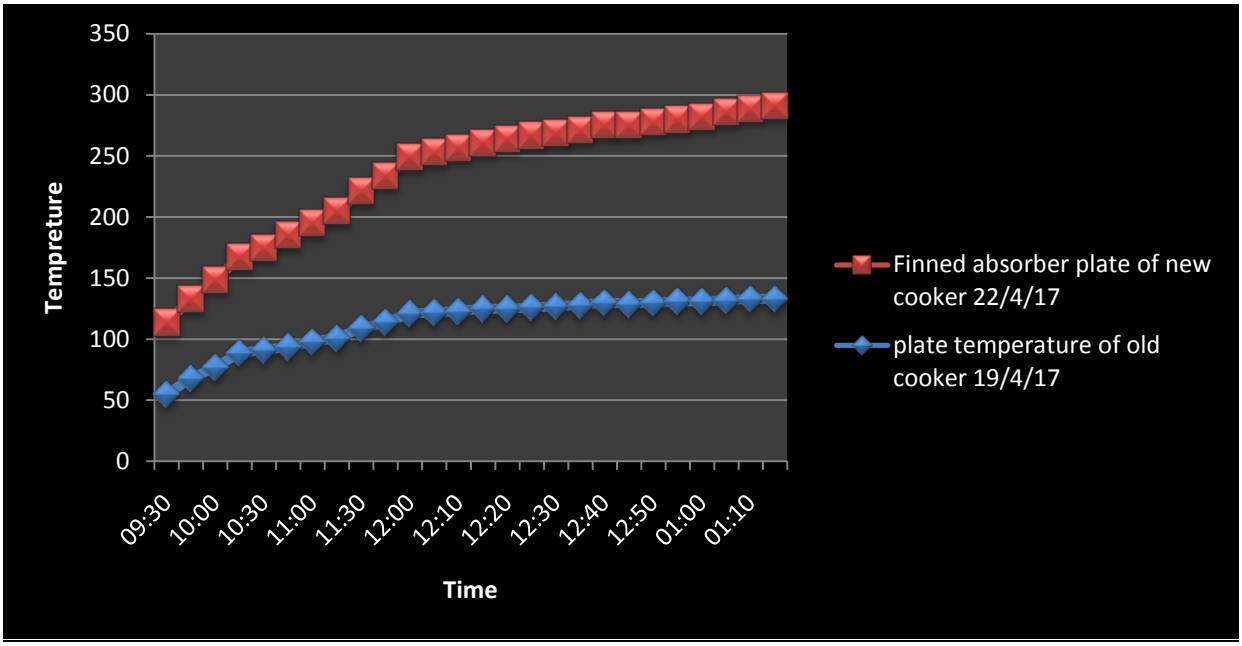

Fig.5.7: Graph comparison between simple plate and rounded fin absorber plate temperature dated on 19/4/17 and 22/4/17 with used simple solar cooker and reflector type solar cooker with Rounded fin absorber plate respectively

VI. CONCLUSION AND FUTURE SCOPE OF WORK

6.1 Conclusion:

1) The result of two tests revealed that5.2 kg of water was raised to 95 °C in 170 and 210 minutes for reflector solar cooker with f rounded absorber plate and without reflector with simple absorber plate respectively and also average solar radiation available on 19/4/17 is 838 W/m^2 and on 22/4/17 is 833 W/m^2 for reflector solar cooker with round rounded fin absorber plate and without reflector with simple absorber plate respectively.

2) The time reduced for boiling of water was 19% and cooking power was increased 24.75%.

3) The performance of the solar cooker has met the standard set by the Bureau of Indian Standards for solar cookers.

4) The Performance has revealed that cooking time can be reduced by using a for reflector solar cooker with round rounded fin absorber plate.

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