

Original Article

***In-vitro, in-silico, and in-vivo studies of Cardamine hirsuta Linn as potential antidiabetic agent in a rat model***

Aqna Malik<sup>1</sup>, Ali Sharif<sup>\*2</sup>, Hafiz Muhammad Zubair<sup>3</sup>, Bushra Akhtar<sup>4</sup>, Aisha Mobashar<sup>5</sup>

1. Department of Pharmacology, Faculty of Pharmacy, The University of Lahore, 54000 Pakistan  
[insharahbatool@yahoo.com](mailto:insharahbatool@yahoo.com)
2. Department of Pharmacology, Faculty of Pharmacy, The University of Lahore, 54000 Pakistan  
[alisharif.pharmacist@gmail.com](mailto:alisharif.pharmacist@gmail.com), 0345-7440663
3. Department of Pharmacology, Faculty of Pharmacy, The University of Lahore, 54000, Pakistan  
[Muhhammad.zubair@pharm.uol.edu.pk](mailto:Muhhammad.zubair@pharm.uol.edu.pk)
4. Department of Pharmacy, University of Agriculture Faisalabad, 38000, Pakistan  
[bushra.akhtar7@hotmail.com](mailto:bushra.akhtar7@hotmail.com)
5. Department of Pharmacology, Faculty of Pharmacy, The University of Lahore, 54000 Pakistan  
[aishamobashar@gmail.com](mailto:aishamobashar@gmail.com)

**\*Corresponding author**

Ali Sharif

Department of Pharmacology

Faculty of Pharmacy, University of Lahore, Lahore

54000, Pakistan;

**Present Address:**

Department Of Pharmacology, Institute of Pharmacy,

Faculty of Pharmaceutical and Allied Health Sciences,

Lahore College for Women University, Lahore 54000,

Pakistan; Phone: +92 345 744 066 3

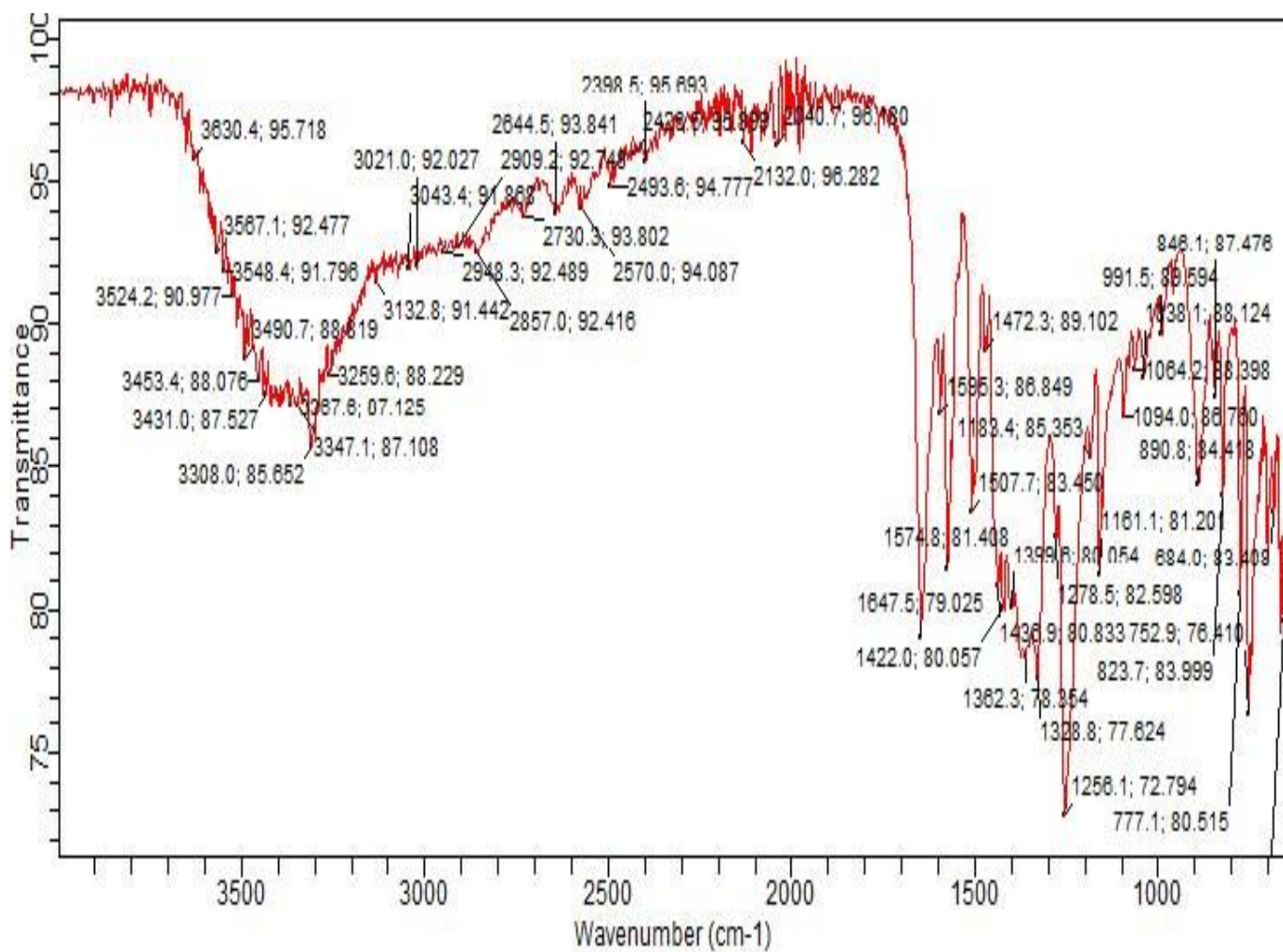
Email: [alisharif.pharmacist@gmail.com](mailto:alisharif.pharmacist@gmail.com)

**Table S1. *In vitro* Antioxidant DPPH assay**

Sr No.	Concentration( $\mu\text{g}/\text{mL}$ )	Ascorbic acid %age inhibition	Hydro-methanolic extract %age inhibition
1	1000.0	70.09	60.08
2	500.0	64.09	55.09
3	250.0	53.02	54.09
4	125.0	50.05	49.05
5	62.5	51.08	49.09
6	32.0	50.04	49.08

**Table S2. Alpha-amylase inhibitory assay:**

Sr No.	Concentration( $\mu\text{g}/\text{mL}$ )	Alpha amylase %age inhibition	Hydro-methanolic extract %age inhibition
1	0.	14.280000	12.160000
2	10.	18.180000	18.290000
3	20.	25.900000	28.510000
4	40.	36.060000	44.420000
5	60.	52.350000	61.460000
6	80.	70.800000	82.434300



**Figure S1. Fourier-Transform Infrared Spectroscopy (FTIR) Analysis**

**Table S3. Drug-likeness properties analyses of top 3 phytocompounds.**

Properties	Mulberrofuran M	Quercetin-3-(6 <sup>''</sup> -caffeoylsophoroside)
Mass	590.5299	788.6567
LogP	6.7570	-1.0392
HBA	10	20
HBD	4	12
PSA	159.8000	336.1900
RO5	2	3
Atoms	66	92
Rings	8	6

**Table S4. Water intake ml/day/100g**

<b>DAY 0</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
	8.55	9	6.225	7.44	8	8
	6.15	11.05	6.525	7.44	10.08	6.24
	4.725	11.62	6.48	6	10.62	6.56
	4.35	10.5	5.6	6.64	11.52	8.55
	5.25	14.25	7.68	7.68	11.8	9.09
<b>Mean</b>	<b>5.81</b>	<b>11.3</b>	<b>6.5</b>	<b>7.04</b>	<b>10.4</b>	<b>7.69</b>
<b>Std. Deviation</b>	<b>1.68</b>	<b>1.92</b>	<b>0.755</b>	<b>0.702</b>	<b>1.51</b>	<b>1.24</b>
<b>Std. Error of Mean</b>	<b>0.75</b>	<b>0.86</b>	<b>0.338</b>	<b>0.314</b>	<b>0.675</b>	<b>0.556</b>
<b>DAY 30th before STZ induction</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
	8.775	10.2	8.25	10.08	12.6	9.9

	6.75	12.35	8.175	12	11.88	9.075
	6.3	14.42	8.56	11.36	12.5	8.25
	4.875	15	8	10.24	13.7	8.8
	4.5	15.75	9.12	10.4	13	8.88
<b>Mean</b>	<b>6.24</b>	<b>13.5</b>	<b>8.42</b>	<b>10.8</b>	<b>12.7</b>	<b>8.98</b>
<b>Std. Deviation</b>	<b>1.7</b>	<b>2.26</b>	<b>0.44</b>	<b>0.828</b>	<b>0.672</b>	<b>0.598</b>
<b>Std. Error of Mean</b>	<b>0.761</b>	<b>1.01</b>	<b>0.197</b>	<b>0.37</b>	<b>0.3</b>	<b>0.267</b>
<b>Day 32<sup>th</sup> (Day 3<sup>rd</sup>) post STZ induction</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
	9.45	16.8	13.5	15.52	18.9	17.46
	7.875	17.55	13.95	15.84	19	17.28
	7.8	16.8	15.04	15.92	17.5	15.36
	7.875	18	14.08	15.84	18	16.48
	5.025	16.8	15.2	16.8	13.6	18.72
<b>Mean</b>	<b>7.61</b>	<b>17.2</b>	<b>14.4</b>	<b>16</b>	<b>17.4</b>	<b>17.1</b>
<b>Std. Deviation</b>	<b>1.6</b>	<b>0.557</b>	<b>0.734</b>	<b>0.481</b>	<b>2.21</b>	<b>1.24</b>
<b>Std. Error of Mean</b>	<b>0.716</b>	<b>0.249</b>	<b>0.328</b>	<b>0.215</b>	<b>0.99</b>	<b>0.556</b>
<b>Day 47<sup>th</sup> (Day 15<sup>th</sup>) post STZ&amp; during treatment with hydro-</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>

<b>methanolic extract of <i>Cardamine Hirsuta</i></b>						
	10.125	14.4	18.075	15.6	19	18.72
	9	14.43	16.65	15.44	19.3	21.4
	8.925	15.4	18	14.96	18	18.1
	8.4	16.35	19.2	16.08	18.5	18.54
	5.625	15	20.64	16	18.5	16.8
<b>Mean</b>	<b>8.42</b>	<b>15.1</b>	<b>18.5</b>	<b>15.6</b>	<b>18.7</b>	<b>18.7</b>
<b>Std. Deviation</b>	<b>1.68</b>	<b>0.806</b>	<b>1.49</b>	<b>0.454</b>	<b>0.503</b>	<b>1.68</b>
<b>Std. Error of Mean</b>	<b>0.752</b>	<b>0.361</b>	<b>0.668</b>	<b>0.203</b>	<b>0.225</b>	<b>0.751</b>
<b>Day 60th</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
	12	22.32	20.925	22.41	23.5	22
	10.125	26	20.775	22.5	22.2	21.4
	10.5	27.3	21.28	22.59	22	23.3
	9.375	16.2	22.16	20.52	22	21.4
	6.75	22.8	22.96	21.15	17.84	21.8
<b>Mean</b>	<b>9.75</b>	<b>22.9</b>	<b>21.6</b>	<b>21.8</b>	<b>21.5</b>	<b>22</b>
<b>Std. Deviation</b>	<b>1.93</b>	<b>4.31</b>	<b>0.922</b>	<b>0.941</b>	<b>2.14</b>	<b>0.782</b>
<b>Std. Error of Mean</b>	<b>0.863</b>	<b>1.93</b>	<b>0.412</b>	<b>0.421</b>	<b>0.959</b>	<b>0.35</b>

**Table S5. Fasting Blood Glucose (FBG) mg/dl**

Groups	DAY 0	Animals on HFD-Diet		Day 0 STZ Induction	Day 3 STZ Induction	During hydro-methanolic extract of Cardamine Hirsuta treatment	
		DaY 1 HFD-Diet	DAY30 <sup>th</sup>	DAY31 <sup>st</sup>	DAY32 <sup>nd</sup>	Day 47th (Day 15th) post STZ	DAY60 <sup>th</sup>
HFD-STD							
<b>R1</b>	111	111	116	118	227	129	85
<b>R2</b>	90	92	93	100	475	125	85
<b>R3</b>	110	119	122	130	459	257	75
<b>R4</b>	118	117	116	120	475	125	82
<b>R5</b>	113	114	113	<b>125</b>	460	200	97
<b>Mean</b>	<b>108</b>	<b>111</b>	<b>112</b>	<b>119</b>	<b>419</b>	<b>167</b>	84.8
<b>Std. Deviation</b>	<b>10.7</b>	<b>10.8</b>	<b>11.1</b>	<b>11.4</b>	<b>108</b>	<b>59.5</b>	7.95
<b>Std. Error of Mean</b>	<b>4.8</b>	<b>4.84</b>	<b>4.97</b>	<b>5.1</b>	<b>48.2</b>	<b>26.6</b>	3.56
HFD-STZ-125mg/kg							
<b>R1</b>	112	112	111	120	274	126	83
<b>R2</b>	114	114	113	123	309	328	97
<b>R3</b>	115	115	116	118	352	325	127
<b>R4</b>	110	110	112	125	108	176	99
<b>R5</b>	111	110	115	130	458	325	205
<b>Mean</b>	<b>112.4</b>	<b>112.2</b>	<b>113.4</b>	<b>123</b>	<b>300</b>	<b>256</b>	<b>122</b>
<b>Std. Deviation</b>	<b>2.074</b>	<b>2.28</b>	<b>2.074</b>	<b>4.66</b>	<b>128</b>	<b>97.5</b>	<b>49</b>

<b>Std. Error of Mean</b>	<b>0.9274</b>	<b>1.02</b>	<b>0.9274</b>	<b>2.08</b>	<b>57.1</b>	<b>43.6</b>	<b>21.9</b>
<b>HFD-STZ-250mg/kg</b>							
<b>R1</b>	111	111	110	123	225	166	85
<b>R2</b>	120	120	122	130	411	115	87
<b>R3</b>	117	117	118	126	325	133	85
<b>R4</b>	118	119	119	127	456	414	120
<b>R5</b>	115	115	115	131	450	300	85
<b>Mean</b>	<b>116</b>	<b>116</b>	<b>117</b>	<b>127</b>	<b>373</b>	<b>226</b>	<b>92.4</b>
<b>Std. Deviation</b>	<b>3.42</b>	<b>3.58</b>	<b>4.55</b>	<b>3.21</b>	<b>98.1</b>	<b>128</b>	<b>15.5</b>
<b>Std. Error of Mean</b>	<b>1.53</b>	<b>1.6</b>	<b>2.03</b>	<b>1.44</b>	<b>43.9</b>	<b>57.2</b>	<b>6.91</b>
<b>HFD-STZ-500mg/kg</b>							
<b>R1</b>	105	105	106	122	220	113	79
<b>R2</b>	99	99	100	119	221	83	75
<b>R3</b>	97	97	99	115	205	103	74
<b>R4</b>	114	112	113	120	356	90	73
<b>R5</b>	111	111	112	119	325	109	70
<b>Mean</b>	<b>105</b>	<b>105</b>	<b>106</b>	<b>119</b>	<b>265</b>	<b>99.6</b>	<b>74.2</b>
<b>Std. Deviation</b>	<b>7.36</b>	<b>6.8</b>	<b>6.52</b>	<b>2.55</b>	<b>69.7</b>	<b>12.7</b>	<b>3.27</b>
<b>Std. Error of Mean</b>	<b>3.29</b>	<b>3.04</b>	<b>2.92</b>	<b>1.14</b>	<b>31.2</b>	<b>5.69</b>	<b>1.46</b>



<b>HFD-STZ</b>							
<b>R1</b>	112	112	111	115	434	455	480
<b>R2</b>	114	114	115	125	426	425	500
<b>R3</b>	115	115	117	130	429	478	478
<b>R4</b>	110	110	112	129	466	420	452
<b>R5</b>	109	108	105	132	489	412	430
<b>Mean</b>	<b>112</b>	<b>112</b>	<b>112</b>	<b>126</b>	<b>449</b>	<b>438</b>	<b>468</b>
<b>Std. Deviation</b>	<b>2.55</b>	<b>2.86</b>	<b>4.58</b>	<b>6.76</b>	<b>27.6</b>	<b>27.6</b>	<b>27.2</b>
<b>Std. Error of Mean</b>	<b>1.14</b>	<b>1.28</b>	<b>2.05</b>	<b>3.02</b>	<b>12.3</b>	<b>12.4</b>	<b>12.2</b>
<b>NC</b>							
<b>R1</b>	102	102	103	84	102	102	101
<b>R2</b>	105	105	102	105	105	104	72
<b>R3</b>	91	91	94	91	88	91	104
<b>R4</b>	112	112	113	112	112	112	105
<b>R5</b>	110	110	114	110	110	79	116
<b>Mean</b>	<b>104</b>	<b>104</b>	<b>105</b>	<b>100</b>	<b>103</b>	<b>97.6</b>	<b>99.6</b>
<b>Std. Deviation</b>	<b>8.28</b>	<b>8.28</b>	<b>8.35</b>	<b>12.3</b>	<b>9.48</b>	<b>12.8</b>	<b>16.4</b>
<b>Std. Error of Mean</b>	<b>3.7</b>	<b>3.7</b>	<b>3.73</b>	<b>5.5</b>	<b>4.24</b>	<b>5.73</b>	<b>7.35</b>

**Table S6. Fasting Insulin  $\mu$ U/ ml**

	<b>GROUPS</b>					
<b>DAY 0</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD-STZ-500mg/kg</b>	<b>HFD-STZ-250mg/kg</b>	<b>HFD-STZ-125mg/kg</b>
<b>R1</b>	22.38	19.4	16.3	17.9	15.3	15.3
<b>R2</b>	23	18.5	17.7	18.3	20.7	22.7
<b>R3</b>	21	19.6	15.2	16.5	20.2	21.2
<b>R4</b>	22.9	17.3	15.5	20.6	22.5	21.5
<b>R5</b>	21.5	16.5	16.6	15.7	20.6	20.6
<b>Mean</b>	<b>22.2</b>	<b>18.3</b>	<b>16.3</b>	<b>17.8</b>	<b>19.9</b>	<b>20.3</b>
<b>Std. Deviation</b>	<b>0.878</b>	<b>1.34</b>	<b>0.986</b>	<b>1.88</b>	<b>2.7</b>	<b>2.88</b>
<b>Std. Error of Mean</b>	<b>0.393</b>	<b>0.599</b>	<b>0.441</b>	<b>0.843</b>	<b>1.21</b>	<b>1.29</b>
<b>DAY 30<sup>th</sup> Before STZ induction</b>	<b>Animals on HFD-Diet</b>					
<b>R1</b>	22.38	62.05	61.02	63.2	65	71.4
<b>R2</b>	23	80.021	79.04	74	79.2	75.6
<b>R3</b>	21	78.04	75.01	75.02	78.02	73.2
<b>R4</b>	22.9	65.2	69.2	76.2	74.02	71.2
<b>R5</b>	21.5	79.02	71.4	76.3	74.3	74.5
<b>Mean</b>	<b>22.2</b>	<b>72.9</b>	<b>71.1</b>	<b>72.9</b>	<b>74.1</b>	<b>73.2</b>
<b>Std. Deviation</b>	<b>0.878</b>	<b>8.54</b>	<b>6.78</b>	<b>5.53</b>	<b>5.57</b>	<b>1.92</b>
<b>Std. Error of Mean</b>	<b>0.393</b>	<b>3.82</b>	<b>3.03</b>	<b>2.47</b>	<b>2.49</b>	<b>0.857</b>
<b>DAY32nd 3rd day post STZ induction</b>						
<b>R1</b>	21	13.4	12.3	11.9	10.3	15.3
<b>R2</b>	23	12.5	13.7	11.3	10.7	14.7
<b>R3</b>	20	14.6	14.2	11.5	10.2	13.2
<b>R4</b>	22.9	13.3	15.5	11.6	10.5	11.5
<b>R5</b>	20	12.5	16.6	11.7	10.6	10.6

<b>Mean</b>	<b>21.4</b>	<b>13.3</b>	<b>14.5</b>	<b>11.6</b>	<b>10.5</b>	<b>13.1</b>
<b>Std. Deviation</b>	<b>1.49</b>	<b>0.862</b>	<b>1.66</b>	<b>0.224</b>	<b>0.207</b>	<b>2.01</b>
<b>Std. Error of Mean</b>	<b>0.667</b>	<b>0.385</b>	<b>0.741</b>	<b>0.1</b>	<b>0.0927</b>	<b>0.9</b>
DAY 60th						
<b>R1</b>	21.27	6.45	12.8	13.29	12.2	8.21
<b>R2</b>	19.2	6.54	12.6	14.9	11.9	8.3
<b>R3</b>	20.3	6.55	13.8	14.8	10	8.2
<b>R4</b>	20.6	6.9	14	15.4	12.5	8.9
<b>R5</b>	18.5	6.3	12.7	13.9	12.9	8.5
<b>Mean</b>	<b>19</b>	<b>6.55</b>	<b>13.2</b>	<b>14.5</b>	<b>11.9</b>	<b>8.42</b>
<b>Std. Deviation</b>	<b>0.817</b>	<b>0.665</b>	<b>0.221</b>	<b>0.848</b>	<b>1.12</b>	<b>0.293</b>
<b>Std. Error of Mean</b>	<b>0.365</b>	<b>0.297</b>	<b>0.0988</b>	<b>0.379</b>	<b>0.503</b>	<b>0.131</b>

**Table S7. Hemoglobin A1C (HbA1C%)**

<b>HbA1C%</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD- 500mg/kg</b>	<b>HFD- 250mg/kg</b>	<b>HFD- 125mg/kg</b>
<b>R1</b>	6.43	14.73	7.32	8.6	8.6	14.76
<b>R2</b>	4.33	15.6	7.65	10.2	13.2	14.7
<b>R3</b>	4.32	15.7	7.33	11.4	13.3	13
<b>R4</b>	4.31	15.2	8.2	9.4	13	13.1
<b>R5</b>	6.37	15.9	8.1	8.2	13.7	13.4
<b>Mean</b>	<b>5.15</b>	<b>15.4</b>	<b>7.72</b>	<b>9.56</b>	<b>12.4</b>	<b>13.8</b>
<b>Std.Dev</b>	<b>1.14</b>	<b>0.465</b>	<b>0.416</b>	<b>1.28</b>	<b>2.12</b>	<b>0.869</b>
<b>Std. Error of Mean</b>	<b>0.51</b>	<b>0.186</b>	<b>0.208</b>	<b>0.574</b>	<b>0.947</b>	<b>0.389</b>

Biochemical analysis

Table S8. Lipid Profile

Triglycerides (mg/dL)	NC	HFD- STZ	HFD- STD	HFD-STZ CH 500mg/kg	HFD-STZ CH 250mg/kg	HFD-STZ CH 125mg/kg
R1	21.5	173	43.2	45.3	46.3	48.9
R2	36.76	156.3	44.5	45.9	46.5	47.9
R3	29.3	170.2	40.3	44.3	46	47.3
R4	35.2	172.5	41.1	44.2	45.9	47.2
R5	40.2	169.8	42.5	43.6	47.6	46.5
<b>Mean</b>	<b>32.6</b>	<b>168</b>	<b>42.3</b>	<b>44.7</b>	<b>46.5</b>	<b>47.6</b>
<b>Std. Deviation</b>	<b>7.35</b>	<b>6.88</b>	<b>1.67</b>	<b>0.924</b>	<b>0.68</b>	<b>0.899</b>
<b>Std. Error of Mean</b>	<b>3.29</b>	<b>3.08</b>	<b>0.746</b>	<b>0.413</b>	<b>0.304</b>	<b>0.402</b>
<b>Total Cholesterol (TC)</b>						
R1	72.7	186.7	82.87	109.4	115.4	119.4
R2	79.92	187.7	83.2	110.2	116.2	120.2
R3	78.2	185.9	80.1	111.3	117.3	118.3
R4	70.2	186.3	81.2	112.4	114.4	120.4
R5	75.3	188.7	81.5	100.2	114.2	118.2
<b>Mean</b>	<b>75.3</b>	<b>187</b>	<b>81.8</b>	<b>109</b>	<b>116</b>	<b>119</b>
<b>Std. Deviation</b>	<b>3.95</b>	<b>1.13</b>	<b>1.27</b>	<b>4.88</b>	<b>1.29</b>	<b>1.03</b>
<b>Std. Error of Mean</b>	<b>1.77</b>	<b>0.508</b>	<b>0.568</b>	<b>2.18</b>	<b>0.576</b>	<b>0.46</b>
<b>High Density Lipoproteins HDL (mg/dL)</b>						
R1	38.69	26	39.8	36.5	32.89	28.2
R2	42.7	27	37.5	37.9	33.76	29.2
R3	43.7	25.3	39.9	36.5	32.9	30.5

<b>R4</b>	40.2	24.9	38.5	35.5	32.5	29.9
<b>R5</b>	39.7	23.7	38.4	35.9	32.1	27.5
<b>Mean</b>	<b>41</b>	<b>25.4</b>	<b>38.8</b>	<b>36.5</b>	<b>32.8</b>	<b>29.1</b>
<b>Std. Deviation</b>	<b>2.11</b>	<b>1.23</b>	<b>1.02</b>	<b>0.91</b>	<b>0.615</b>	<b>1.22</b>
<b>Std. Error of Mean</b>	<b>0.945</b>	<b>0.551</b>	<b>0.455</b>	<b>0.407</b>	<b>0.275</b>	<b>0.546</b>
<b>Low Density Lipoproteins LDL (mg/dL)</b>						
<b>R1</b>	16.8	126.7	38.35	40.78	48.7	50.9
<b>R2</b>	13.76	96.4	38.2	39.8	47.6	49.7
<b>R3</b>	20.7	120.9	37.6	38.5	44.5	50.2
<b>R4</b>	24.8	119	37.9	40.2	45.3	49.3
<b>R5</b>	23.7	98.7	37.2	39.9	46.7	48.4
<b>Mean</b>	<b>20</b>	<b>112</b>	<b>37.9</b>	<b>39.8</b>	<b>46.6</b>	<b>49.7</b>
<b>Std. Deviation</b>	<b>4.65</b>	<b>13.8</b>	<b>0.464</b>	<b>0.839</b>	<b>1.7</b>	<b>0.941</b>
<b>Std. Error of Mean</b>	<b>2.08</b>	<b>6.18</b>	<b>0.207</b>	<b>0.375</b>	<b>0.759</b>	<b>0.421</b>
<b>Very Low Lipoproteins VLDL (mg/dL)</b>						
<b>R1</b>	27.76	34	24.76	26.9	30.9	32.3
<b>R2</b>	27.79	35.4	23.5	25.9	29.8	32.7
<b>R3</b>	27.4	34.2	24	26.3	29.4	31.9
<b>R4</b>	26.9	35.2	24.7	26.1	30.7	33.4
<b>R5</b>	26.5	33.1	23.9	25.9	29.4	32.9
<b>Mean</b>	<b>27.3</b>	<b>34.4</b>	<b>24.2</b>	<b>26.2</b>	<b>30</b>	<b>32.6</b>
<b>Std. Deviation</b>	<b>0.561</b>	<b>0.939</b>	<b>0.543</b>	<b>0.415</b>	<b>0.716</b>	<b>0.573</b>
<b>Std. Error of Mean</b>	<b>0.251</b>	<b>0.42</b>	<b>0.243</b>	<b>0.185</b>	<b>0.32</b>	<b>0.256</b>

**Table S9. Liver Function Tests (LFTs)**

<b>ALT (U/L)</b>	<b>NC</b>	<b>HFD-STZ</b>	<b>HFD-STD</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>R1</b>	14.2	20.9	117	22.8	25.3	28.2
<b>R2</b>	17.2	21.2	117	23.5	25.4	29.6
<b>R3</b>	10.3	22.4	119	23.8	26.3	28.5
<b>R4</b>	19.3	21.9	116	24.9	24.2	29.6
<b>R5</b>	20.2	20.1	115	23.4	23.2	28.7
<b>Mean</b>	<b>16.2</b>	<b>21.3</b>	<b>117</b>	<b>23.7</b>	<b>24.9</b>	<b>28.9</b>
<b>Std. Deviation</b>	<b>4.04</b>	<b>0.892</b>	<b>1.48</b>	<b>0.773</b>	<b>1.2</b>	<b>0.646</b>
<b>Std. Error of Mean</b>	<b>1.81</b>	<b>0.399</b>	<b>0.663</b>	<b>0.346</b>	<b>0.536</b>	<b>0.289</b>
<b>ALP (U/L)</b>						
<b>R1</b>	83	87	247	85.4	90.5	120.5
<b>R2</b>	79.6	89.6	322.7	81.4	96.2	127.9
<b>R3</b>	78.9	106.7	386	80.6	90.5	115.2
<b>R4</b>	88.5	119.7	355.7	90.4	95.2	120.6
<b>R5</b>	85.3	116.7	267.5	90.5	94.5	124.6
<b>Mean</b>	<b>83.1</b>	<b>104</b>	<b>316</b>	<b>85.7</b>	<b>93.4</b>	<b>122</b>
<b>Std. Deviation</b>	<b>4</b>	<b>15.1</b>	<b>58.4</b>	<b>4.74</b>	<b>2.7</b>	<b>4.79</b>
<b>Std. Error of Mean</b>	<b>1.79</b>	<b>6.75</b>	<b>26.1</b>	<b>2.12</b>	<b>1.21</b>	<b>2.14</b>
<b>AST (U/L)</b>						
<b>R1</b>	59.7	65.8	235	66.9	67.8	79.5
<b>R2</b>	59.8	71.9	165.7	72.2	74.3	77.6
<b>R3</b>	55.2	70.2	145.7	74.9	75	79.5
<b>R4</b>	65.5	69.3	155.6	70.5	74.3	78.6
<b>R5</b>	54.3	60.9	125.6	69.7	71.2	77.4
<b>Mean</b>	<b>58.9</b>	<b>67.6</b>	<b>166</b>	<b>70.8</b>	<b>72.5</b>	<b>78.5</b>
<b>Std. Deviation</b>	<b>4.47</b>	<b>4.37</b>	<b>41.6</b>	<b>2.97</b>	<b>3.02</b>	<b>1</b>

<b>Std. Error of Mean</b>	<b>2</b>	<b>1.95</b>	<b>18.6</b>	<b>1.33</b>	<b>1.35</b>	<b>0.449</b>
---------------------------	----------	-------------	-------------	-------------	-------------	--------------

**Table S10. Serum Urea and Creatinine (mg/dl).**



<b>Serum Urea (mg/dl)</b>	<b>NC</b>	<b>HFD- STZ</b>	<b>HFD- STD</b>	<b>HFD-STZ CH 500mg/kg</b>	<b>HFD-STZ CH 250mg/kg</b>	<b>HFD-STZ CH 125mg/kg</b>
<b>R1</b>	26.1	65	30.1	35.4	40.5	45.9
<b>R2</b>	20.21	78	30.2	36.7	41.5	44.5
<b>R3</b>	23.7	79	31.5	38.9	42.4	46
<b>R4</b>	23.2	80	32.6	37.2	41.5	45.9
<b>R5</b>	25.3	50	35.6	36.9	41	44.8
<b>Mean</b>	<b>23.7</b>	<b>70.4</b>	<b>32</b>	<b>37</b>	<b>41.4</b>	<b>45.4</b>
<b>Std.Dev</b>	<b>2.28</b>	<b>12.9</b>	<b>2.26</b>	<b>1.26</b>	<b>0.705</b>	<b>0.712</b>
<b>Std. Error of Mean</b>	<b>1.02</b>	<b>5.78</b>	<b>1.01</b>	<b>0.562</b>	<b>0.315</b>	<b>0.318</b>
<b>Serum Creatinine (mg/dl)</b>						
<b>R1</b>	0.4	0.67	0.43	0.49	0.5	0.53
<b>R2</b>	0.41	0.75	0.43	0.48	0.55	0.54
<b>R3</b>	0.42	0.69	0.44	0.47	0.51	0.52
<b>R4</b>	0.42	0.63	0.45	0.46	0.52	0.54
<b>R5</b>	0.41	0.76	0.42	0.45	0.5	0.53
<b>Mean</b>	<b>0.412</b>	<b>0.7</b>	<b>0.434</b>	<b>0.47</b>	<b>0.516</b>	<b>0.532</b>
<b>Std.Dev</b>	<b>0.00837</b>	<b>0.0548</b>	<b>0.0114</b>	<b>0.0158</b>	<b>0.0207</b>	<b>0.00837</b>
<b>Std. Error of Mean</b>	<b>0.00374</b>	<b>0.0245</b>	<b>0.0051</b>	<b>0.00707</b>	<b>0.00927</b>	<b>0.00374</b>

**Table S11.Liver and Muscle Glycogen (mg/g)**

<b>Liver Glycogen (mg/g)</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD- 500mg/kg</b>	<b>HFD- 250mg/kg</b>	<b>HFD- 125mg/kg</b>
R1	16.126	11.18	10.17	10	9.5	7.591
R2	<b>17.18</b>	11.09	10.15	9.8	9.6	7.5
R3	17	16.98	15.12	10.5	9.3	7.4
R4	16.98	14.96	10.15	10.6	9.25	6.98
R5	16.99	12.9	10.99	10.67	9.1	7.34
<b>Mean</b>	<b>16.9</b>	<b>13.4</b>	<b>7.36</b>	<b>11.3</b>	<b>10.3</b>	<b>9.35</b>
<b>Std. Deviation</b>	<b>0.416</b>	<b>2.54</b>	<b>0.234</b>	<b>2.16</b>	<b>0.389</b>	<b>0.2</b>
<b>Std. Error of Mean</b>	<b>0.186</b>	<b>1.13</b>	<b>0.105</b>	<b>0.965</b>	<b>0.174</b>	<b>0.0894</b>
<b>Muscle Glycogen (mg/g)</b>						
R1	1.51	0.9783	0.439	0.5	0.6854	0.01
R2	<b>1.52</b>	1	0.534	0.4	0.98	0.1
R3	1	1	0.675	0.3	0.76	0.2
R4	0.99	0.976	0.345	0.34	0.96	0.1
R5	0.98	0.943	0.234	0.2	0.91	0.09
<b>Mean</b>	<b>1.2</b>	<b>0.979</b>	<b>0.1</b>	<b>0.348</b>	<b>0.859</b>	<b>0.445</b>
<b>Std. Deviation</b>	<b>0.288</b>	<b>0.0234</b>	<b>0.0675</b>	<b>0.112</b>	<b>0.13</b>	<b>0.17</b>
<b>Std. Error of Mean</b>	<b>0.129</b>	<b>0.0105</b>	<b>0.0302</b>	<b>0.05</b>	<b>0.058</b>	<b>0.076</b>

The relative weight of organs (liver, pancreas, and kidney)

Table S12. Relative Weight of Organs (liver, pancreas, and kidney)

Tissue	Groups					
<b>Pancreas (g)</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
R1	1.5	0.8	0.45	0.66	0.66	0.59
R2	<b>1.57</b>	0.89	0.46	0.69	0.7	0.6
R3	1.45	0.99	0.5	0.67	0.61	0.61
R4	1.05	0.87	0.51	0.68	0.63	0.59
R5	1.02	0.92	0.48	0.65	0.62	0.58
<b>Mean</b>	<b>1.32</b>	<b>0.894</b>	<b>0.48</b>	<b>0.692</b>	<b>0.644</b>	<b>0.594</b>
<b>Std. Deviation</b>	<b>0.262</b>	<b>0.0695</b>	<b>0.0255</b>	<b>0.0421</b>	<b>0.0365</b>	<b>0.0114</b>
<b>Std. Error of Mean</b>	<b>0.117</b>	<b>0.0311</b>	<b>0.0114</b>	<b>0.0188</b>	<b>0.0163</b>	<b>0.0051</b>
<b>Liver (g)</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
R1	12.43	12.44	7.45	11.37	11.9	11.82
R2	12.45	12.81	7.89	12.01	11.2	10.2
R3	13	12.05	7.99	12	11.13	11
R4	12.9	12.09	7.88	11.57	11.89	11
R5	12.34	12.34	7.87	12.06	12.02	11.8
<b>Mean</b>	<b>12.6</b>	<b>12.3</b>	<b>7.82</b>	<b>11.8</b>	<b>11.6</b>	<b>11.2</b>
<b>Std. Deviation</b>	<b>0.303</b>	<b>0.307</b>	<b>0.21</b>	<b>0.312</b>	<b>0.426</b>	<b>0.674</b>
<b>Std. Error of Mean</b>	<b>0.135</b>	<b>0.137</b>	<b>0.094</b>	<b>0.14</b>	<b>0.191</b>	<b>0.301</b>
<b>Kidney (g)</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
R1	1.04	0.64	0.52	<b>0.97</b>	<b>0.91</b>	<b>0.89</b>
R2	1.04	<b>1.15</b>	0.59	1.02	0.89	0.76
R3	1.03	1.16	0.48	0.96	0.87	0.84

R4	1.09	1.16	0.53	1.04	0.84	0.83
R5	1.08	1.07	0.68	0.96	0.9	0.72
<b>Mean</b>	<b>1.06</b>	<b>1.04</b>	<b>0.56</b>	<b>0.99</b>	<b>0.882</b>	<b>0.808</b>
<b>Std. Deviation</b>	<b>0.027</b>	<b>0.225</b>	<b>0.0778</b>	<b>0.0374</b>	<b>0.0277</b>	<b>0.0676</b>
<b>Std. Error of Mean</b>	<b>0.0121</b>	<b>0.1</b>	<b>0.0348</b>	<b>0.0167</b>	<b>0.0124</b>	<b>0.0302</b>
<b>Relative weight of Liver</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
R1	5.685	4.45519713	7.45	4.995983936	5.063829787	5.628571429
R2	6.03517588	4.49458484	7.811881188	5.124	5.045045045	4.927536232
R3	5.73762376	4.88721805	7.99	5.298804781	5.059090909	5.365853659
R4	5.84343434	4.65703971	7.801980198	5.302631579	5.404545455	5.392156863
R5	8.31724138	4.29965157	7.87	5.25106383	5.390134529	5.514018692
<b>Mean</b>	<b>6.3237</b>	<b>4.5587</b>	<b>7.7848</b>	<b>5.1945</b>	<b>5.1925</b>	<b>5.3656</b>
<b>Std. Deviation</b>	<b>1.1224</b>	<b>0.22334</b>	<b>0.20155</b>	<b>0.13243</b>	<b>0.18716</b>	<b>0.26636</b>
<b>Std. Error of Mean</b>	<b>0.50197</b>	<b>0.099881</b>	<b>0.090135</b>	<b>0.059224</b>	<b>0.083702</b>	<b>0.11912</b>
<b>Relative weight of Pancreas</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
R1						
R2	0.75	0.286738351	0.455445545	0.265060241	0.280851064	0.280952381
R3	0.788944724	0.321299639	0.5	0.276	0.315315315	0.289855072
R4	0.717821782	0.372180451	0.504950495	0.266932271	0.277272727	0.299019608
R5	0.53030303	0.314079422	0.48	0.298245614	0.286363636	0.275700935
R5	0.703448276	0.320557491	0.5	0.276595745	0.278026906	0.271028037
<b>Mean</b>	<b>0.698</b>	<b>0.323</b>	<b>0.488</b>	<b>0.277</b>	<b>0.288</b>	<b>0.283</b>
<b>Std. Deviation</b>	<b>0.0994</b>	<b>0.0309</b>	<b>0.0206</b>	<b>0.0132</b>	<b>0.0159</b>	<b>0.0112</b>
<b>Std. Error of Mean</b>	<b>0.0445</b>	<b>0.0138</b>	<b>0.00922</b>	<b>0.0059</b>	<b>0.00712</b>	<b>0.00502</b>
<b>Relative weight of Kidney</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>

R1	0.52	0.229390681	0.72	0.389558233	0.387234043	0.423809524
R2	0.522613065	0.415162455	0.643564356	0.408	0.400900901	0.367149758
R3	0.50990099	0.436090226	0.66	0.38247012	0.395454545	0.411764706
R4	0.550505051	0.418772563	0.574257426	0.456140351	0.381818182	0.387850467
R5	0.744827586	0.3728223	0.62	0.404255319	0.403587444	0.336448598
<b>Mean</b>	<b>0.57</b>	<b>0.374</b>	<b>0.644</b>	<b>0.408</b>	<b>0.394</b>	<b>0.385</b>
<b>Std. Deviation</b>	<b>0.0991</b>	<b>0.0844</b>	<b>0.0536</b>	<b>0.0288</b>	<b>0.00916</b>	<b>0.035</b>
<b>Std. Error of Mean</b>	<b>0.0443</b>	<b>0.0377</b>	<b>0.0239</b>	<b>0.0129</b>	<b>0.0041</b>	<b>0.0157</b>

**Table S13. Urine volume ml /day/100g**

	<b>Groups</b>					
<b>DAY 0</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
R1	3.7962	2.7639	2.4975	3.0969	3.33	3.33
R2	2.7306	2.8971	2.8305	3.0969	3.7296	2.5974
R3	2.0979	2.6973	2.7639	2.4975	3.9294	2.7306
R4	1.9314	2.331	2.331	2.7639	4.2624	3.1635
R5	2.331	3.1968	3.1635	3.1968	3.9294	3.3633
<b>Mean</b>	<b>2.58</b>	<b>2.78</b>	<b>2.72</b>	<b>2.93</b>	<b>3.84</b>	<b>3.04</b>
<b>Std. Deviation</b>	<b>0.744</b>	<b>0.315</b>	<b>0.321</b>	<b>0.292</b>	<b>0.342</b>	<b>0.352</b>
<b>Std. Error of Mean</b>	<b>0.333</b>	<b>0.141</b>	<b>0.143</b>	<b>0.131</b>	<b>0.153</b>	<b>0.157</b>
<b>DAY30th Animals on HFD-Diet</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
R1	5.08	6.4	6.84	7.4	7.48	7.8
R2	4.16	7.16	6.32	7.12	7.52	7.88
R3	4.2	7.2	7	7.8	6.8	7.96
R4	3.8	7	6.6	7.56	7.08	8.32
R5	2.8	7.4	7.4	7.96	6.64	8.52
<b>Mean</b>	<b>4.01</b>	<b>7.03</b>	<b>6.83</b>	<b>7.57</b>	<b>7.1</b>	<b>8.1</b>
<b>Std. Deviation</b>	<b>0.823</b>	<b>0.381</b>	<b>0.408</b>	<b>0.33</b>	<b>0.395</b>	<b>0.309</b>
<b>Std. Error of Mean</b>	<b>0.368</b>	<b>0.17</b>	<b>0.183</b>	<b>0.148</b>	<b>0.176</b>	<b>0.138</b>
<b>Day 32nd (Day 3rd) post STZ induction</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
R1	4.329	9	9.352	9.4	9.45	9.7
R2	3.4965	9.3	9.018	9.25	9.5	9.6

R3	3.5298	9.4	10.02	9.5	8.75	9.6
R4	3.4965	8.8	8.016	9.5	9	10.3
R5	2.4975	9.5	7.4816	10	8.5	10.4
<b>Mean</b>	<b>3.47</b>	<b>9.2</b>	<b>8.778</b>	<b>9.53</b>	<b>9.04</b>	<b>9.92</b>
<b>Std. Deviation</b>	<b>0.6497</b>	<b>0.2915</b>	<b>1.024</b>	<b>0.282</b>	<b>0.435</b>	<b>0.3962</b>
<b>Std. Error of Mean</b>	<b>0.2906</b>	<b>0.1304</b>	<b>0.4578</b>	<b>0.1261</b>	<b>0.1946</b>	<b>0.1772</b>
<b>Day 60th</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
R1	5.328	8.37	10.78	8.715	8.225	7.35
R2	4.4955	8.31	12.18	8.75	7.77	7.245
R3	4.662	7.98	11.13	8.785	7.7	7.175
R4	4.1625	8.31	11.2	7.98	7.7	7.14
R5	3.33	8.61	10.29	8.225	7.805	7.49
<b>Mean</b>	<b>4.396</b>	<b>8.316</b>	<b>11.12</b>	<b>8.491</b>	<b>8.96</b>	<b>8.736</b>
<b>Std. Deviation</b>	<b>0.7315</b>	<b>0.2249</b>	<b>0.6954</b>	<b>0.3659</b>	<b>0.2514</b>	<b>0.1706</b>
<b>Std. Error of Mean</b>	<b>0.3271</b>	<b>0.1006</b>	<b>0.311</b>	<b>0.1636</b>	<b>0.1124</b>	<b>0.0763</b>

**Table S14. Urine Creatinine (mg/dl)**

<b>DAY 0</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	97.32	91.2	91.2	97.4	94.2	80
<b>R2</b>	95.2	94	91.5	95.2	96.2	95
<b>R3</b>	96.3	93.2	92	99.6	95	98.5
<b>R4</b>	98.2	91.2	96.3	97.4	96.1	96.2
<b>R5</b>	97.5	90.5	95	98.6	96.5	94.2
<b>Mean</b>	<b>96.9</b>	<b>92.02</b>	<b>93.2</b>	<b>97.64</b>	<b>95.6</b>	<b>92.78</b>
<b>Std. Deviation</b>	<b>1.17</b>	<b>1.497</b>	<b>2.301</b>	<b>1.646</b>	<b>0.967</b>	<b>7.326</b>
<b>Std. Error of Mean</b>	<b>0.5233</b>	<b>0.6696</b>	<b>1.029</b>	<b>0.7359</b>	<b>0.4324</b>	<b>3.276</b>
<b>DAY30th before STZ induction</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	97.32	91.2	91.2	97.4	94.2	80
<b>R2</b>	95.2	95.2	91.5	95.2	96.2	95
<b>R3</b>	96.3	91.2	93	97.4	95	98.5
<b>R4</b>	98.2	91.2	96.3	97.4	96.1	94.2
<b>R5</b>	97.5	90.5	95	98.6	95.2	94.2
<b>Mean</b>	<b>96.9</b>	<b>91.9</b>	<b>93.4</b>	<b>97.2</b>	<b>95.3</b>	<b>92.4</b>
<b>Std. Deviation</b>	<b>1.17</b>	<b>1.89</b>	<b>2.21</b>	<b>1.23</b>	<b>0.829</b>	<b>7.15</b>
<b>Std. Error of Mean</b>	<b>0.523</b>	<b>0.846</b>	<b>0.989</b>	<b>0.551</b>	<b>0.371</b>	<b>3.2</b>
<b>DAY32th Day 3 (Post STZ Induction)</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	96.32	81	16.2	16.2	15.2	16.2
<b>R2</b>	95.2	85	17.3	17.3	17.3	17.3
<b>R3</b>	96.3	82	15.5	15.2	15.5	14.5
<b>R4</b>	97.2	84	14.8	14.8	14.8	16.8
<b>R5</b>	97.5	83	18.2	19.2	18.2	15.2



<b>Mean</b>	<b>96.5</b>	<b>83</b>	<b>16.4</b>	<b>16.5</b>	<b>16.2</b>	<b>16</b>
<b>Std. Deviation</b>	<b>0.902</b>	<b>1.58</b>	<b>1.37</b>	<b>1.77</b>	<b>1.47</b>	<b>1.15</b>
<b>Std. Error of Mean</b>	<b>0.403</b>	<b>0.707</b>	<b>0.611</b>	<b>0.793</b>	<b>0.658</b>	<b>0.513</b>
<b>Day 60th</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	96.32	84.2	16.2	67.2	41.2	32.5
<b>R2</b>	95.2	83.01	17.3	65.3	45.6	31.5
<b>R3</b>	96.3	81.2	15.5	66.1	44.2	40.2
<b>R4</b>	97.2	85.5	14.8	69.2	48.9	41.5
<b>R5</b>	97.5	83.2	18.2	70.1	50.1	37.5
<b>Mean</b>	<b>96.5</b>	<b>83.4</b>	<b>16.4</b>	<b>67.6</b>	<b>46</b>	<b>36.6</b>
<b>Std. Deviation</b>	<b>0.902</b>	<b>1.59</b>	<b>1.37</b>	<b>2.03</b>	<b>3.59</b>	<b>4.49</b>
<b>Std. Error of Mean</b>	<b>0.403</b>	<b>0.71</b>	<b>0.611</b>	<b>0.909</b>	<b>1.61</b>	<b>2.01</b>

**Table S15. Urinary Urea: (mg/dl)**

<b>DAY 0</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD- STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD- STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	2.79	2.77	2.77	2.77	2.77	2.77
<b>R2</b>	2.9	2.74	2.74	2.74	2.74	2.74
<b>R3</b>	2.8	2.68	2.68	2.65	2.66	2.67
<b>R4</b>	2.74	2.65	2.65	2.69	2.64	2.63
<b>R5</b>	2.87	2.64	2.64	2.64	2.64	2.64
<b>Mean</b>	<b>2.82</b>	<b>2.7</b>	<b>2.7</b>	<b>2.7</b>	<b>2.69</b>	<b>2.69</b>
<b>Std. Deviation</b>	<b>0.0644</b>	<b>0.0568</b>	<b>0.0568</b>	<b>0.0563</b>	<b>0.0608</b>	<b>0.062</b>
<b>Std. Error of Mean</b>	<b>0.0288</b>	<b>0.0254</b>	<b>0.0254</b>	<b>0.0252</b>	<b>0.0272</b>	<b>0.0277</b>
<b>DAY 30th before STZ induction</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD- STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD- STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>

<b>R1</b>	2.74	2.69	2.78	2.71	2.71	2.71
<b>R2</b>	2.71	2.7	2.71	2.74	2.74	2.72
<b>R3</b>	2.73	2.74	2.7	2.75	2.71	2.75
<b>R4</b>	2.72	2.76	2.74	2.78	2.78	2.74
<b>R5</b>	2.71	2.73	2.73	2.74	2.73	2.74
<b>Mean</b>	<b>2.72</b>	<b>2.72</b>	<b>2.73</b>	<b>2.74</b>	<b>2.73</b>	<b>2.73</b>
<b>Std. Deviation</b>	<b>0.013</b>	<b>0.0288</b>	<b>0.0311</b>	<b>0.0251</b>	<b>0.0288</b>	<b>0.0164</b>
<b>Std. Error of Mean</b>	<b>0.00583</b>	<b>0.0129</b>	<b>0.0139</b>	<b>0.0112</b>	<b>0.0129</b>	<b>0.00735</b>
<b>Day 32nd (Day 3rd) post STZ induction</b>	NC	<b>HFD-STD</b>	<b>HFD- STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD- STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	2.74	0.61	0.63	0.63	0.64	0.62
<b>R2</b>	2.5	0.62	0.62	0.64	0.62	0.62
<b>R3</b>	2.73	0.67	0.64	0.64	0.67	0.66
<b>R4</b>	2.72	0.64	0.64	0.65	0.64	0.74
<b>R5</b>	2.71	0.68	0.68	0.66	0.61	0.68
<b>Mean</b>	<b>2.68</b>	<b>0.644</b>	<b>0.642</b>	<b>0.644</b>	<b>0.636</b>	<b>0.664</b>
<b>Std. Deviation</b>	<b>0.101</b>	<b>0.0305</b>	<b>0.0228</b>	<b>0.0114</b>	<b>0.023</b>	<b>0.0498</b>
<b>Std. Error of Mean</b>	<b>0.0453</b>	<b>0.0136</b>	<b>0.0102</b>	<b>0.0051</b>	<b>0.0103</b>	<b>0.0223</b>
<b>DAY 47th ( DAY 15th after STZ induction)</b>	NC	<b>HFD-STD</b>	<b>HFD- STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD- STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	2.74	0.62	1.65	1	0.78	0.63
<b>R2</b>	2.5	0.63	1.55	1.5	0.74	0.68
<b>R3</b>	2.73	0.69	1.8	1.4	0.75	0.7
<b>R4</b>	2.72	0.66	1.9	1.3	0.98	0.74
<b>R5</b>	2.71	0.67	2	1.2	0.99	0.8
<b>Mean</b>	<b>2.68</b>	<b>0.654</b>	<b>1.78</b>	<b>1.28</b>	<b>0.848</b>	<b>0.71</b>
<b>Std. Deviation</b>	<b>0.101</b>	<b>0.0288</b>	<b>0.182</b>	<b>0.192</b>	<b>0.126</b>	<b>0.064</b>
<b>Std. Error of Mean</b>	<b>0.0453</b>	<b>0.0129</b>	<b>0.0815</b>	<b>0.086</b>	<b>0.0563</b>	<b>0.0286</b>

<b>Day 60th</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 125mg/kg</b>
<b>R1</b>	2.74	0.65	2.36	2	1.98	1.74
<b>R2</b>	2.5	0.58	2.35	2.24	1.88	1.75
<b>R3</b>	2.73	0.61	2.4	2.17	1.78	1.78
<b>R4</b>	2.72	0.71	2.41	2.12	1.91	1.72
<b>R5</b>	2.71	0.69	2.38	2.14	1.89	1.71
<b>Mean</b>	<b>2.68</b>	<b>0.648</b>	<b>2.38</b>	<b>2.13</b>	<b>1.89</b>	<b>1.74</b>
<b>Std. Deviation</b>	<b>0.101</b>	<b>0.054</b>	<b>0.0255</b>	<b>0.0876</b>	<b>0.0719</b>	<b>0.0274</b>
<b>Std. Error of Mean</b>	<b>0.0453</b>	<b>0.0242</b>	<b>0.0114</b>	<b>0.0392</b>	<b>0.0322</b>	<b>0.0122</b>

**Oxidative stress biomarkers**

**Table S16. MDA content (nmol/mgprot)**

<b>Tissue MDA content (nmol/mgprot)</b>	<b>NC</b>	<b>HFD- STD</b>	<b>HFD- STZ</b>	<b>HFD- 500mg/kg</b>	<b>HFD- 250mg/kg</b>	<b>HFD- 125mg/kg</b>
<b>Pancreas</b>						
<b>R1</b>	2.21	2.3	3.98	2.45	2.47	2.45
<b>R2</b>	2.23	2.3	3.98	2.45	2.5	2.45
<b>R3</b>	2.22	2.32	3.99	2.43	2.49	2.59
<b>R4</b>	2.21	2.31	3.97	2.41	2.45	2.5
<b>R5</b>	2.2	2.36	4.05	2.4	2.47	2.41
<b>Mean</b>	<b>2.21</b>	<b>2.32</b>	<b>3.99</b>	<b>2.48</b>	<b>2.48</b>	<b>2.43</b>
<b>Std. Deviation</b>	<b>0.0114</b>	<b>0.0249</b>	<b>0.0321</b>	<b>0.0693</b>	<b>0.0195</b>	<b>0.0228</b>
<b>Std. Error of Mean</b>	<b>0.0051</b>	<b>0.0111</b>	<b>0.0144</b>	<b>0.031</b>	<b>0.00872</b>	<b>0.0102</b>
<b>Liver</b>						
<b>R1</b>	3.37	3.69	5.84	3.68	3.77	3.77
<b>R2</b>	3.27	3.66	5.67	3.67	3.67	3.69
<b>R3</b>	3.3	3.56	5.69	3.69	3.74	3.74
<b>R4</b>	3.35	3.45	5.6	3.6	3.79	3.79
<b>R5</b>	3.34	3.55	4.99	3.62	3.89	3.9
<b>Mean</b>	<b>3.33</b>	<b>3.58</b>	<b>5.56</b>	<b>3.65</b>	<b>3.77</b>	<b>3.78</b>
<b>Std. Deviation</b>	<b>0.0404</b>	<b>0.0958</b>	<b>0.329</b>	<b>0.0396</b>	<b>0.0801</b>	<b>0.0779</b>
<b>Std. Error of Mean</b>	<b>0.0181</b>	<b>0.0428</b>	<b>0.147</b>	<b>0.0177</b>	<b>0.0358</b>	<b>0.0348</b>
<b>Kidney</b>						
<b>R1</b>	1.43	1.56	3.74	1.96	2.51	2.93
<b>R2</b>	1.44	1.54	3.76	1.98	2.67	2
<b>R3</b>	1.42	1.51	3.74	1.97	2.69	1.99
<b>R4</b>	1.45	1.49	3.77	1.95	3	2.32
<b>R5</b>	1.48	1.53	3.79	1.92	2.7	2.96
<b>Mean</b>	<b>1.44</b>	<b>1.53</b>	<b>3.76</b>	<b>1.96</b>	<b>2.71</b>	<b>2.44</b>
<b>Std. Deviation</b>	<b>0.023</b>	<b>0.027</b>	<b>0.0212</b>	<b>0.023</b>	<b>0.178</b>	<b>0.48</b>
<b>Std. Error of Mean</b>	<b>0.0103</b>	<b>0.0121</b>	<b>0.00949</b>	<b>0.0103</b>	<b>0.0794</b>	<b>0.215</b>

<b>Blood Serum(nmol/ml)</b>						
<b>R1</b>	2.28	2.57	5.9375	2.79	4.5	3.98
<b>R2</b>	2.28	2.98	5.6	2.99	4.3	3.99
<b>R3</b>	2.38	2.91	5.4	3.15	3.98	4.07
<b>R4</b>	2.34	2.8	5.67	3.16	4.12	3.99
<b>R5</b>	2.35	2.95	5.62	3.06	4.15	4.08
<b>Mean</b>	<b>2.33</b>	<b>2.84</b>	<b>5.65</b>	<b>3.03</b>	<b>4.21</b>	<b>4.02</b>
<b>Std. Deviation</b>	<b>0.0445</b>	<b>0.167</b>	<b>0.193</b>	<b>0.151</b>	<b>0.198</b>	<b>0.0487</b>
<b>Std. Error of Mean</b>	<b>0.0199</b>	<b>0.0745</b>	<b>0.0863</b>	<b>0.0676</b>	<b>0.0885</b>	<b>0.0218</b>

**Table S17. SOD Activity50μL(U/mg Protein)**

<b>SOD Activity 50µL (U/mg Protein)</b>	<b>NC</b>	<b>HFD- STD</b>	<b>HFD- STZ</b>	<b>HFD-STZ 500mg/kg</b>	<b>HFD-STZ 250mg/kg</b>	<b>HFD-STZ 1250mg/kg</b>
<b>R1</b>	350.7	210.7	85.9	198.05	161.2	155.08
<b>R2</b>	363.7	250.9	100.2	197.54	170.5	132.06
<b>R3</b>	350.7	223.5	110.2	214.57	166.8	123.05
<b>R4</b>	309.2	245.5	90.28	207.24	155	144.07
<b>R5</b>	310.5	275.5	11.9	200.7	165.2	121.09
<b>Mean</b>	<b>337</b>	<b>241</b>	<b>79.7</b>	<b>204</b>	<b>164</b>	<b>135</b>
<b>Std. Deviation</b>	<b>25.3</b>	<b>25.2</b>	<b>39</b>	<b>7.24</b>	<b>5.92</b>	<b>14.4</b>
<b>Std. Error of Mean</b>	<b>11.3</b>	<b>11.3</b>	<b>17.5</b>	<b>3.24</b>	<b>2.65</b>	<b>6.44</b>
<b>R1</b>	315.2	306.32	127.33	278.9	250.2	235.3
<b>R2</b>	396.91	307.6	123.89	265.09	245.2	255.1
<b>R3</b>	352.6	309.41	177.8	287.9	223.3	200.6
<b>R4</b>	389.27	370.16	178.5	352.6	256.3	19035
<b>R5</b>	390.2	350.16	150.32	386.9	259.6	167.08
<b>Mean</b>	<b>369</b>	<b>329</b>	<b>152</b>	<b>314</b>	<b>247</b>	<b>210</b>
<b>Std. Deviation</b>	<b>34.7</b>	<b>29.6</b>	<b>26.3</b>	<b>52.7</b>	<b>14.3</b>	<b>35.3</b>
<b>Std. Error of Mean</b>	<b>15.5</b>	<b>13.2</b>	<b>11.8</b>	<b>23.6</b>	<b>6.4</b>	<b>15.8</b>
<b>R1</b>	280.53	218.97	87.92	203.4	95.8	88.21
<b>R2</b>	283.89	236.9	65.9	241.03	90.3	83.7
<b>R3</b>	300.09	220.07	64.1	188.03	85.6	82.6
<b>R4</b>	290.36	223.6	70.5	224.6	95.3	78.5
<b>R5</b>	290.6	252.6	70.6	198.7	92.6	89.6
<b>Mean</b>	<b>289</b>	<b>230</b>	<b>71.8</b>	<b>211</b>	<b>91.9</b>	<b>84.5</b>
<b>Std. Deviation</b>	<b>7.5</b>	<b>14.3</b>	<b>9.45</b>	<b>21.4</b>	<b>4.17</b>	<b>4.47</b>
<b>Std. Error of Mean</b>	<b>3.36</b>	<b>6.4</b>	<b>4.23</b>	<b>9.55</b>	<b>1.86</b>	<b>2</b>
<b>R1</b>	300.96	298.93	142.51	288.6	228.6	174.86
<b>R2</b>	312.8	299.9	141.46	279.8	245	123
<b>R3</b>	380.9	300.8	131.2	300.8	250.8	194.6

<b>R4</b>	286.5	287.6	135.6	280.65	229.7	165.6
<b>R5</b>	285.5	277.6	139.6	275.5	267.9	144.6
<b>Mean</b>	<b>313</b>	<b>293</b>	<b>138</b>	<b>285</b>	<b>244</b>	<b>161</b>
<b>Std. Deviation</b>	<b>39.4</b>	<b>10.1</b>	<b>4.66</b>	<b>9.98</b>	<b>16.3</b>	<b>27.6</b>
<b>Std. Error of Mean</b>	<b>17.6</b>	<b>4.53</b>	<b>2.08</b>	<b>4.47</b>	<b>7.28</b>	<b>12.4</b>

**Table S18. T.AOC Activity U/mg**

<b>T.AOC Activity (U/mg)</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>Tissue</b>						
<b>Pancreas</b>						
<b>R1</b>	2.76	2.56	0.9	2.51	2.02	1.23
<b>R2</b>	2.8	2.53	1.2	2.4	2.1	1.25
<b>R3</b>	2.83	2.59	1.3	2.47	2.11	1.67
<b>R4</b>	2.85	2.45	0.89	2.5	2.34	1.3
<b>R5</b>	2.81	2.5	1.4	2.52	2.4	1.27
<b>Mean</b>	<b>2.81</b>	<b>2.526</b>	<b>1.138</b>	<b>2.48</b>	<b>2.194</b>	<b>1.344</b>
<b>Std. Deviation</b>	<b>0.0339</b>	<b>0.05413</b>	<b>0.2329</b>	<b>0.04848</b>	<b>0.1658</b>	<b>0.1841</b>
<b>Std. Error of Mean</b>	<b>0.0152</b>	<b>0.02421</b>	<b>0.1041</b>	<b>0.02168</b>	<b>0.07414</b>	<b>0.08232</b>
<b>Liver</b>						
<b>R1</b>	3.36	2.32	1.6	2.61	2.12	2.02
<b>R2</b>	3.39	2.14	1.4	2.45	2.13	2.05
<b>R3</b>	3.56	2.39	1.3	2.53	2.22	1.98
<b>R4</b>	3.45	2.45	1.23	2.59	2.17	1.86
<b>R5</b>	3.65	2.56	1.09	2.56	2.15	1.71
<b>Mean</b>	<b>3.48</b>	<b>2.37</b>	<b>1.32</b>	<b>2.55</b>	<b>2.16</b>	<b>1.92</b>
<b>Std. Deviation</b>	<b>0.121</b>	<b>0.157</b>	<b>0.191</b>	<b>0.0626</b>	<b>0.0396</b>	<b>0.14</b>

<b>Std. Error of Mean</b>	<b>0.0542</b>	<b>0.0701</b>	<b>0.0855</b>	<b>0.028</b>	<b>0.0177</b>	<b>0.0625</b>
<b>Kidney</b>						
<b>R1</b>	2.4	1.7	0.4822	1.5	0.32	1.59
<b>R2</b>	2.5	2.09	0.47	1.56	1.32	1.24
<b>R3</b>	2.56	1.76	0.43	1.532	1.25	1.02
<b>R4</b>	2.55	2.09	0.44	1.532	1.2	1.09
<b>R5</b>	2.32	1.89	0.47	1.576	1.02	1.07
<b>Mean</b>	<b>2.47</b>	<b>1.91</b>	<b>0.458</b>	<b>1.54</b>	<b>1.02</b>	<b>1.2</b>
<b>Std. Deviation</b>	<b>0.103</b>	<b>0.181</b>	<b>0.0223</b>	<b>0.0293</b>	<b>0.408</b>	<b>0.232</b>
<b>Std. Error of Mean</b>	<b>0.0462</b>	<b>0.0812</b>	<b>0.00995</b>	<b>0.0131</b>	<b>0.182</b>	<b>0.104</b>
<b>Blood Serum(nmol/ml)</b>						
<b>R1</b>	95.805	69.106	23.014	56.24U/ml	56.795	46.188
<b>R2</b>	95.805	79.1066	23.014	57.288	56.425	45.2
<b>R3</b>	83	88.366	23.014	56	50.3	46.6
<b>R4</b>	83.225	79.106	23.754	55.5	56.425	47.8
<b>R5</b>	71.237	77.2	26.0233	56.24U/ml	57.288	46.7
<b>Mean</b>	<b>78.6</b>	<b>85.8</b>	<b>23.8</b>	<b>56.3</b>	<b>55.4</b>	<b>46.5</b>
<b>Std. Deviation</b>	<b>6.86</b>	<b>10.3</b>	<b>1.3</b>	<b>0.652</b>	<b>2.9</b>	<b>0.939</b>
<b>Std. Error of Mean</b>	<b>3.07</b>	<b>4.62</b>	<b>0.583</b>	<b>0.292</b>	<b>1.3</b>	<b>0.42</b>

**Table S19. Serum G6PD Conc. %**

<b>Serum G6PD Conc. %</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>R1</b>	88%	80%	24%	79	69%	65%
<b>R2</b>	80%	84%	25%	78	70%	67%
<b>R3</b>	85%	83%	26%	80	72%	69%
<b>R4</b>	80%	79%	27%	77	71%	68%
<b>R5</b>	84%	83%	25%	81	73%	66%



<b>Mean</b>	<b>83.4</b>	<b>81.8</b>	<b>25.4</b>	<b>79</b>	<b>71</b>	<b>67</b>
<b>Std. Deviation</b>	<b>3.44</b>	<b>2.17</b>	<b>1.14</b>	<b>1.58</b>	<b>1.58</b>	<b>1.58</b>
<b>Std. Error of Mean</b>	<b>1.54</b>	<b>0.97</b>	<b>0.51</b>	<b>0.707</b>	<b>0.707</b>	<b>0.707</b>

**Table S20. GSH-ST Activity (U/mg protein)**

<b>GSH-ST Activity (U/mg protein)</b>	<b>NC</b>	<b>HFD- STD</b>	<b>HFD- STZ</b>	<b>HFD- 500mg/kg</b>	<b>HFD- 250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>Pancreas</b>	8.276	6.5356	4.19	5.312	5.234	5
<b>R1</b>	8.2	6	4.09	5.98	5.3	5.09
<b>R2</b>	8.9	6.7	4.12	5.99	5.4	5.03
<b>R3</b>	8.45	6.43	4.13	5.91	5.1	5.07
<b>R4</b>	8.56	6.234	4.19	5.9	5.8	4.78
<b>R5</b>	8.43	6.123	4.15	5.44	5.3	5.01
<b>Mean</b>	<b>8.47</b>	<b>6.34</b>	<b>4.15</b>	<b>5.76</b>	<b>5.36</b>	<b>5</b>
<b>Std. Deviation</b>	<b>0.247</b>	<b>0.265</b>	<b>0.0399</b>	<b>0.299</b>	<b>0.239</b>	<b>0.112</b>
<b>Std. Error of Mean</b>	<b>0.101</b>	<b>0.108</b>	<b>0.0163</b>	<b>0.122</b>	<b>0.0976</b>	<b>0.0456</b>
<b>Liver</b>						
<b>R1</b>	18.276	16.5356	4.19	15.312	15.234	12
<b>R2</b>	18.23	17	4.19	15.2	14.99	12.5
<b>R3</b>	18.45	17.32	4.2	15.32	15.02	13.5
<b>R4</b>	17.9	16.56	3.98	15.98	15.12	13.9
<b>R5</b>	17.99	16.43	4.12	15.23	15.05	14.03
<b>Mean</b>	<b>18.2</b>	<b>16.8</b>	<b>4.14</b>	<b>15.4</b>	<b>15.1</b>	<b>13.2</b>
<b>Std. Deviation</b>	<b>0.223</b>	<b>0.378</b>	<b>0.0929</b>	<b>0.324</b>	<b>0.0973</b>	<b>0.894</b>
<b>Std. Error of Mean</b>	<b>0.0996</b>	<b>0.169</b>	<b>0.0415</b>	<b>0.145</b>	<b>0.0435</b>	<b>0.4</b>
<b>Kidney</b>						
<b>R1</b>	8.276	6.5356	4.19	5.312	5.234	5
<b>R2</b>	8.7	6.9	4.3	5.98	5.43	5.4
<b>R3</b>	8.9	6.95	4.2	5.78	5.55	5.3
<b>R4</b>	9.12	6.93	4.09	5.99	5.08	5.2
<b>R5</b>	9.01	7	4.01	6	5.74	<u>5.1</u>

<b>Mean</b>	<b>8.8</b>	<b>6.86</b>	<b>4.16</b>	<b>5.81</b>	<b>5.41</b>	<b>5.2</b>
<b>Std. Deviation</b>	<b>0.332</b>	<b>0.187</b>	<b>0.111</b>	<b>0.294</b>	<b>0.259</b>	<b>0.158</b>
<b>Std. Error of Mean</b>	<b>0.149</b>	<b>0.0835</b>	<b>0.0497</b>	<b>0.132</b>	<b>0.116</b>	<b>0.0707</b>
<b>Blood Serum (U/ml)</b>	<b>NC</b>	<b>HFD- STD</b>	<b>HFD- STZ</b>	<b>HFD- 500mg/kg</b>	<b>HFD- 250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>R1</b>	6.5356	8.276	4.19	5.312	5.234	5
<b>R2</b>	9.56	8.3	3.98	6.7	5.23	5.1
<b>R3</b>	10.9	8.9	3.87	5.98	5.34	5.2
<b>R4</b>	9.7	8.23	3.45	5.14	5.32	4.98
<b>R5</b>	8.8	9.8	3	5.99	5.22	5
<b>Mean</b>	<b>9.1</b>	<b>8.7</b>	<b>3.7</b>	<b>5.82</b>	<b>5.27</b>	<b>5.06</b>
<b>Std. Deviation</b>	<b>1.62</b>	<b>0.673</b>	<b>0.474</b>	<b>0.622</b>	<b>0.0565</b>	<b>0.0932</b>
<b>Std. Error of Mean</b>	<b>0.724</b>	<b>0.301</b>	<b>0.212</b>	<b>0.278</b>	<b>0.0253</b>	<b>0.0417</b>

**Table S21. GS-PX Activity**

<b>GS-PX Activity</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>Pancreas</b>				<b>500</b>	<b>250</b>	<b>125</b>
<b>R1</b>	1206.44	1114.12	900.53	1100.03	1057.03	1092
<b>R2</b>	1115.3	1113.12	888.53	1087.03	1049.03	1093.7
<b>R3</b>	1233.43	1115.12	889.53	1110.03	1067.03	1091.5
<b>R4</b>	1099.44	1110.12	878.53	1099.03	1037.03	1092.6
<b>R5</b>	<b>1002.43</b>	<b>1111.12</b>	<b>868.53</b>	<b>1001.03</b>	<b>1095.03</b>	<b>1090.9</b>
<b>Mean</b>	<b>1131</b>	<b>1113</b>	<b>865</b>	<b>1092</b>	<b>1061</b>	<b>1079</b>
<b>Std. Deviation</b>	<b>92.13</b>	<b>2.074</b>	<b>37.42</b>	<b>1.074</b>	<b>21.95</b>	<b>44.58</b>
<b>Std. Error of Mean</b>	<b>41.2</b>	<b>0.9274</b>	<b>16.74</b>	<b>0.4802</b>	<b>9.818</b>	<b>19.94</b>
<b>Liver</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>R1</b>	559.4	544.4	308.25	507.645	443.295	457.13
<b>R2</b>	558.5	560.5	400.9	550.9	504.7	444.9
<b>R3</b>	560.9	555.5	399.8	545.3	509.6	489.6
<b>R4</b>	561.2	558.5	401.6	509.8	525.8	445.9
<b>R5</b>	560.3	559.6	387.9	555.7	535.7	456.7
<b>Mean</b>	<b>560</b>	<b>556</b>	<b>380</b>	<b>534</b>	<b>504</b>	<b>459</b>
<b>Std. Deviation</b>	<b>1.11</b>	<b>6.59</b>	<b>40.3</b>	<b>23.3</b>	<b>36</b>	<b>18.1</b>
<b>Std. Error of Mean</b>	<b>0.497</b>	<b>2.95</b>	<b>18</b>	<b>10.4</b>	<b>16.1</b>	<b>8.11</b>
<b>Kidney</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>R1</b>	<b>47.01</b>	<b>45.09</b>	<b>23.16</b>	<b>44.68</b>	<b>43.32</b>	<b>33.8</b>
<b>R2</b>	<b>45</b>	<b>44.3</b>	<b>23.15</b>	<b>40.8</b>	<b>43.1</b>	<b>38.5</b>
<b>R3</b>	<b>48.9</b>	<b>46.9</b>	<b>30.9</b>	<b>43.6</b>	<b>43.2</b>	<b>37.3</b>
<b>R4</b>	<b>47.3</b>	<b>45.9</b>	<b>25.6</b>	<b>42.7</b>	<b>42</b>	<b>33.6</b>
<b>R5</b>	<b>47.1</b>	<b>45.6</b>	<b>20.8</b>	<b>43.7</b>	<b>41.9</b>	<b>34.6</b>
<b>Mean</b>	<b>47.1</b>	<b>45.6</b>	<b>24.7</b>	<b>43.1</b>	<b>42.7</b>	<b>35.6</b>
<b>Std. Deviation</b>	<b>1.39</b>	<b>0.965</b>	<b>3.85</b>	<b>1.46</b>	<b>0.694</b>	<b>2.21</b>
<b>Std. Error of Mean</b>	<b>0.62</b>	<b>0.431</b>	<b>1.72</b>	<b>0.654</b>	<b>0.31</b>	<b>0.988</b>

<b>Blood Serum Activity</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>R1</b>	782.608	652.17	391.3	658.69	650.78	645.69
<b>R2</b>	402.72	293.52	289.28	353.65	362.71	589.9
<b>R3</b>	780.7	652.17	380.2	702.9	727.5	627.5
<b>R4</b>	690.7	652.17	367.2	687.9	654.5	580.7
<b>R5</b>	783.5	652.17	350.6	767.5	737.5	667.4
<b>Mean</b>	<b>688</b>	<b>580.4</b>	<b>355.7</b>	<b>634.1</b>	<b>626.6</b>	<b>622.2</b>
<b>Std. Deviation</b>	<b>164.4</b>	<b>160.4</b>	<b>40.12</b>	<b>161.8</b>	<b>152.9</b>	<b>36.7</b>
<b>Std. Error of Mean</b>	<b>73.5</b>	<b>71.73</b>	<b>17.94</b>	<b>72.35</b>	<b>68.37</b>	<b>16.41</b>

**Table S22. Catalase Activity (U/g protein)**

<b>Catalase Activity (U/g protein)</b>	<b>NC</b>	<b>HFD-STD</b>	<b>HFD-STZ</b>	<b>HFD-500mg/kg</b>	<b>HFD-250mg/kg</b>	<b>HFD-125mg/kg</b>
<b>Pancreas</b>						
<b>R1</b>	22.9	20.5	15.3	18.3	17.6	16.2
<b>R2</b>	21.3	19.3	14.6	18.2	17.2	16.3
<b>R3</b>	22.5	20.3	10.3	18	16	15
<b>R4</b>	20.4	19.1	12.4	18.6	17.9	16.9
<b>R5</b>	20.9	20.4	10.9	19	17.7	16.8
<b>Mean</b>	<b>21.6</b>	<b>19.9</b>	<b>12.7</b>	<b>18.4</b>	<b>17.3</b>	<b>16.2</b>
<b>Std. Deviation</b>	<b>1.06</b>	<b>0.665</b>	<b>2.21</b>	<b>0.39</b>	<b>0.76</b>	<b>0.757</b>
<b>Std. Error of Mean</b>	<b>0.475</b>	<b>0.297</b>	<b>0.986</b>	<b>0.174</b>	<b>0.34</b>	<b>0.339</b>
<b>Liver</b>						
<b>R1</b>	501.2	499.2	272.4	480.2	402.1	387.3
<b>R2</b>	471.3	471.4	256.4	470.2	410.3	400.3
<b>R3</b>	487.2	470.2	300.4	465.2	430.2	400.5

<b>R4</b>	450.3	444.3	287.5	446.3	420.5	399.7
<b>R5</b>	473.4	450.2	212.4	420.5	404.5	400
<b>Mean</b>	<b>477</b>	<b>467</b>	<b>266</b>	<b>456</b>	<b>414</b>	<b>398</b>
<b>Std. Deviation</b>	<b>19</b>	<b>21.6</b>	<b>34.1</b>	<b>23.6</b>	<b>11.7</b>	<b>5.74</b>
<b>Std. Error of Mean</b>	<b>8.51</b>	<b>9.65</b>	<b>15.3</b>	<b>10.5</b>	<b>5.24</b>	<b>2.57</b>
<b>Kidney</b>						
<b>R1</b>	58.89	55.9	24.07	55.9	53.07	50.9
<b>R2</b>	60.9	55.4	23.09	55.07	52.3	50.2
<b>R3</b>	58.5	54.9	22.1	55,8	51.9	49.6
<b>R4</b>	57.5	56.9	25.9	55,03	52.5	48.7
<b>R5</b>	58.6	57.2	23.9	55,4	52.9	42.5
<b>Mean</b>	<b>58.9</b>	<b>56.1</b>	<b>23.8</b>	<b>55.4</b>	<b>52.5</b>	<b>48.4</b>
<b>Std. Deviation</b>	<b>1.25</b>	<b>0.976</b>	<b>1.4</b>	<b>0.402</b>	<b>0.469</b>	<b>3.38</b>
<b>Std. Error of Mean</b>	<b>0.557</b>	<b>0.437</b>	<b>0.628</b>	<b>0.18</b>	<b>0.21</b>	<b>1.51</b>
<b>Hemolysate Activity (U/gHb)</b>						
<b>R1</b>	132	123	98	121	115	113
<b>R2</b>	156	130	99	125	110	100
<b>R3</b>	145	135	80	130	109	99
<b>R4</b>	210	139	97	137	112	102
<b>R5</b>	162	133	100	130	111	114
<b>Mean</b>	<b>161</b>	<b>132</b>	<b>94.8</b>	<b>129</b>	<b>111</b>	<b>106</b>
<b>Std. Deviation</b>	<b>29.7</b>	<b>6</b>	<b>8.35</b>	<b>6.02</b>	<b>2.3</b>	<b>7.3</b>
<b>Std. Error of Mean</b>	<b>13.3</b>	<b>2.68</b>	<b>3.73</b>	<b>2.69</b>	<b>1.03</b>	<b>3.26</b>

### Antioxidant Capacity

**Table: S23 Total phenolic contents (TPC)**

S.no	Absorbance of hydro-methanolic extract <i>Cardamine Hirsuta</i> (Y)	$x=(y-b)/m$
1	1.67	225.6603774
2	1.45	184.1509434
3	1.33	161.509434
		190.4402516±32.53

**Table: S24 Total flavonoid contents (TFC)**

<b>Total Flavonoids Content</b>	<b><math>R \times D.F \times V \times 100 / W</math></b>
1	4.020547945
2	4.780821918
3	3.45890411
<b><math>\mu\text{g}</math> of QE/mg of hydro-methanolic extract of <i>Cardamine hirsuta</i></b>	<b>4.086757991±0.6634</b>
R - Result obtained from the standard curve	
D.F - Dilution factor	
V - Volume of stock Solution	
100 - For 100 g dried plant	
W - Weight of plant used in the experiment	