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Synthesis of some Schiff base Derivatives using One pot Grinding Method and Its Biological activities

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ABSTRACT

In this present study, we reported the synthesis of some Schiff base derivatives by one pot grinding method from 2-hydroxy benzohydrazide and Aromatic aldehydes. NMR and IR spectroscopy were used to characterize the synthesized compounds. The antioxidant, antidiabetic and anti-inflammatory properties of the Schiff base derivatives 3(a-j) were studied. Regarding standards, all the compounds demonstrated good biological activity.

Keywords: Antiinflammatory, Schiff base, Antioxidant, Antidiabetic properties.

INTRODUCTION

In recent trends, the substituted benzohydrazide analogues is one of the most important aspect in the field of organic synthesis. The hydrazides have been employed as organic reagents for the characterization and derivatization of carbonyl compounds. In earlier the hydrazide compounds have gained very important due to their biological applications such as anti-tubercular, anti-bacterial, anti-malarial, anti-fungal and anti-inflammatory activities. It can also be used as pharmacophore agents. When amines are combined with carbonyl compounds in an acid-catalyzed condensation process, organic molecules called Schiff's bases are created. It is an important class of organic chemistry shows many biological and pharmaceutical applications [Fig. 1]. These Schiff bases are widely used as polymer stabilizers[1], catalyst, dyes and pigments and also corrosion inhibitors. Several earlier reports addressed the Schiff base biological applications and bio lubricant additives[2]. It is used as a catalyst for the fixation of carbon dioxide in atmosphere[3]. In addition to that Schiff bases are used as vitrimers[4], applications of photoactive solar energy in material chemistry[5], amodari products in carbohydrate field[6], luminescence chemo sensors[7]. It shows several biological activities like antifungal, antiviral[8], anti proliferative[9], anti-inflammatory[10] and antibacterial activity[11]. Several methods for the synthesis of Schiff bases have been reported previously, Bhagat reported the Schiff bases from salicylaldehyde and aromatic amines under microwave conditions[12], Abu-yamin synthesized schiffbases from condensation of 2-amino-6-ethoxybenzothiazole with

acrolein under reflux condition in ethanol solvent[13]. Hence, to overcome these conditions we developed a simple method for synthesis of Schiff bases from aromatic aldehydes with 2-hydroxybenzohydrazide. This method offers a variety of benefits, including easy set-up, rapid reaction times, excellent yields, and no need for an oil bath.

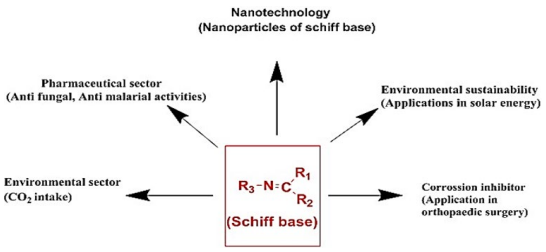

Fig. 1. Applications of Schiff base in different fields

EXPERIMENTAL

Materials and Procedures

The reagents and chemicals utilized for synthesizing of Schiff base compounds were procured from Sigma-Aldrich and used unpurified. The standard DPPH method was used for the Antioxidant studies. Anti-inflammatory action was achieved utilising the albumin denaturation method, while anti-diabetic activity was achieved using the enzyme alpha-amylase. The ^{13}C NMR & ^{1}H NMR values of Samples are characterized using a Bruker Advance 400 MHz spectrometer.

General Schiff base synthesis process

Mixture of compound1 (1eq), compound 2 (1eq) and ethanol (5 mL) was taken into mortar and pulverized with pestle for 5 minute. Pour the contents into crushed ice after the completion of reaction confirmed by Thin layer chromatography. The resultant solid was dried after being filtered apart. Pure products were produced when the solid was recrystallized from ethanol.

Spectral information on synthesized compounds (3a-j)

Compound (3a)

Yellow solids; m.p. 195-197^{0}C; (FTIR) (-OH) ν 3748 cm^{-1}; (C=O) ν and N-H 1761, 3262 cm^{-1}; ν C=N and C-H 1644, 1931 cm^{-1}; ν C=C 3075 cm^{-1}. ^{1}H NMR (400 Megahertz for $CDCl_3$) (d and J=8Hz; 1H), δ 6.86 for (H-3), 6.94-6.99 (H-1,13); 7.13 (d, J=7.60 Hertz, H-11); 7.22 (H -15); 7.25-7.29 for (H-12); 7.44 (t and J=14.8 Hertz; H-2); 7.89 (d and J=7.6 Hertz, H-6); 8.34 N=CH (H-9); 9.68ppm (H-18); 11.81ppm (-OH). ^{13}C NMR (100 Megahertz, $CDCl_3$) δ 148.78; 112.75-133.79; 164.72; 157.65; 159.00. MS(m/z); (M+) for $C_{14}H_{12}N_2O_3$; 257.

Compound (3b)

Yellow solids; m.p.205-207^{0}C, (FTIR) ν (-OH) 3745 cm^{-1}; ν N-H 3278 cm^{-1}, C=N and C-H 1605, 1910 cm^{-1}, ν C=C 3078 cm^{-1}. ^{1}H NMR (400 Megahertz $CDCl_3$) δ for 6.96 (d and J=8.8 Hertz;1H); δ 7.45 (d and J=8.0 Hertz, 1H); δ 7.91 (d and J=10.8 Hertz for 1H) for (H-12), (H-11) and (H-6) protons, 6.984-7.098 (m H-3,1), 7.29 (s, H -15); 7.83 (t, H-2); 8.34 (s, H-9); 9.38 (s, H-18); δ 10.91 (s,-OH); 3.81 (s, -OCH_3), ^{13}C NMR (100 Megahertz, $CDCl_3$) 147.25; 112.31-149.50, 165.08.150.48 and 159.42; 158.75, 56.04. MS (m/z); (M^+) for $C_{15}H_{14}N_2O_4$; 286.

Compound (3c)

Yellow solids, m.p. 150-153^{0}C, FT-IR ν (C=O) and ν N-H 1806 and 3248 cm^{-1}, ν C=N and aromatic ν C-H 1605 cm^{-1}, 1918 cm^{-1}, aromatic ν C=C 3051 cm^{-1}. ^{1}H NMR(400 Megahertz, $CDCl_3$) for δ 7.07 (d and J=8.8 Hertz, 2H); for δ 7.67 (d and J=8.4 Hertz, 2H) and 7.87 (d and J=6.8 Hertz, 1H) for ((H-14,16), (H-13,17) and (H-6); δ 7.44ppm for (s, 2H), 6.96 (t and J=12.4 Hertz, 2H) for (H-1,3); 8.43 N=CH (s, H-11); 9.38 (s, H-11), δ 11.89 (s, -OH);). ^{13}C NMR (100 Megahertz, $CDCl_3$) for δ 147.91, 116.58-159.10; 165.13; 159.10; 124.04, MS (m/z); (M+) for $C_{14}H_{11}ClN_2O_2$,274.

Compound (3d)

Yellow solids; m.p. 184-186^{0}C, (FTIR) ν (-OH) 3276 cm^{-1}, ν (C=O) 1805 cm^{-1}, ν C=N and aromatic ν for C-H 1610 and 1916 cm^{-1}, aromatic ν for C=C 3075 cm^{-1}. ^{1}H NMR(400 Megahertz, $CDCl_3$), δ for 6.97 (d and J=10.2 Hertz for 2H); for (H-3, 14), 7.41 (d, 1H) for (H-13), 7.88 (s,H-1, 17), 7.24; 7.53 (2t H-1,2), 8.37 N=CH (s, H-9), 9.38 NH (s, H-11); δ 11.77(s, -OH); δ 3.81 (s,-OCH_3). ^{13}C NMR (100 Megahertz, $CDCl_3$) for δ 147.25, 112.31-159.19, 165.09, 159.19; 151.37, 149.53; 55.91, 56.00. MS (m/z), (M+) for $C_{16}H_{16}ClN_2O_4$; 300.

Compound (3e)

Yellow solids; m.p. 216-218^{0}C; (FT-IR) ν for (-OH) 3434 cm^{-1}, ν for (N-H) 3233 cm^{-1}; ν (C=N) and aromatic ν (C-H) 1638 cm^{-1}, 1595 cm^{-1}, aromatic ν (C=C) 3085 cm^{-1}. ^{1}H NMR (400 Megahertz, $CDCl_3$). δ for 6.96 (d and J=10.2 Hertz for 2H), for (H-3, 14),

7.41 (d for 1H and 13H); 7.88 (s,H-1, 17); 7.24; 7.53 (2t, H-1,2), 8.37 N=CH (s,H-9); δ 9.38 (s, H-11), δ 11.81 (s, -OH); 3.83; 3.85 (s,-OCH_3). ^{13}C NMR (100 Megahertz , $CDCl_3$) δ 149.17, 104.99-159.02; 165.05; 159.02; 153.62; 139.81; 56.42; 60.64. MS (m/z); (M+) for $C_{17}H_{18}N_2O_5$; 330.

Compound (3f)

Yellow solids; m.p. 245-246^{0}C; (FTIR) ν for (-OH) 3432 cm^{-1}; ν for (C=O) and ν for N-H 1629 and 3248 cm^{-1}; ν for C=N and aromatic ν for C-H 1610 and 1554 cm^{-1}, aromatic ν for C=C 3068 cm^{-1}. ^{1}H NMR (400 Megahertz, $CDCl_3$) δ for 7.07 (d and J=8.8 Hertz for 2H); δ 7.67 (d and J=8.4 Hertz for 2H) and 7.87 (d and J=6.8 Hz for 1H,14H,16H), (H-13,17) and (H-6); 7.44 (s, 2H), 6.96 (t, J=12.4 Hertz, 2H) for (1H,3H), δ 8.43 N=CH (s,11H); δ 9.38 (s, 11H); δ 11.89 (s-OH). ^{13}C NMR(100 Megahertz, $CDCl_3$) δδ 147.91, 116.58-159.10; 165.13; 159.10; 124.04. MS (m/z); (M+) for $C_{14}H_{11}BrN_2O_2$; 318.

Compound (3g)

Yellow solids; m.p. 220-223^{0}C, (FTIR) ν for (-OH) 3293 cm^{-1}, ν for (C=O) and ν for N-H 1630 and 3208 cm^{-1}, ν for C=N and aromatic ν for C-H 1610 cm^{-1} and 1608 cm^{-1}, ν for C=C 3074 cm^{-1}. ^{1}H NMR (400 Megahertz, $CDCl_3$) δ for 6.98 (t and J=11.2 Hertz for 2H); for (3H,15H); δ (H-13,17); 7.32 (s,H-1,14); δ For, 7.88 (d and J=8.0 Hertz for 1H and 6H); 8.42ppm for N=CH (s,H-11); 9.38 (s, H-11), δ 11.85, (s,-OH),3.81 (s-OCH_3). ^{13}C NMR (100 Megahertz, $CDCl_3$) δ 147.25; 112.31-159.19, 165.09; 159.19, 151.37, 149.53,55.91, 56.00. MS(m/z); (M+) for $C_{15}H_{14}N_2O_3$, 271.

Compound (3h)

Yellow solids; m.p. 232-234^{0}C; (FTIR) ν for (-OH) 3433 cm^{-1}; ν for (C=O) and ν for N-H 1653 cm^{-1} and 3264 cm^{-1}, ν for C=N and aromatic ν C-H 1627 and 1610 cm^{-1} aromatic ν for C=C 3037 cm^{-1}. ^{1}H NMR (400 Megahertz, $CDCl_3$) δ for 6.98 (d and J=6.4 Hz, 2H) for (H-3,1)), 7.29, 7.44, 7.65 and 7.89ppm for (s, H-14,16), (H-2), (H-13,17) and (H-6), 8.41 N=CH (s, H-11), 9.38 (s, H-11), δ 11.80 (s, -OH) and 2.51 (s, -CH_3); δ ^{13}C NMR (100 Megahertz, $CDCl_3$) δ 149.39, 116.43-159.19, 165.16, 159.19, 140.81, 21.50; MS(m/z); (M+) for $C_{15}H_{14}N_2O_2$, 254.

Compound (3i)

Yellow solids; m.p. 282-283^{0}C; (FTIR) ν (C=O) and ν -OH 1629 and 3249 cm^{-1}; ν for C=N and aromatic ν for C-H 1629 and 1811 cm^{-1}; aromatic ν for C=C 3055 cm^{-1}. ^{1}H NMR (400 Megahertz, $CDCl_3$)δ 6.98 (d and J=6.4 Hertz, 2H) for (H-3,1); 7.29; 7.44; 7.65 and 7.89ppm for (s, H-14,16); (s, H-2); (s, H-13,17) and (H-6); 8.32 N=CH (s, H-12); 10.91 (s, H-9); δ 11.63 (s, -OH) and 2.99 (s, -CH_3). ^{13}C NMR (100 Megahertz, $CDCl_3$) δ 149.39; 116.43-159.19; 165.16; 159.19; 140.81; 21.50ppm. MS(m/z); (M+) for $C_{16}H_{17}N_3O_2$; 284.

Compound (3j)

Yellow solids; m.p. 282-283^{0}C; (FTIR) ν for (-OH) 3252 cm^{-1}; ν for (C=O) 1653 cm^{-1}; ν for C=N and aromatic ν for C-H 1628 and 1610 cm^{-1}, ν for C=C 3036 cm^{-1}; ^{1}H NMR (400 Megahertz, $CDCl_3$) δ for 6.98 (d and J=9.2 Hertz, 1H); δ 7.02 (d and J=8.0 Hertz, 2H); δ for 7.69 (d and J=8.0 Hertz, 2H) and 7.89 (d and J=6.8 Hertz for1H); for ((H-3); (H-15,17); (H-14,18) and (H-6); 8.40 (s, H-12); 10.91 (s, H-9); δ 11.95 (s, -OH); δ for 1.35 (t and J=6.8 Hertz, 3H) (-CH_3) and (-CH_2) proton and 4.08 (m, 2H). ^{13}C NMR (100 Megahertz, $CDCl_3$) δ for ^{13}C NMR 149.39; 116.43-159.19; 165.16; 159.19; 140.81; 21.50. MS(m/z); (M+) for $C_{16}H_{16}N_2O_2$; 284.

Table 1: Name of the synthesized compounds

S. No	Name of the Compound	Compound ID
1	2-Hydroxybenzoic acid (3-hydroxybenzylidine) hydrazide	3a
2	2-Hydroxy-benzoic acid (3-Hydroxy 4-methoxy benzylidine) hydrazide	3b
3	2-Hydroxy - benzoic acid (4-Chloro benzylidine) hydrazide	3c
4	2-Hydroxy benzoic acid (3, 4-Dimethoxybenzylidine) hydrazide	3d
5	2-Hydroxy benzoic acid (3, 4, 5-Timethoxybenzylidine) hydrazide	3e
6	2-Hydroxy benzoic acid (4-Bromo benzylidine)-Hydrazide	3f
7	2-Hydroxy benzoic acid (3-Methoxybenzylidine) Hydrazide	3g
8	2-Hydroxy benzoic acid (4-Methoxybenzylidine)-Hydrazide	3h
9	2-Hydroxy benzoic acid (4-Dimethyl amino benzylidine)-Hydrazide	3i
10	2-Hydroxy benzoic acid (4-Ethoxybenzylidine)-Hydrazide	3j

General procedure for the antioxidant activity of compounds with DPPH method

The DPPH (diphenyl picryl hydrazyl) activity was performed by using previous reported methods[14]. Antioxidants are generally able to donate a proton to reduce stable DPPH to yellow colored non radical DPPH. The color change from deep violet to light yellow color of compounds and standard (Ascorbic acid) was measured by using UV-Visible spectrophotometer at 517nm.The stock solutions of standard and samples were prepared in methanol solvent. After that synthesized compounds were subjected to serial dilutions ranging from 0.001-0.004mM. Later 3 mL of test solution was mixed with 1 mL of DPPH solution and incubate dark for 30 minutes. Absorbance of standard and test samples were measured at 517nm. The 5 of inhibition and IC_{50} values of each compound were calculated.

The % of DPPH radical activity was calculated as follows.

% of inhibition = (Ab-As/Ab)x100
Here Ab-Absorbance of control sample.
As-Absorbance of test sample.

General procedure for the anti-inflammatory activity of compounds (3a-j) by albumin denaturation method

The recommended technique of Sakatetal.,2010 was used through small alterations. The mixture included 1% bovine albumin fraction solution and Samples; A slight quantity of 37°C HCl was added this mixture to modify the pH. The sample extracts have been at first cultured at 37° Celcius for twenty min before being heating to 51°Celcius for twenty min. After the samples were cooled, turbidity was assessed, using a spectrophotometer at 660nm. Standard drug considered was Diclofenac sodium. The experiment was carried out in triplicate. The following was determined regarding the prevention of protein denaturation.

% of Inhibition=100X [ODControl–OD Sample)/OD Control]

General procedure for the anti-diabetic activity of compounds (3a-j) with α-Amylase enzyme inhibition method

The starch liquid solution of 0.1% w/v was obtained by means of whirling 0.1 g of potato starch in 100 millilitre of 16 milli mole sodium acetate as buffer. By combining 27.5 milligram of amylase with 100 milliliters of purified water, the enzyme solution was made. Creating the colorimetric reagent, combine 3,5-Dinitrosalicylic acid (DNS) and Ninety six milli mole sodium potassium tartrate solution. Subsequently, the solution of starch is included with the plant extract tubes & control, and then allowed to respond with the amylase solution at 25°C in alkaline conditions. About 3 mins, the mixture was allowed to continue and Production of Maltose was estimated by lowering 3,5-Dinitrosalicylic acid to 3-amino-5-nitro salicylic acid. The response can be noticed at 540nm (Singh, Malik 1980).

% of Inhibition=100X [(Control OD-Test OD)/ Control OD]

RESULTS AND DISCUSSION

Initially, a mixture of 2-hydroxy benzohydrazide (1), Benzaldehyde (2), as well as water (5 mL) was swirled for three hours at room temperature, yielding the product (3) in 20% of the time. (Table 2, entry 1). The desired percentage yield was 29%, when the identical reaction was undertaken at 50°C for 30 minutes. (Table 2, entry 2). When the temperature was raised, no substantial yield was noticed (Table 2, entry 3).

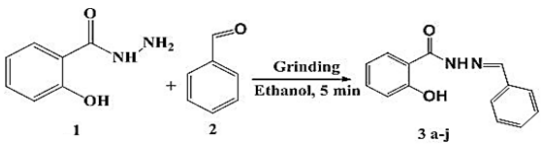

Fig. 2. Synthesis of Schiff's base

At normal circumstances, we shifted the solvent to methanol. Product yield has been elevated to 48%. (Table 2, Entry 4). When he similar reaction was repeated under reflux conditions, no progress toward increased yield were detected (Table 2, Entry 5). Under normal circumstances, the product yield was 59% in ethanol solvent (Table 2, Entry 6). We attempted to increase the yield by using non-traditional sources such as grinding, and the required product production was substantially enhanced to 81%. (Table 2, Entry 7-10). When the reaction was repeated at different time intervals, the product yield increased. To increase the yield, we ran the reactions in different solvents such as DMF, ethyl acetate, CAN, 1,4-dioxane and DMSO (Table

2, Entries 11-15). A moderate product yield was obtained. As a result, we concluded that grinding is the best method for producing Schiff base derivatives with good yield (Figure 3).

Table 2: Optimization of compound 3a

Entry	Solvent	Reaction conditions	Time(min)	Yield(%)
1	Water	RT	180	25
2	Water	50°C	30	29
3	Water	80°C	30	31
4	Methanol	RT	60	48
5	Methanol	80°C	60	52
6	Ethanol	RT	180	59
7	Ethanol	Grinding	60	81
8	Ethanol	Grinding	5	95
9	Ethanol	Grinding	10	92
10	Ethanol	Grinding	30	74
11	DMF	Grinding	10	59
12	Ethyl acetate	Grinding	10	63
13	ACN	Grinding	10	47
14	1,4-Dioxane	Grinding	10	43
15	DMSO	Grinding	15	51

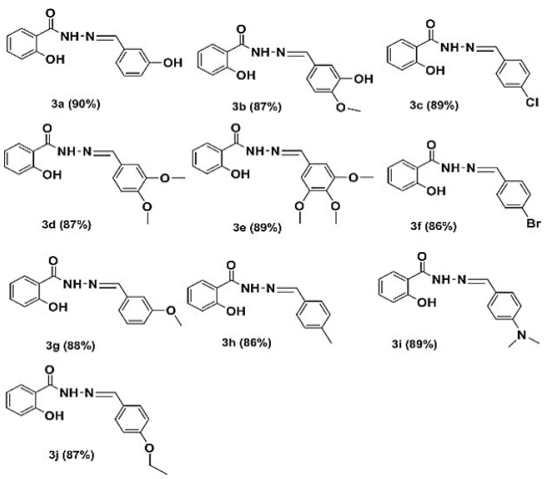

Fig. 3. Diversity of the Schiff base compounds

Antioxidant activity of Schiff's base compounds

Antioxidants are the agents which inhibits the cellular damage in human body caused by oxidation process. The free radicals are the atoms with odd number of electrons which is produced by the oxidation process involved in biological system and it is responsible for more number of diseases in human body including cell damage, cardiovascular disease, neural disorders, atherosclerosis and Parkinson's diseases which could be stopped by antioxidants. From the % of inhibition and IC_{50} values we concluded that absorbance values of standard and test samples were increased with concentration. The results showed the synthesized Schiff's base compounds shows good antioxidant activity (Table 3) when compared to standard ascorbic acid. The DPPH values of Test sample and standard were examined under UV-Visible spectrophotometer at 517nm. From the %of inhibition and IC_{50} values we concluded that absorbance values of standard and test samples were increased with concentration. The results showed the synthesized Schiff's base compounds showed good antioxidant activity when compared to standard ascorbic acid (Figure 4).

Table 3: Percentage of inhibition and IC_{50} values of compounds (3a-j)

Entry	Compound	% of inhibition at different concentrations (mM)				IC_{50}
		0.001	0.002	0.003	0.004	
1	3a	51.75	65.11	77.69	81.97	0.725
2	3b	50.19	59.27	64.85	69.9	0.827
3	3c	50.71	60.57	70.42	75.74	0.837
4	3d	49.93	59.27	69.64	74.83	0.949
5	3e	51.75	66.01	74.31	80.28	0.648
6	3f	48.89	67.44	74.57	84.69	0.917
7	3g	50.58	61.08	69.13	71.85	0.772
8	3h	49.02	60.57	71.59	73.8	0.994
9	3i	48.76	62.12	70.16	74.48	0.958
10	3j	50.54	63.16	67.96	78.21	0.839
11	Std	57.71	68.74	78.98	93.77	0.42

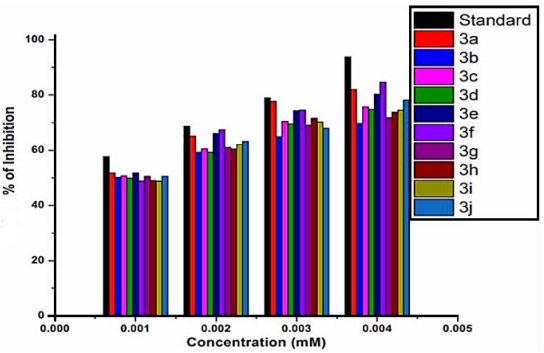

Fig. 4. Derived compounds with DPPH activity

Anti-inflammatory activity of Schiff's base compounds

There are some issues with using living creatures in research-based pharmacology studies, such as moral concerns and a nonexistence of justification for the sake of their usage, when other techniques exist. As a result, the protein denaturation bioassay was used in this investigation to analyze the anti-inflammatory property of Schiff's base derivatives *In vitro*. Known sources of inflammation include albumen denaturation. Bio proteins lack their biochemical processes when they are denatured. Sometimes in arthritic diseases, protein denaturation leads to the formation of autoantigens. Hydrophobic, disulfide, and electrostatic hydrogen bonding

changes lead to denaturation. The primary cause of inflammation in the current study is Protein denaturation.The inquiry into the anti-inflammatory activity's mechanism included a look at the Schiff base's capacity to prevent protein denaturation. Heat-induced albumin denaturation was effectively inhibited by selected Schiff bases. As shown in Figure [Table 4 and Fig. 5], standard anti-inflammatory drug used was Aspirin.The albumin denaturation method was tested with various concentrations of samples at 100 g/mL, 200 g/mL, 300 g/mL, 400 g/mL and 500 g/mL. All the compounds (3a-j) compounds showed good percentage of inhibition. The compound (3e) exhibited greater inhibition against standard.

Table 4: Anti-Inflammatory potential Inhibition of albumin denaturation

S. No	Test	% of Protein Denaturation	Concentration of the sample (µg/mL)				
			100	200	300	400	500
1		3a	30	40	45	53	60
2		3b	28	39	49	57	69
3		3c	25	36.5	47.5	59.5	68.5
4		3d	20.3	30.2	40.5	59.5	67
5	Albumin denaturation	3e	31	42	51	62	72
6		3f	12	24.6	36.3	48	60.4
7		3g	29	37	48	60	70
8		3h	14.5	31.5	47	61	69
9		3i	30	35	48	53	60
10		3j	25	40	49	60	71.4
11		Asprine (standard)	35	46	56	67	77

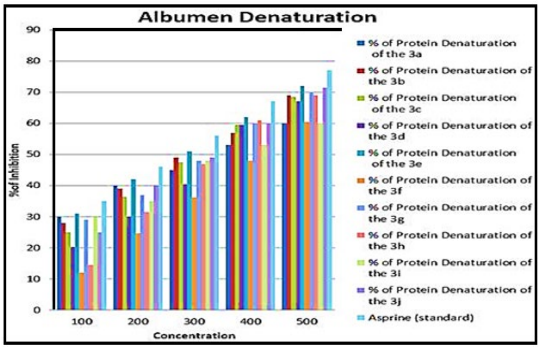

Fig. 5. Graph of Anti inflammatory potential inhibition of albumin denaturation

Antidiabetic activity of synthesized compounds (3a-j) with alpha-amylase enzyme inhibition

Chronically high blood sugar levels are a hallmark of the metabolic illness known as diabetes mellitus. Inhibiting the starch enzymatic glucosidase and amylase restricts the breakdown of carbohydrates into simple sugars, a major contributor to the rise in blood sugar levels. Emerging compounds with repressing activities against carbohydrate hydrolyzing enzymes can therefore be a beneficial method for controlling diabetics. As in Fig. 1.5 and Table 1.4 Amylase and glucosidase was considerably restricted by 2-hydroxy benzoic acid (3-hydroxy benzylidine)-Hydrazide [3a] concentrationand enzyme progress were significantly decreased. As a result, the biomolecules most likely increased the anti-diabetic ability of the synthesized compounds. As Acarbose was introduced, amylase inhibitory actions were observed in ascending sequence (Fig. 6). Results were also compared. Though, the aforementioned consequences recommend that the synthetically produced Schiff base derivatives of 2-hydroxy benzoic acid benzylidene hydrazide, are hopefully best antidiabetic substances at preventing amalyse also may be a useful approach in the treatment of diabetes. These inhibitory levels were compared to the reference medication Acarbose at the following composition: 20, 40, 60, 80 and 100. Different 2-hydroxy benzoic acid benzylidene hydrazide derivative concentrations of the alpha-amylase enzyme were evaluated, including 20 µg/mL, 40 µg/mL, 60 µg/mL, 80 µg/mL and 100 µg/mL. At 20 & 40 µg/mlconcentration, albumen denaturation didn't differ significantly according to Schiff basis, but somehow, they differ substantially for nanoparticles at 0.15 µg/mL, 0.20 µg/mL and 0.25 µg/mL when all data are compared to Acarbose, the standard medication (Fig. 6). The Schiff base's potential to inhibit the alphaamylase enzyme was investigated as a element of the review into the mechanisms of the antidiabetic activity. According to an *In-vitro* investigation on anti-diabetic efficiency, the activity of the alpha-amylase enzyme is inhibited to a greater extent by 2 hydroxy benzoic acid (3methoxy benzylidine)hydrazide [3g]. When concentration is increasing together with a rise in the %of protein denaturation, when compared to the standard drug, acarbose (Table 5), the values are closer to 3 gram.

Table 5: Antidiabetic potential Inhibition of α amylase enzyme

S. No	Test	% of inhibition	Concentration of the sample (µg/mL)				
			20	40	60	80	100
1	Alpha amylase inhibitory activity	% of inhibition of the 3a	14	23	30	48	59
2		% of inhibition of the 3b	20	30.5	41.5	50.5	60.5
3		% of inhibition of the 3c	15	22	30	40	50
4		% of inhibition of the 3d	25	33.5	45	55	64.4
5		% of inhibition of the 3e	20	45	57.5	67.4	82.5
6		% of inhibition of the 3f	38	47	59	69	84.5
7		% of inhibition of the 3g	40	50	61	73	85
8		% of inhibition of the 3h	38	47.5	58	66	78
9		% of inhibition of the 3i	37	45	56	70	82
10		% of inhibition of the 3j	31.5	40.5	51.5	60.5	70.6
11		Acarbose(Standard)	44	54	68	78	90

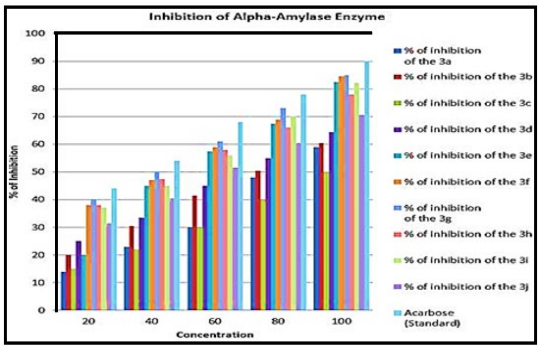

Fig. 6. Graph of Antidiabetic potential inhibition of α amylase

CONCLUSION

In this present study, we synthesized some Schiff base compounds via Grinding method by the reaction of 2-Hydroxy benzohydrazides with Aromatic aldehydes. All the synthesized compounds (3a-i) were showed good antioxidant, Antidiabetic and Anti inflammatory activity against the standards.

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Conflict of Interest

The authors declared no conflict of interest.

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