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RESEARCH ARTICLE

A NEWER METHODDEVELOPED FOR THE SYNTHESIS OF DIFERULOYL METHANE AND ITS DERIVATIVES

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Abstract

Here in the current research work we have developed newer method for the synthesis of diferuloyl methane(curcumin)**Ca-q**. MangnesiumHydroxide were found to be an effective and mild base for synthesis of curcumin and its derivatives obtained by reaction of one equivalent of acetyl acetone with two equivalent of corresponding aromatic aldehyde in microwave(240 W). The existingscheme offers severalaids such as high yield, less time, and environmentally friendly.

Introduction:-

Curcumin,**(1)** a polyphenol derived from Curcuma longa (commonly known as turmeric) is aprehistoric spice and therapeutic used in India for centuries to persuade color in food and to treat a wide range of maladies [1]. Curcumin a major yellow pigment and active constituent of turmeric powder mined from Curcuma longa L. Curcumin, usually called diferuloyl methane, is a hydrophobic polyphenol derived from the rhizome (turmeric) of the herb Curcuma longa (Zingiberaceae). Turmeric has been used for thousands of years in ayurvedic and traditional medicine of Chinese and Indians. In modern days, curcumin continues to be used as asubstitute medicinal agent in many parts of South East Asia for the treatment of many ailments such as stomach upset, flatulence, jaundice, arthritis, sprains, wounds and skin infections [2].It has attracted a lot of attention due to its promising biological properties to treat cancer,[3] Alzheimer's disease,[4] HIV,[5-6] chronic inflammations,[2] oxidative stress,[7] and cystic fibrosis[8]. Curcumin underwent clinical trial for cancer owing to its prominent activity as an antitumor and chemopreventive agent[9] However, this trial ceased due to poor bioavailability of the molecule [10-11]. Clinical trials are ongoing to test the efficacy of curcumin against Alzheimer's disease [12] and cystic fibrosis [13]. Intense research is also being undertaken to modify the structure of curcumin toupsurge the bioavailability and potency while sustaining the relative non-toxic nature of this natural product [14-17].

During the pastera, synthetic modifications of curcumin, which were aim at enhancing its bioactivities, have been intensively studied. One sustainable strategy for green synthesis of organic compounds is microwave irradiation. Since, microwaves will not affect molecular structure in the excitation of molecules; the effect of microwave absorption is purely kinetic. Compared to traditional methods, microwave synthesis is more suitable to synthesize and can be carried out in greater yields in short reaction times under mild reaction conditions.[18-22]The current scheme offers various benefits such as high yield, short time, efficient, and environmentally friendly. Curcumin present in two-formketo form in basic medium enol form in acidic medium.

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Figure 1:- Tautomeric structure of curcumin **(1).**

Experimental Section

M.P points was determined by open glass capillary method. All chemicals used were reagent grade and were used as received. A Laboratory Microwave Oven (Model BP 310/50) operating at 2450 MHz and power output of 600 W were used for all the experiments. The completion of reactions was monitored by TLC. IR spectra were recorded on a Shimadzu FTIR-420 spectrophotometer. 1H NMR and 13C NMR spectra were recorded at 400oC on a Bruker AVANCE DPX (400 MHz) FT spectrometer in CDCl3 using TMS as an internal reference (chemical shift in δ ppm).

A- ***General procedure for the synthesis of curcuminderivatives Ca-q (Conventional Method)***

To a mixture of two equivalent of substituted benzaldehyde (10 mmol), one equivalent of acetylacetone (5 mmol) dissolved in 20 mL of DMF was added three equivalents of calcium hydroxide (15 mmol), and the reaction mixture was stirred at 110 °C. TLC monitored the progress of the reaction. After completion of the reaction, it was poured into cold water, neutralized with cold dil. HCl up to pH 4 to 5. The solid precipitated was fi ltered, washed with cold water and purified by crystallization from ethanol.

B- Procedure for synthesis of curcumin derivtetis Ca-q (Microwave method)

In a microwave assisted method in 250 ml beaker we have taken two eqivalent of substituted benzaldehyde (20 mmol), and one of acetyl acetone (10 mmol) 20 ml water and three equivalent of Mangnesium hydroxide was added. The reaction mixture was stirred at room tempeatutre and then irradiated for 3–7 min in microwave at 240 W (40%) power. Then the reaction mixture was poured into ice-cold water neutralized with HCl The solid product was filtered on sunction pump, washed with cold water and purified by crystallization from ethanol.

Result and Discusion:-

Acetyl acetone having terminal two-methyl group and it also having active methylene group 1 eqiuvqlent of Mangnesium hydroxide form complex with acetyl acetone in its enol form. It blocks that acive methylene group and othere two equivalent of Mangnesium hydroxide take proton form terminal -$CH_3$and generate carbanion. That generated carbanion react with aromatic aldehyde, Workup using dil. HCl cleved Ba complex to give curcumin derivaties. The reaction was moniyored by TLC and purified from alchohol. From experimental result is was observed that old-fashioned method time required getting product in 12-16 hour and yield is less. The microwave-assisted method gives high yield in short time. Surprisingly we get product within 4-6 minutes very hight yield. It is vey important to mention aromatic aldehyde bearing both electron donating and electron withawing groups easily undergo condensation to give corresponding curcuim analogues. While study on effect of substitution on aromatic rings it was obsedved that reaction is prone to steric hindrance and yield suffer from othosubstituted aldehyde.

Table. 1:- Synthesis of curcumin and its derivatives byTraditional method and Microwave method.

Sr. No	Compound Code	R^1	R^2	R^3	Traditional method		Microwave method		Melting Point ^oC
					Time in Hour	Yeild (%)	Time in min	Yeild (%)	

1	Ca	$-OCH_3$	H	H	15	55.25	5	69	122-240
2	Cb	H	H	OH	16	54.20	4	71	175
3	Cc	H	$-OCH_3$	OH	12	61.20	6	85	181-182
4	Cd	H	H	Br	13	59.20	4	82	154-156
5	Ce	H	H	$N(CH_3)_2$	14	68.50	6	68	147-149
6	Cf	NO_2	H	H	15	44.25	5	75	141-142
7	Cg	H	NO_2	H	16	60.28	5	90	161-163
8	Ch	H	H	NO_2	12	52.28	4	89	146-147
9	Ci	H	$-OCH_3$	$-OCH_3$	13	48.25	6	79	129-130
10	Cj	OH	H	H	14	51.84	4	71	187
11	Ck	H	H	$-OCH_3$	15	54.20	6	79	161-162
12	Cl	Cl	H	H	16	55.54	5	76	116-119
13	Cm	H	H	Cl	12	61.28	5	84	151-152
14	Cn	H	H	CH_3	13	56.28	4	79	111-113
15	Co	H	H	H	14	57.25	6	87	142
16	Cp	H	H	$-OCH_3$	12	55.65	5	76	128
17	Cq	H	$-OCH_3$	H	13	56.85	6	81	143

Data of Ca:
IR (KBr): ν 3412, 1668, 1255, 1142, 961, 752 cm–1 1 H NMR (300 MHz, CDCl3): δ 3.85 (6H, s, 2·ArOCH3), 6.13 (1H, s, H-4), 6.62 (1H, d, J =16 Hz, H-6), 6.79 (2H, d, J = 7.5 Hz, H-3′, 3′′), 6.83 (1H, d, J = 16 Hz, H-2), H- 6.97 (1H, d, J = 16 Hz, H-7), 7.17 (4H, m, H-4′, 5′, 4′′, 5′′), 7.53 (2H, d, J = 7.5 Hz, H-6′, 6′′), 7.74 (2H, d, J = 16 Hz, H-1) ppm 13C NMR (75MHz, CDCl3): δ 55.4 (OCH3), 101.2 (C-4), 115.2 (C-3′, 3′′), 118.5 (C-6), 120.8 (C-5′, 5′′), 122.9 (C-2), 127.9 (C-4′, 4′′), 125.4 (C-1′,1′′), 134.8 (C-6′, 6′′), 140.4 (C-7), 142.4 (C-1), 159.3 (C-2′, 2′′), 182.4 (C-3, C-5) ppm

Data of Cb:
IR (KBr): ν 3412, 2932, 1627, 1603, 962, 814 cm–1 1 H NMR (300 MHz, CDCl3): δ 6.52 (1H, s, H-4), 6.82 (1H, d, J = 16.0 Hz, H-7), 6.89 (1H, d, J =16 Hz, H-6), 7.04 (1H, d, J =16 Hz, H-2), 7.35 (2H, dd, J = 8.0, 2 Hz, H-3′, 5′, 3′′, 5′′), 7.56 (4H, dd, J = 8.0 Hz, H-2′, 6′, 2′′, 6′′), 7.75 (1H, d, J = 16.0 Hz, H-1) ppm 13C NMR (75MHz, CDCl3): δ 101.1 (C-4), 118.6 (C-6), 122.6 (C-4′, 4′′), 123.1 (C-2), 128.6 (C-2′, 6′, 2′′, 2′′), 130.6 (C-3′, 5′, 3′′, 5′′), 131.9 (C-1′, 1′′), 140.4 (C-7), 142.2 (C-1), 182.5 (C-3, C-5) ppm

Data of Cj:
IR (KBr): ν 3412, 3211, 1620, 1600, 1269, 1168, 1140, 955, 831 cm–1 1 H NMR (300 MHz, DMSO-d6): δ 6.12 (1H, s, H-4), 6.73 (1H, d, J = 16.0 Hz, H-7), 6.83 (1H, d, J =16 Hz, H-6), 6.87 (4H d, J = 8.0 Hz, H-3′, 5′, 3′′, 5′′), 7.56 (4H, d, J = 8.0 Hz, H-2′, 6′, 2′′, 6′′), 7.67 (2H, d, J = 16.0 Hz, H-1) ppm 13C NMR (75 MHz, DMSO-d6): δ 101.1 (C-4), 115.3 (C-3′, 5′, 3′′, 5′′), 118.3 (C-6), 123.2 (C-2), 127.4 (C-1′, 1′′), 130.6 (C-2′, 6′, 2′′, 2′′), 140.4 (C-7), 142.7 (C-1), 159.7 (C-4′, 4′′), 182.6 (C-3, C-5) ppm

Date of Ce:
IR (KBr): ν 3417, 2920, 1664, 1362, 962, 814 cm–1 1 H NMR (300 MHz, CDCl3): δ 3.03 (12H, s, 2· ArN(CH3)2), 6.25 (1H, s, H-4), 6.72 (4H, d, J = 8.7 Hz, H-3′, 5′, 3′′, 5′′), 6.84 (1H, d, J = 16 Hz, H-7), 6.91 (1H, d, J =16 Hz, H-6), 7.05 (1H, d, J =16 Hz, H-2), 7.42 (4H, d, J = 8.7 Hz, H-2′, 6′, 2′′, 6′′), 7.63 (2H, d, J = 16 Hz, H-1) 13C NMR (75MHz, CDCl3): δ 42.4 (N(CH3)2), 101.6 (C-4), 110.9 (C-3′, 5′, 3′′, 5′′), 118.9 (C-6), 123.4 (C-2), 124.3 (C-1′, 1′′), 129.6 (C-2′, 6′, 2′′, 2′′), 140.3 (C-7), 142.1 (C-1), 149.7 (C-4′, 4′′), 182.6 (C-3, C-5)

Data of Cg:
IR (KBr): ν 3425, 2933, 1695, 1608, 1177, 1028, 977, 826 cm–1 1 H NMR (300 MHz, CDCl3): δ 6.78 (1H, s, H-4), 6.86 (1H, d, J = 16 Hz, H-7), 7.12 (1H, d, J = 16 Hz, H-6), 7.23 (2H, d, J = 15.7 Hz, H-2), 7.58 (2H, dd, J = 8, 8 Hz, H-5′, 5′′), 7.95 (1H, d, J = 15.7 Hz, H-1), 7.98 (2H, dd, J = 8, 2Hz, H-6′, 6′′), 8.06 (2H, m, H-4′, 4′′), 8.16 (2H, d, J = 2 Hz, H-2′, 2′′) ppm 13C NMR (75 MHz, CDCl3): δ 101.4 (C-4), 119.2 (C-6), 122.7 (C-2′, 2′′), 123.1 (C-2), 123.4 (C-4′, 4′′), 129.4 (C-5′, 5′′), 134.3 (C-6′, 6′′), 137.5 (C-1′, 1′′), 139.9 (C-7), 142.3 (C-1), 147.4 (C-3′, 3′′), 182.4 (C-3, C-5) ppm

Data of Cf:
IR (KBr): ν 3455, 1697, 1596, 1255, 1142, 961, 752 cm–1 1 H NMR (300 MHz, CDCl3): δ 6.78 (1H, s, H-4), 6.84 (1H, d, J =16 Hz, H-6), 7.10 (1H, d, J = 16 Hz, H-2), 7.32 (1H, d, J =16 Hz, H-7), 7.73 (2H, m, H-5′, 5′′), 7.91 (2H, m, H-4′, 4′′), 8.02 (2H, dd, J = 8, 2 Hz, H-6′, 6′′), 8.14 (2H, d, J = 8, 2 Hz, H-3′, 3′′), 8.27 (2H, d, J = 15.8 Hz, H-1,7) ppm 13C NMR (75 MHz, CDCl3): δ 101.2 (C-4), 119.4 (C-6), 123.4 (C-2), 123.4 (C-3′, 3′′), 127.2 (C-6′, 6′′), 127.4 (C-1′, 1′′), 128.9 (C-4′, 4′′), 134.6 (C-5′, 5′′), 140.1 (C-7), 142.9 (C-1), 147.5 (C-2′, 2′′), 182.5 (C-3, C-5) ppm

Data of Ci:
IR (KBr): ν 3420, 2933, 1676, 1592, 1177, 1028, 977, 826 cm–1 1 H NMR (300 MHz, CDCl3): δ 3.92, (s, 6H), 3.97 (s, 6H), 6.67 (1H, s, H-4), 6.83 (d, J = 16.0 Hz, 1H, H-7), 6.89 (1H, d, J =16 Hz, H-6), 6.97 (2H, d, J = 8.0 Hz, H-5′, 5′′), 7.05 (1H, d, J = 16Hz, H-2), 7.13 (2H, d, J = 2.0 Hz, H-2′, 2′′), 7.21 (2H, dd, J = 2.0, 8.0 Hz, H-6′, 6′′), 7.68 (2H, d, J = 16.0 Hz, H-1) ppm 13C NMR (75MHz, CDCl3): δ 55.8 (OCH3), 56.2 (OCH3), 101.5 (C-4), 111.9 (C-2′, 2′′), 112.3 (C-5′, 5′′), 118.4 (C-6), 122.4 (C-6′, 6′′), 123.2 (C-2), 127.4 (C-1′, 1′′), 140.3 (C-7), 142.6 (C-1), 149.0 (C-4′, 4′′), 149.7 (C-3′, 3′′), 182.8(C-3, C-5) ppm

Data of Cc:
m.p. = 181—182 °C IR (KBr): ν 3468 (br s, OH), 1627 (C=O), 1604, 1508 (C=C, Ar), 1282, 1027 cm–1 1 H-NMR (DMSO-d6, 300 MHz): δ 3.84 (s, 6H, 2 × OCH3), 6.06 (s, 1H), 6.71 (d, 2H, J = 16.6 Hz), 6.82 (d, 2H, J = 8.22 Hz, ortho coupling), 7.16 (d, 2H, J = 8.03 Hz, ortho coupling), 7.33 (s, 2H), 7.55 (d, 2H, J = 15.35 Hz), 9.74 (s, 2H, 2 × phenolic OH), 10.13 (s, 1H, enol OH) ppm 13C-NMR (DMSO-d6, 75 MHz): δ 56.22 (2 × OCH3), 101.43, 111.82, 116.23, 121.62, 123.70, 126.86, 141.28, 148.53, 149.88, 183.76 ppm Mass (EI): m/z 369 (MH+)

Data of Co:
IR (KBr): ν 3398, 2942, 1684, 1605, 1172, 1025 cm–1 1 H NMR (300 MHz, CDCl3): δ 6.54 (1H, s, H-4), 6.73 (1H, d, J = 16.0 Hz, H-7), 6.82 (1H, d, J = 16.0 Hz, H-6), 7.15 (1H, d, J = 16.0 Hz, H-2), 7.27 (2H, dd, J = 8.0, 2Hz, H-4′, 4′′), 7.37 (4H, dd, J = 8.0 Hz, H-3′, 5′, 3′′, 5′′), 7.51 (4H, dd, J = 8.0, 2.0 Hz, H-2′, 6′, 2′′, 6′′), 7.64 (1H, d, J = 16.0 Hz, H-1) ppm 13C NMR (75MHz, CDCl3): δ 101.2 (C-4), 118.3 (C-6), 122.9 (C-2), 126.5 (C-4′, 4′′), 128.3 (C-2′, 6′, 2′′, 6′′), 128.6 (C-3′, 5′, 3′′, 5′′), 135.2 (C-1', 1"), 140.5 (C-7), 142.3 (C-1), 182.4 (C-3, C-5) ppm

Data of Cn:
IR (KBr): ν 3422, 2942, 1672, 1605, 1172, 1025 cm–1 1 H NMR (300 MHz, CDCl3): δ 2.35 (6H, s, ArCH3), 6.52 (1H, s, H-4), 6.83 (1H, d, J = 16.0 Hz, H-7), 6.87 (1H, d, J = 16.0 Hz, H-6), 7.06 (1H, d, J = 16.0 Hz, H-2) 7.13 (2H, dd, J = 8.0, 2Hz, H-3′, 5′, 3′′, 5′′), 7.47 (4H, dd, J = 8.0 Hz, H-2′, 6′, 2′′, 6′′), 7.69 (1H, d, J = 16.0 Hz, H-1) ppm 13C NMR (75MHz, CDCl3): δ 21.4 (CH3), 101.1 (C-4), 118.5 (C-6), 123.2 (C-2), 128.4 (C-2′, 6′, 2′′, 6′′), 128.7 (C-3′, 5′, 3′′, 5′′), 130.9 (C-4′, 4′′), 132.2 (C-1′, 1′′), 140.4 (C-7), 142.2 (C-1), 182.2 (C-3, C-5) ppm

Data of Cm:
IR (KBr): ν 3422, 2932, 1685, 1603, 1172, 1025 cm–1 1 H NMR (300 MHz, CDCl3): δ 6.57 (1H,s, H-4), 6.82 (1H, d, J = 16.0 Hz, H-7), 6.88 (1H, d, J = 16.0 Hz, H-6), 7.08 (1H, d, J = 16.0 Hz, H-2), 7.32 (2H, dd, J = 8.0, 2Hz, H-3′, 5′, 3′′, 5′′), 7.52 (4H, dd, J = 8.0 Hz, H-2′, 6′, 2′′, 6′′), 7.71 (1H, d, J = 16.0 Hz, H-1) ppm 13C NMR (75MHz, CDCl3): δ 101.0 (C-4), 118.9 (C-6), 123.5 (C-2), 128.6 (C-3′, 5′, 3′′, 5′′), 129.2 (C-2′, 6′, 2′′, 2′′), 131.9 (C-1′, 1′′), 133.6 (C-4′, 4′′), 140.6 (C-7), 142.4 (C-1), 182.5 (C-3, C-5) ppm

Data of Cl:
IR (KBr): ν 3374, 2932, 1627, 1683, 1173 cm–1 1 H NMR (300 MHz, CDCl3): δ 6.61 (1H,s, H-4), 6.87 (1H, d, J = 16.0 Hz, H-6), 6.87 (1H, d, J = 16 Hz, H-2), 7.09 (1H, d, J = 16Hz, H-7), 7.28 (2H, dd, J = 8.0, 2 Hz, H-4′, 4′′), 7.33 (2H, J = 8, 2 Hz, H-5′, 5′′), 7.37 (2H, dd, J = 8, 2 Hz, H-6′, 6′′), 7.48 (2H, dd, J = 8.0 Hz, H-3′, 3′′), 7.84 (2H, d, J = 16.0 Hz, H-1) ppm 13C NMR (75MHz, CDCl3): δ 101.5 (C-4), 118.6 (C-6), 123.7 (C-2), 127.3 (C-5′, 5′′), 128.4 (C-6′, 6′′), 129.2 (C-4′, 4′′), 129.7 (C-3′, 3′′), 132.9 (C-1′, 1′′), 134.6 (C-2′, 2′′), 140.4 (C-7), 142.7 (C-1), 182.8 (C-3, C-5) ppm

Data of Ck:
IR (KBr): ν 3441, 2933, 1672, 1600, 1177, 1028, 977, 826 cm–1 1 H NMR (300 MHz, CDCl3): δ 3.84 (6H, s, 2-ArOCH3), 6.74 (1H, s, H-4), 6.82 (1H, d, J =16 Hz, H-7), 6.92 (1H, d, J = 16 Hz, H-6), 6.98 (4H, d, J = 8.7 Hz, H-3′, 5′, 3′′, 5′′), 7.06 (1H, d, J = 16 Hz, H-2), 7.46 (4H, d, J = 8.7 Hz, H-2′, 6′, 2′′, 6′′), 7.69 (2H, d, J = 15.7 Hz, H-

1) ppm 13C NMR (75MHz, CDCl3): δ 56.2 (OCH3), 101.3 (C-4), 114.6 (C-3′, 5′, 3′′, 5′′), 118.6 (C-6), 123.5 (C-2), 128.1 (C-1′, 1′′), 130.4 (C-2′, 6′, 2′′, 2′′), 140.6 (C-7), 142.4 (C-1), 159.7 (C-4′, 4′′), 182.3 (C-3, C-5) ppm

Data of Cj:
IR (KBr): ν 3412, 3391, 1615, 1255, 1142, 961, 752 cm–1 1 H NMR (300 MHz, DMSO-d6): δ 6.16 (1H, s, H-4), 6.64(1H, d, J = 16 Hz, H-6), 6.87 (2H, d, J = 7.5 Hz, H-3′, 3′′), 6.95 (2H, d, J = 16 Hz, H-2), 7.05 (1H, d, J = 16Hz, H-7), 7.25 (4H, m, H-4′, 5′, 4′′, 5′′), 7.67 (2H, d, J = 7.5 Hz, H-6′, 6′′), 7.89 (1H, d, J = 16 Hz, H-1) ppm 13C NMR (75 MHz, DMSO-d6): δ 101.3 (C-4), 117.2 (C-3′, 3′′), 118.9 (C-6), 121.1 (C-5′, 5′′), 122.2 (C-1′, 1′′), 122.9 (C-2), 127.3 (C-5′, 5′′), 128.8 (C-6′, 6′′), 129.4 (C-4′, 4′′), 140.1 (C-7), 142.6 (C-1), 157.3 (C-2′, 2′′), 182.4 (C-3, C-5) ppm

Data of Ch:
IR (KBr): ν 3452, 2933, 1692, 1608, 1177, 1028, 977, 826 cm–1 1 H NMR (300 MHz, CDCl3): δ 6.83 (1H, s, H-4), 6.91(1H, d, J = 16 Hz, H-7), 7.08 (2H, d, J = 15.7 Hz, H-,6), 7.28 (1H, d, J =16 Hz, H-2), 7.92 (2H, d, J = 15.7 Hz,H-1), 8.12 (4H, d, J = 8.7 Hz, H-2′, 6′, 2′′, 6′′), 7.98 (4H, d, J = 8.7 Hz, H-3′, 5′, 3′′, 5′′) ppm 13C NMR (75 MHz, CDCl3): δ 101.8 (C-4), 118.8 (C-6), 123.6 (C-2), 123.8 (C-3′, 5′, 3′′, 5′′), 129.2 (C-2′, 6′, 2′′, 2′′), 140.6 (C-7), 141.3 (C-1′, 1′′), 142.6 (C-1), 147.4 (C-4′, 4′′), 182.8 (C-3, C-5) ppm

Data for Cp:
IR (cm-1, KBr): 3638 (enolic OH), 1705 (C=O), 1640 (C=C); 1H NMR (400MHz, CDCl3, ppm): 15.0 (s, 1H, enolic OH), 7.84 (d, 4H, Ar-H), 7.66 (s, 1H, CH=C), 7.03(s, 1H, CH=C), 7.0 (d, 4H, Ar-H), 6.85 (s, 1H, CH=C), 6.7 (s, 1H, CH=C), 6.65 (s, 1H, CH=C), 3.8 (s, 6H, 2-OCH3); MS (EI) 70eV, m/z (rel. intensity): 336 (M+, 100), 337 (23.5), and 338 (2.7)

Data for Cq:
IR (cm-1, KBr): 3628 (enolic OH), 1720.24 (C=O), 1645.65 (C=C); 1H NMR (400MHz, CDCl3, ppm): 15.0 (s, 1H, enolic -OH), 7.66 (s, 1H, CH=C), 7.46 (s, 2H, Ar-H), 7.44 (s, 2H, Ar-H), 7.39 (d, 2H, Ar-H), 7.03 (s, 1H, CH=C), 6.95 (d, 2H, Ar-H), 6.85 (s, 1H, CH=C), 6.7 (s, 1H, CH=C), 6.65 (s, 1H, CH=C), 3.869 (s, 6H, 2-OCH3). MS (EI) 70eV, m/z (rel. intensity): 336 (M+, 100), 337 (23.7), and 338 (3.9)

Conclusion:-

A series of diferuloyl methane analogs **Ca-q** was synthesized using microwave irradiation with magnesium hydroxide with regioselectivity.In the conclusion, the present work describes simplistics method to synthsise curcumin and its analogs using a cheap Mangnesium hydroxide by microwavw method. Compared to literature methods the present roote is mentionable in terms of reaction condition, high yield, energy efficient and less time. All the reported compounds had given the best yields with greater purity.

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