FORM 2

THE PATENTS ACT, 1970
(39 of 1970)

The Patent Rules, 2006

Complete Specification

(See section 10 and rule 13)

A NOVEL COMPOUND FOR THE DETECTION OF ADENINE AND PROCESS FOR PREPARATION THEREOF

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH
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Incorporated under the Registration of Societies Act (XXI of 1860).

The following specification particularly describes the nature of this invention and the manner in which it is to be performed

FIELD OF THE INVENTION:

The present invention relates to a novel compound for detecting adenine. More particularly, the present invention relates to a compound of formula (I), process for preparation thereof and use of compound of formula (I) for detecting adenine. This compound (I) can also detect adenine of AMP, ADP, ATP and DNA at very low concentration. The present invention further relates to a kit comprising compound of formula (I).

BACKGROUND THE INVENTION:

Adenine (also known as Vitamin B4) belongs to the group of purine-based biologically active compounds. It is found in DNA and nucleotides (ATP, ADP, NADH, and NADPH). Adenine and its derivatives are playing major role in different physiological and metabolic pathways. Their concentration levels of adenine and its derivative provide important information of different diseases. Beside these the release of adenine is also associated with the activity of various toxins and immunotoxins and other ribosome deactivating proteins like gelonin and ricin.

Adenine quantification is an important tool for the investigation of various physiological and pathophysiological metabolic pathways. Although few electrochemical sensors are available for the detection of adenine, till date the prevalent method for quantifying free adenine is only chromatography. No optical sensors are reported for detection or quantification of free adenine. A number of studies have suggested that adenine may confer important biological functions in various physiological processes. For example, it also known that this compound act as a co-enzyme with other compounds such as vitamins and presumably helps in speeding up the processes of producing energy in our body.

Reference may be made to *WO2016131833A1*, which reports a fluorescence based sensor molecule for the detection of nicotinamide adenine dinucleotide analyte. That sensor molecule also used for the detection of concentrations of NAD+, NADP' and/or the ratios of the concentrations of NAD '/NAD H and NADP '/NADPH.

Reference may be made to an article entitled "Genetically Encoded Fluorescent Sensors for Intracellular NADH Detection" by Y. Zhao et al. published in *Cell Metabolism, Cell Press,*

United States, 2011, 14, 555 – 566 reports a genetically encoded fluorescent sensors for reduced nicotinamide adenine dinucleotide (NADH), which manifest a large change in fluorescence upon selective NADH binding.

Reference may be made to an article entitled ''Determination of NAD(+) and NADH in a single cell under hydrogen peroxide stress by capillary electrophoresis'' by W. Xie al. published in *Anal. Chem.*, 2009, 81, 1280–1284 developed a new method to determine cellular coenzymes NAD^+ and NADH by coupling an enzymatic cycling reaction with capillary electrophoresis laser-induced fluorescence.

Reference may be made to an article entitled ''Neural activity triggers neuronal oxidative metabolism followed by astrocytic glycolysis'' by K.A. Kasischke et al. published in *Science,* 2004, 305, 99–103 reports a two-photon fluorescence imaging of NADH shows the sensitivity and spatial three-dimensional resolution to resolve metabolic signatures in processes of astrocytes and neurons deep in highly scattering brain tissue slices.

Reference may be made to an article entitled "Enzyme Based Amperometric Biosensor for Adenine Determination" by B. Boka et al. published in *Electroanalysis*, 2013, 25, 237–242 reports An enzyme-based amperometric biosensor was developed for the rapid determination of adenine in biological and food samples. This electrochemical sensor shows high sensitivity (The detection limit was 1 μM.) at pH 7.0.

Reference may be made to an article entitled "Electrochemical biosensor for simultaneous determination of guanine and adenine based on dopamine-melanin colloidal nanospheres–graphene composites" by H. Wang et al. published in *J Solid State Electrochem.*, 2014, 18, 2435–2442 reports a novel electrochemical sensor for sensitive determination of guanine and adenine based on dopamine-melanin colloidal nanospheres – graphene composites-modified glassy carbon electrode.

Reference may be made to an article entitled " Redox sensor CtBP mediates hypoxia-induced tumor cell migration" by Q. Zhang et al. published in *Proc. Natl. Acad. Sci. USA,* 2006, 103, 9029–9033 reports the hypoxia increased free NADH levels in cancer cells, promoting CtBP recruitment to the E-cadherin promoter.

Reference may be made to an article entitled ''Structural basis for NADH/NAD+ redox sensing by a Rex family repressor'' by K.J. McLaughlin et al. published in *Mol. Cell,* 2010,

38, 563–575 developed the molecular mechanism for NADH/NAD(+) sensing among Rex family members by determining structures of thermus aquaticus Rex which bound to NAD(+) and DNA operator.

Reference may be made to an article entitled ''Magnetic nanoparticles with fluorescence and affinity for DNA sensing and nucleus staining'' by C. Liu et al. published in *RSC Adv.*, 2017, 7, 5937–5947 reports fuorescence magnetic nanoparticles which are for specific DNA adsorption and are promising for fuorescent labeling and DNA separation.

Reference may be made to US4777019A, 11 Oct 1988, which reports semiconductor devise for selective detection of complementary biological monomer consisting of a purine, pyrimidine and nucleotide.

Reference may be made to an article entitled ''Novel electrochemical biosensor for simultaneous detection of adenine and guanine based on Cu_2O nanoparticles'' by J. Chomouckaaet et al. published in *Procedia Engineering,* 2012, 47, 702–705 reports a Cu_2O nanoparticles based novel electrochemical sensor for sensitive detection of adenine and guanine.

Reference may be made to an article entitled ''A colorimetric assay for the quantitation of free adenine Applied to determine the enzymatic activity of ribosome-inactivating proteins'' by I. Heisleret al. published in *Analytical Biochemistry, 2002, 302, 114–122* developed a high-throughput, enzyme-based colorimetric assay for adenine quantitation.

Reference may be made to an article entitled ''Label-free DNA sensor based on fluorescent cationic polythiophene for the sensitive detection of hepatitis B virus oligonucleotides'' by H. Guan et al. published in *Luminescence,* 2010, 25, 311–316 reports a water-soluble fluorescent polythiophene that allows specific recognition and sensitive detection of oligonucleotides related to YMDD mutation of HBV.

Luminescence-based methods are popular and powerful tool for detecting biologically active species due to its simplicity, excellent sensitivity, and well-defined spatiotemporal resolutions. Till date no fluorescent formulas for the detection of adenine has been reported. The reported biosensors for the detection of adenine were mostly based on electrochemical sensing. But these cannot be used in live cells.

Considering this opportunity, for the first time we are demonstrating a fluorescent OFF-ON based molecular formula for the specific detection and quantification of adenine with excellent sensitivity. We are also reporting a new approach for the detection of adenine in AMP, ADP, ATP and DNA also. To the best of our knowledge, such an example is not available in the contemporary literature. Accordingly, the present invention provides a compound which allow for sensitive and selective detection of adenine.

OBJECTIVE OF THE INVENTION:

The main objective of the present invention is to provide a novel compound of formula (I).

Another objective of the present invention is to provide a process for the preparation of compound of formula (I).

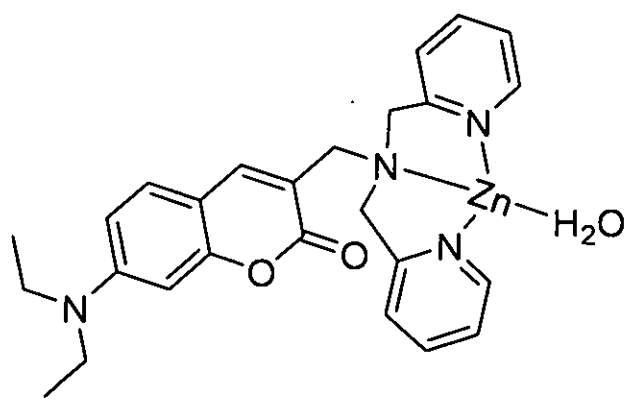
Yet another objective of the present invention is to provide use of compound of formula (I) for the detection of adenine.

Yet another object of the present invention is to detect adenine in AMP, ADP, ATP and DNA at very low concentration (μM).

Still another objective of the present invention is to provide a kit for the detection of adenine in biological systems comprising compound of formula (I).

SUMMARY OF THE INVENTION:

Accordingly, the present invention provides a compound of formula (I);



Formula (I)

In another embodiment, the present invention provides a process for the preparation of compound of formula (I) comprising the steps of:

a) Step-1: Adding $NaBH_4$ to a solution of 7-(diethylamino)-2-oxo-2H-chromene-3-carbaldehyde [compound (A)] in ethanol followed by stirring the reaction mixture at 20-50 °C for the period in the range of 4 to 6 hrs. The crude product was purified by column chromatography to yield the orange crystals of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)].

b) Step-2: Adding triethyl amine and methane sulfonyl chloride to the solution of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)] at temperature in the range of 0 to 4 °C for the period in the range of 1 to 2 hrs to afford the reaction mixture. This crude product was further react with LiBr and Di-(2-picolyl)amine to yield the yellow crystals of compound (C).

c) Step-3: Adding $Zn(ClO_4)_2$, xH_2O to a solution of [3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one] [compound (C)] in methanol followed by stirring the mixture at 20-50 °C for the period of 6 hrs. Yellow color precipitate appeared, which was filtered off and dried in air to get the desired complex (formula I).

In yet another embodiment, the present invention provides use of compound of formula (I) for the detection of adenine.

In preferred embodiment, the present invention provides use of compound of formula (I) as reagent for detection of adenine in AMP, ADP, ATP and DNA.

In still another embodiment, the present invention provides a kit for the detection of adenine comprising at least compound of formula (I).

BRIEF DESCRIPTION OF THE DRAWINGS:

Fig. 1: Absorption spectrum of formula (I) (5 μM) in aqueous HEPES buffer having pH 7.4.

Fig. 2: Change in emission intensity of formula (I) in presence and absence of different interfering analytes in aqueous HEPES buffer (pH 7.4).

Fig. 3: Emission titration profile of formula (I) (5 μM) with varying [adenine] (0–50 μM) in aqueous HEPES buffer (pH 7.4).

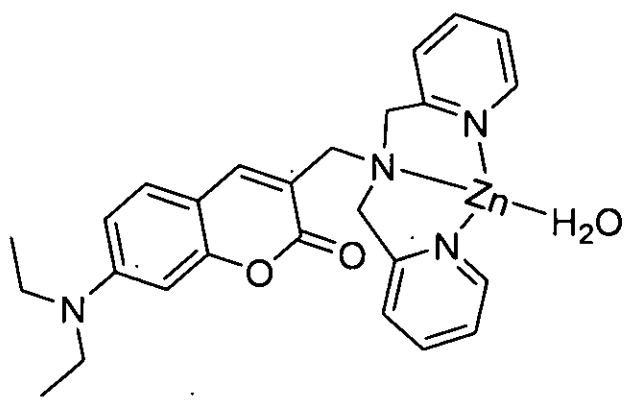
Fig. 4: Change in emission intensity of different adenine derivatives in aqueous HEPES buffer (pH 7.4).

Fig. 5: ^{31}Phosphorus NMR of AMP and AMP+ formula (I) in D_2O

DETAILED DESCRIPTION OF THE INVENTION

The invention will now be described in detail in connection with certain preferred and optional embodiments, so that various aspects thereof may be more fully understood and appreciated.

In the view of above, the present invention provides a compound of formula (I);



Formula I

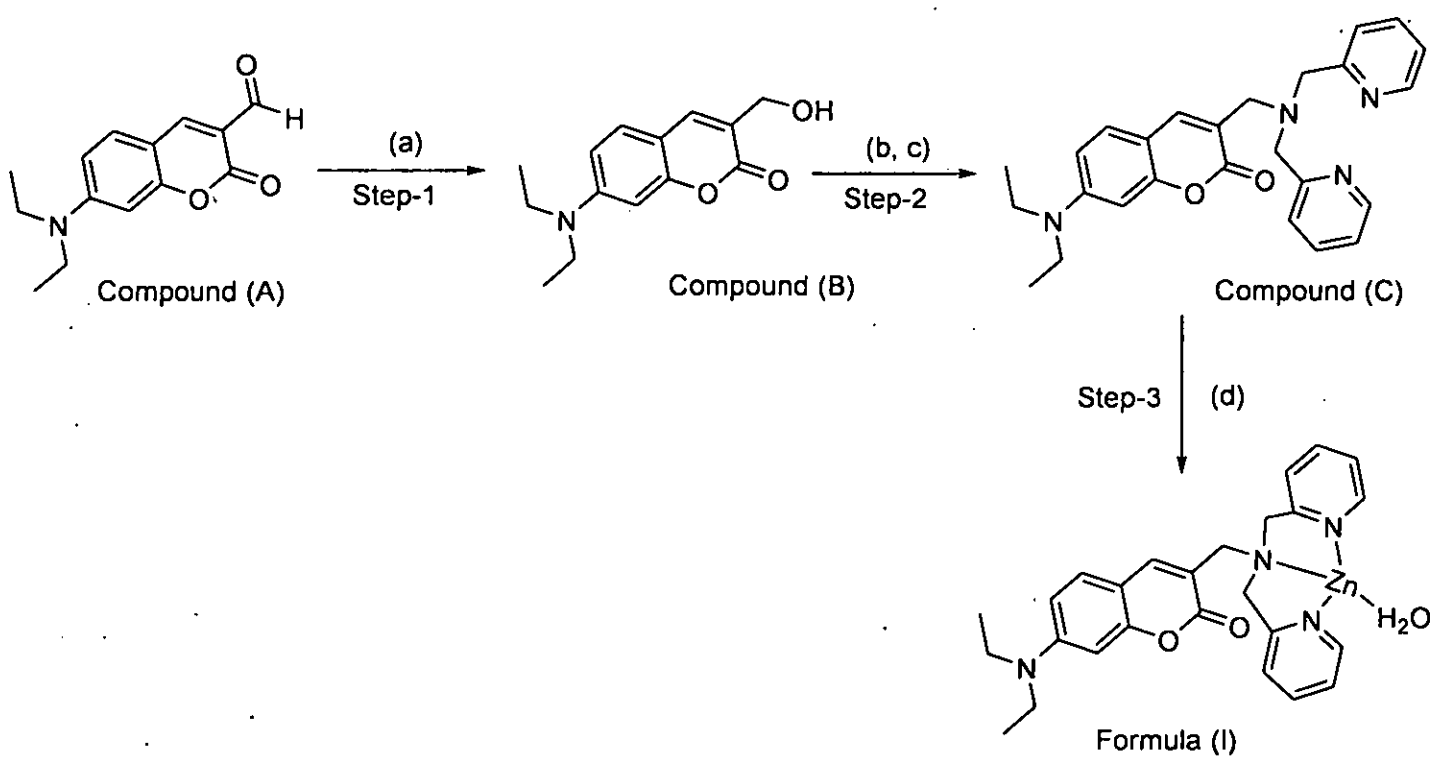
In another embodiment, the present invention provides a process for the preparation of compound of formula (I) comprising the steps of:

a) Step-1: Adding $NaBH_4$ to a solution of 7-(diethylamino)-2-oxo-2H-chromene-3-carbaldehyde [compound (A)] in ethanol followed by stirring the reaction mixture at 20-50 °C for the period in the range of 4 to 6 hrs. The crude product was purified by column chromatography to yield the orange crystals of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)].

b) Step-2: Adding triethyl amine and methane sulfonyl chloride to the solution of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)] at temperature in the range of 0 to 4 °C for the period in the range of 1 to 2 hrs to afford the reaction mixture. This crude product was further react with LiBr and Di-(2-picolyl)amine to yield the yellow crystals of compound (C).

c) Step-3: Adding $Zn(ClO_4)_2$, xH_2O to a solution of [3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one] [compound (C)] in methanol followed by stirring the mixture at 20-50 °C for the period of 6 hrs. Yellow color precipitate appeared, which was filtered off and dried in air to get the desired complex (formula I).

The process for the preparation of formula (I) is as shown scheme 1;



Scheme 1: Synthetic Methodology of Formula (I): (a) $NaBH_4$, ethanol; (b) methane sulfonyl chloride, DCM; (c) LiBr. THF; (d) $Zn(ClO_4)_2$, xH_2O, Methanol.

In yet another embodiment, the present invention provides use of compound of formula (I) for the detection of adenine.

In preferred embodiment, the present invention provides use of compound of formula (I) as reagent for detection of adenine in AMP, ADP, ATP and DNA.

The spectroscopic properties of Formula (I) in aq. HEPES buffer medium under physiological pH (7.4) medium (Fig. 1). In order to check the response of formula (I) (5 μM) with in presence of 10 mole equivalent of various anions (NO_3^-, NO_2^-, HO^-, $H_2PO_4^-$, HPO_4^-, PPi, O_2^-, NH_2NH_2, Cl^-, Br^-, I^-, and $CH_3CO_2^-$), nucleobases (adenine, guanine, cytosine thymine and uracil) and adenine derivatives (AMP, ADP and ATP), emission spectra are recorded in aq. HEPES buffer medium are shown in Fig. 2-4.

From fig. 2 it is observed that there is no change in emission intensity in presence of NO_3^-, NO_2^-, HO^-, $H_2PO_4^-$, HPO_4^-, PPi, O_2^-, NH_2NH_2, Cl^-, Br^-, I^-, and $CH_3CO_2^-$ guanine, cytosine thymine and uracil, except adenine. In Fig. 3 a turn ON emission response is observed for formula(I), only in presence of adenine and its derivatives (AMP, ADP and ATP) with λ_{Ems}^{Max} = 500 nm (λ_{Ext} = 400 nm). The effects of pH on emission spectrum of formula (I) is also investigated. The emission intensity of the formula (I) remains unaltered within the pH range 4-10. Therefore, to explore the bio analytical application, all the studies are carried out at physiological pH medium.

The formula (I) itself shows a weak emission spectrum (λ_{Ext} = 400 nm) in aq-PBS buffer medium. An enhancement in emission signal are observed at λ_{Max} = 500 nm with gradual increasing [adenine] (Fig. 3). A good linearity is observed between emission intensity and concentration of adenine in the range of 1 - 20 μM, with a lower detection limit of 1μM. All these result demonstrate that formula (I) detect trace amount of adenine quantitatively with high sensitivity under physiological pH in aq. HEPES buffer medium.

Formula (I) only binds with adenine not with phosphate group. ^{31}P clearly indicates that the formula (I) has no interaction with the phosphorus of AMP, ADP, ATP.

In still another embodiment, the present invention provides a kit for the detection of adenine comprising at least compound of formula (I).

The following examples, which include preferred embodiments, will serve to illustrate the practice of this invention, it being understood that the particulars shown are by way of example and for purpose of illustrative discussion of preferred embodiments of the invention.

Examples Following examples are given by way of illustration therefore should not be construed to limit the scope of the invention.

Example 1

Synthesis of Formula (I)

Step A: Preparation of Compound (B) [7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one]

a) To a solution of 7-(diethylamino)-2-oxo-2H-chromene-3-carbaldehyde [compound (A)] (5 g, 20.4 mmol) in ethanol, $NaBH_4$ (1.16 g, 30.6 mmol) was added and stirred at 20 °C for 4 hr.

The solvent was removed under reduced pressure and the crude product was neutralized with HCL (1M). The crude product was further purified by silica gel column chromatography by using 5% acetone in DCM medium to yield the orange crystals of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)]. Yield 41%.

b) To a solution of 7-(diethylamino)-2-oxo-2H-chromene-3-carbaldehyde [compound (A)] (5 g, 20.4 mmol) in ethanol, $NaBH_4$ (1.16 g, 30.6 mmol) was added and stirred at 30 °C for 4 hr. The solvent was removed under reduced pressure and the crude product was neutralized with HCL (1M). The crude product was further purified by silica gel column chromatography by using 5% acetone in DCM medium to yield the orange crystals of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)]. Yield 36%.

c) To a solution of 7-(diethylamino)-2-oxo-2H-chromene-3-carbaldehyde [compound (A)] (5 g, 20.4 mmol) in ethanol, $NaBH_4$ (1.16 g, 30.6 mmol) was added and stirred at 50 °C for 4 hr. The solvent was removed under reduced pressure and the crude product was neutralized with HCL (1M). The crude product was further purified by silica gel column chromatography by using 5% acetone in DCM medium to yield the orange crystals of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)]. Yield 21%.

^{1}H NMR ($CDCl_3$, 400 MHz, δ ppm): 8.66 (1H, s), 7.46 (1H, d, *J* 4.0), 6.71 (1H, d, *J* 4.0), 6.54 (1H, s), 4.28 (2H, s), 3.55-3.44 (4H, m), 1.27 (6H, t, *J* 4.0), ^{13}C NMR ($CDCl_3$, 125 MHz): 161.65, 157.30, 150.64, 128.36, 126.78, 125.60, 109.19, 104.32, 97.22, 59.59. 44.31, 12.75.

Step B: Preparation of Compound (C) [3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one]

To a solution of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one [compound (B)] (1 g, 4.0 mmol) in anhydrous DCM / Chloroform / THF, TEA (490.5 mg, 4.9 mmol) and methane sulfonyl chloride (556.3 mg, 4.9 mmol) was added and the reaction mixture is stirred at 0^0C for 2 hr. The reaction mass was washed with satd.$NaHCO_3$ solution, water and brine solution. The solvent was removed to yield the crude product and dissolved in anhydrous THF followed by the addition of the LiBr (excess) and stirred the reaction mixture for 1 hr at room temperature. After that excess Di-(2-picolyl)amine was added to the reaction mixture and again stirred for 24h at room temperature. Then the solvent was removed under reduced pressure and extracted with DCM. The crude product was further purified by silica

gel column chromatography by using 20% acetone in DCM medium to yield the yellow solid of 3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one [compound (C)]. Yield 71% (for DCM); 69% (for chloroform); 51% (for THF).

^{1}H NMR ($CDCl_3$, 400 MHz, δ ppm): 8.54 (2H, d, *J* 4.0), 7.68 (2H, t, *J* 4.0), 7,54 (2H, d, *J* 8.0), 7.48 (1H, d, *J* 8.0), 7.17 (2H, t, *J* 4.0), 6.54 (1H, d, *J* 8.0), 6.67 (2H, s), 3.90 (4H, s), 3.83 (2H, s), 3.40 (4H, d, *J* 8.0), 1.19 (6H, t, *J* 4.0). ^{13}C NMR ($CDCl_3$, 125 MHz): 162.46, 158.62, 156.22, 153.49, 150.40, 149.06, 136.66, 125.29, 122.98, 122.29, 108.31, 107.66, 97.54, 60.59, 54.37, 44.65, 12.42

Step C: Preparation of compound of Formula (I)

a) 3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one [compound (C)] (500mg, 1.17 mmol) was dissolved in 50 mL of methanol. To this, $Zn(ClO_4)_2$, xH2O (521 mg, 1.4 mmol) solution in 10 mL HPLC water was added in a drop wise manner. The resultant solution mixture was allowed to stir for 6 h at 20 °C. A yellow coloured precipitate appeared, which was filtered off and dried in air to get the desired formula (I) in pure form (Yield: 78%).

b) 3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one [compound (C)] (500mg, 1.17 mmol) was dissolved in 50 mL of methanol. To this, $Zn(ClO_4)_2$, xH2O (521 mg, 1.4 mmol) solution in 10 mL HPLC water was added in a drop wise manner. The resultant solution mixture was allowed to stir for 6 h at 30 °C. A yellow coloured precipitate appeared, which was filtered off and dried in air to get the desired formula (I) in pure form (Yield: 63%).

c) 3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one [compound (C)] (500mg, 1.17 mmol) was dissolved in 50 mL of methanol. To this, $Zn(ClO_4)_2$, xH2O (521 mg, 1.4 mmol) solution in 10 mL HPLC water was added in a drop wise manner. The resultant solution mixture was allowed to stir for 6 h at 50 °C. A yellow coloured precipitate appeared, which was filtered off and dried in air to get the desired formula (I) in pure form (Yield: 49%).

^{1}H NMR (400 MHz, dmso-d6) δ (ppm): 8.45(2H, d, *J* 4.0), 7.77 (2H, t, *J* 4.0), 7,58 (2H, d, *J* 4.0), 7.54 (1H, d, *J* 8.0), 7.27 (2H, t, *J* 4.0), 6.64 (1H, d, *J* 8.0), 6.42 (1H, s), 6.29 (1H, s), 3.89 (4H, s), 3.84 (2H, s), 3.43 (4H, d, *J* 4.0), 1:17 (6H, t, *J* 4.0). ^{13}C NMR ($CDCl_3$, 125

MHz): 160.92, 155.86, 154.61, 151.14, 148.04, 141.19, 126.23, 125.37, 111.36, 109.25, 108.42, 97.69, 57.00, 44.43, 12.91.

Example 2

Detection of adenine by Kit

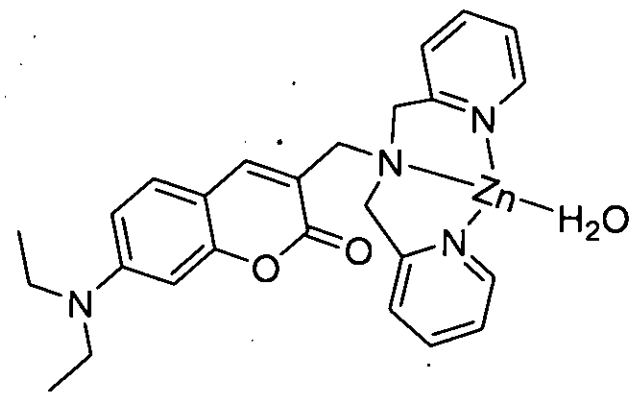
General experimental procedure for UV-Vis and Fluorescence studies: Stock solution of formula (I) (1×10^{-4} M) was prepared in aqueous HEPES buffer (10 mM) at pH 7.4 water. All the analytes stock solution (1×10^{-2} M) was prepared in aqueous HEPES buffer (10 mM) at pH 7.4. 500 µL of this stock solution of formula (I) was added to 10 ml of HEPES (10mM) aqueous buffer medium having solution pH 7.4 to make the effective formula (I) concentration of (1×10^{-5}) M. This solution was used for all the photophysical studies. All the photophysical studies were performed in aq. HEPES buffer medium at pH7.4. All emission studies were done using λ_{Ext} = 400 nm with an emission slit width of 6 nm, unless and otherwise mentioned.

ADVANTAGES OF THE INVENTION:

1. The reagent of the present invention specifically detects adenine over other nucleobases at physiological pH.
2. The reagent of the present invention could be used for the detection of adenine in different adenine derivatives (AMP, ADP and ATP).
3. The formula (I) can also be used to monitor (rate kinetics) the synthesis of adenine, which plays a critical role in activity of various toxins and immunotoxins and other ribosome deactivating proteins like gelonin and ricin.
4. The reagent of the present invention can be utilized to detect DNA with lower detection limit.
5. The present invention further relates to a kit comprising compound of formula (I).

We Claim:

1. A compound of formula I

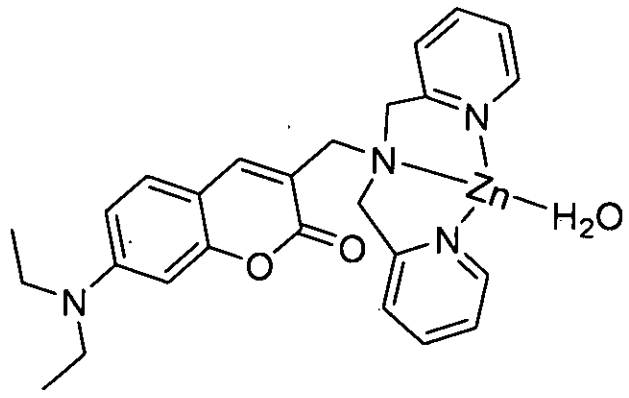


Formula I

2. The compound as claimed in claim 1, wherein said compound is useful for the detection of adenine.

3. The compound as claimed in claim 1, wherein said compound is useful for the detection of adenine in AMP, ADP, ATP and DNA at micro molar (uM) range.

4. A process for the preparation of compound of formula I



Formula I

comprising the steps of:

a. adding $NaBH_4$ to a solution of 7-(diethylamino)-2-oxo-2H-chromene-3-carbaldehyde in ethanol followed by stirring at a temperature ranging between 20-50°C for a period in range of 4 to 6 hours;

b. purifying the reaction mixture obtained in step (a) by column chromatography to obtain orange crystals of 7-(diethylamino)-3-(hydroxymethyl)-2H-chromen-2-one compound [B];

c. dissolving compound B in organic solvent to obtain a solution;

d. adding organic base and methane sulfonyl chloride to the solution obtained in step (c) at a temperature ranging between 0 to 4 °C for the period in the range of 1 to 2 hours to obtain a reaction mixture;

e. the reaction mixture charging as obtained in step (d) with LiBr and Di-(2-picolyl) amine to yield the yellow crystals of 3-((bis(pyridin-2-ylmethyl)amino)methyl)-7-(diethylamino)-2H-chromen-2-one compound [3];

f. adding $Zn(ClO_4)_2$, xH_2O to the alcoholic (methanol/ethanol) as solution of compound 3 obtained in step (e) followed by stirring at a temperature ranging between 20-50°C for a period in the range of 4-6 hours to obtain a reaction mass;

g. filtering off the reaction mass as obtained in step (f) followed by drying to obtain compound of formulas [1].

5. The process as claimed in claim 4 wherein, the organic solvent used is selected from the group consisting of dichloromethane, chloroform and tetrahydrofuran.

6. The process as claimed in claim 4, wherein, the organic base used is selected from the group consisting of diethylamine, trimethylamine and pyridine.

Dated this 4th day of July 2017

Kapil Arya

Scientist
Innovation Protection Unit
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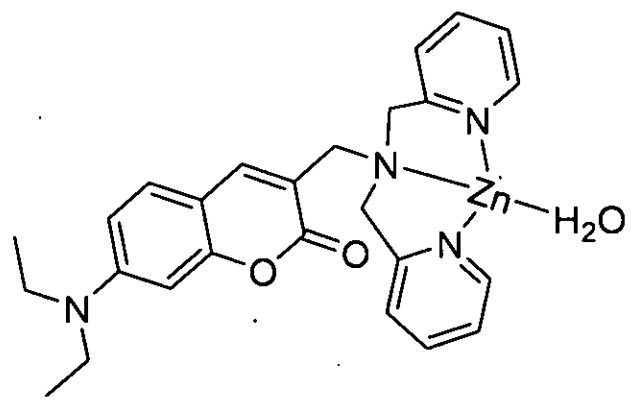
A NOVEL COMPOUND FOR THE DETECTION OF ADENINE AND PROCESS FOR PREPARATION THEREOF

Abstract:

Adenine is a purine nucleobase which is used in forming nucleotides of the nucleic acids. The present invention relates to compound of formula I which can detect free adenine and even in AMP, ADP, ATP and DNA at very low concentration. The compound of formula I is a sensor molecule for fluorescence or luminescence-based detection of adenine analyte. Further, the invention relates to process for the preparation of compound of formula I. A kit is prepared by using the compound of formula I for the detection of adenine.



Formula I

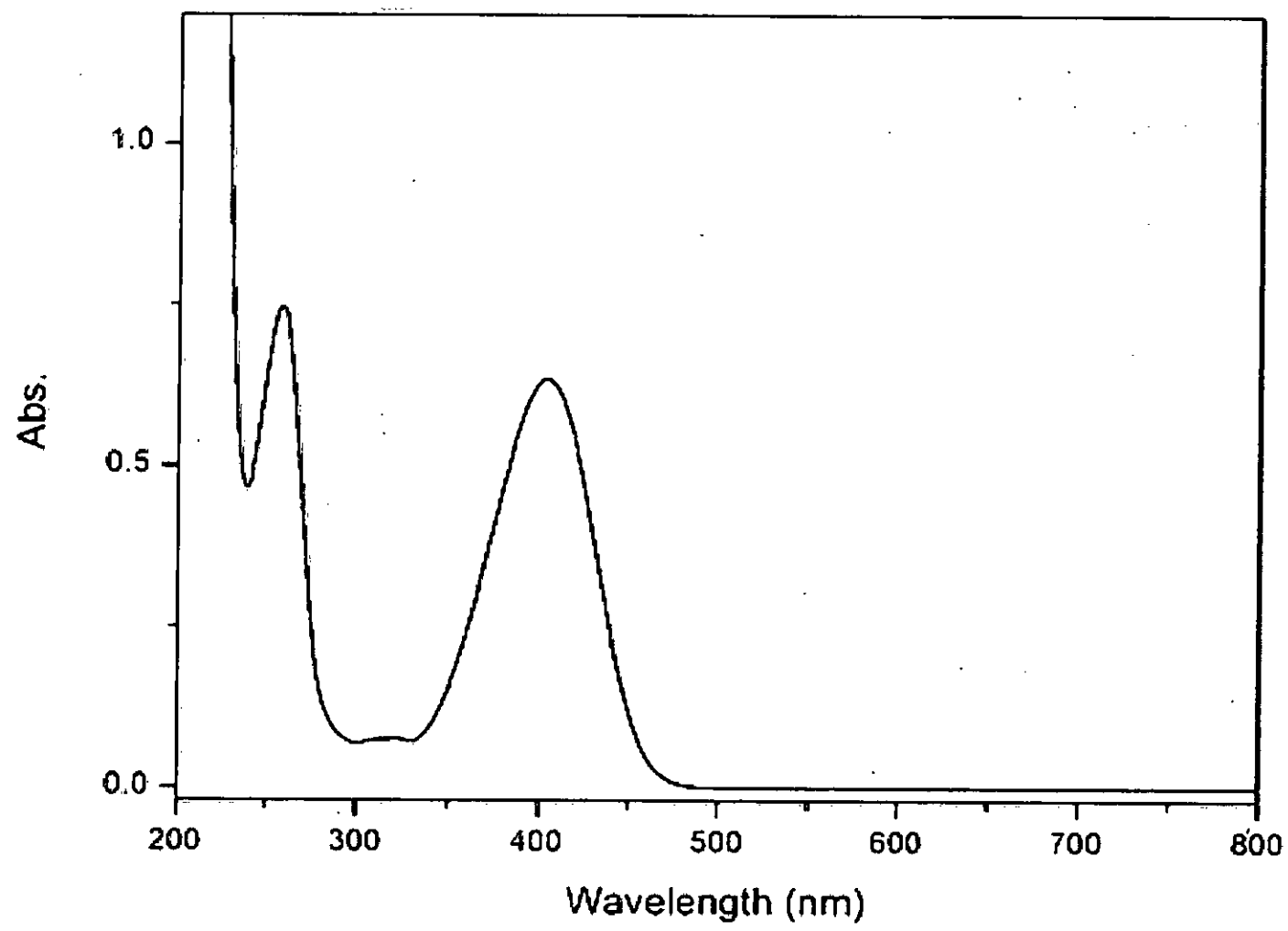


Figure:- 1

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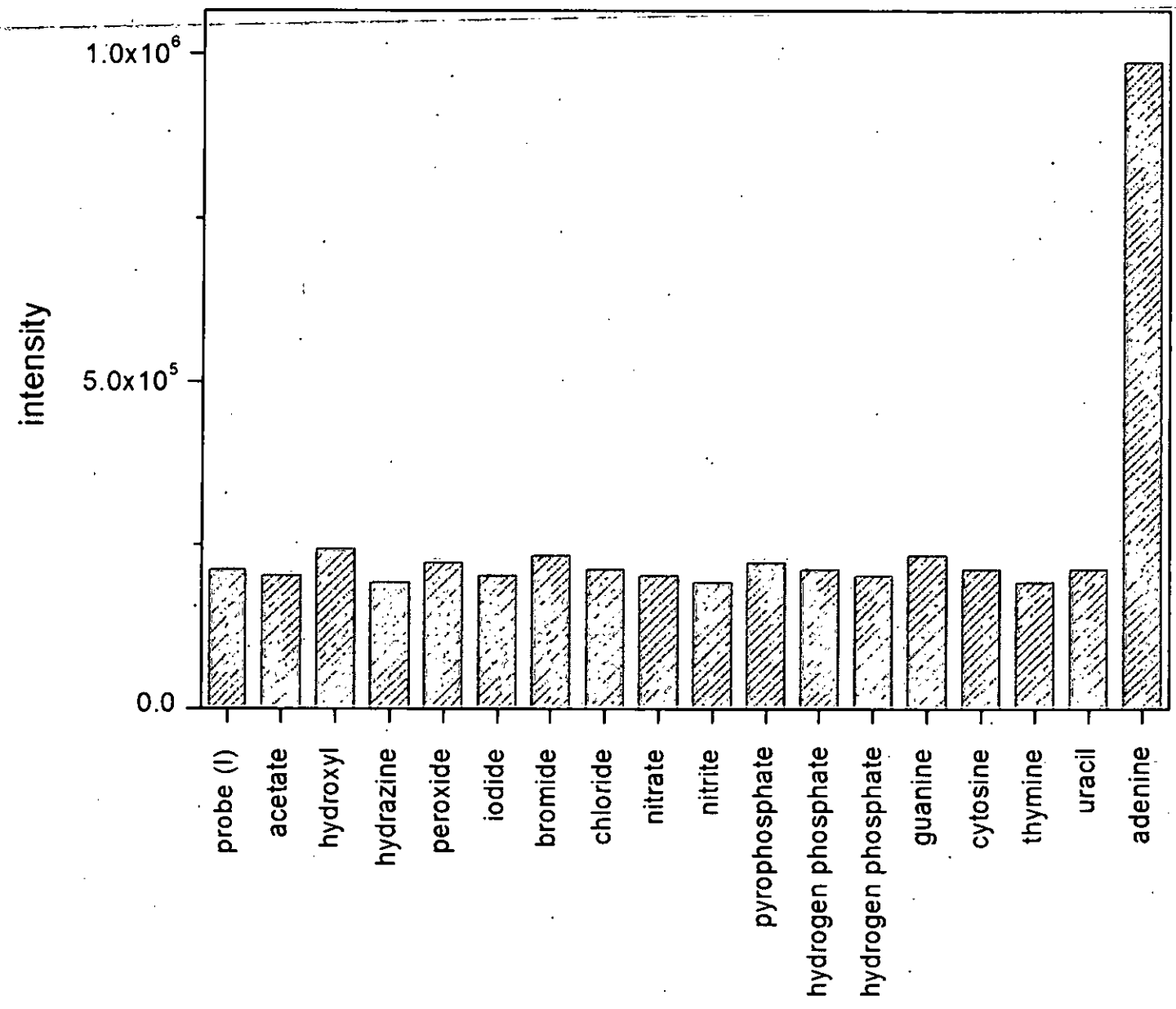

Figure:- 2

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14, सत्संग विहार मार्ग / 14, Satsang Vihar Marg
नई दिल्ली-110067 / New Delhi-110067

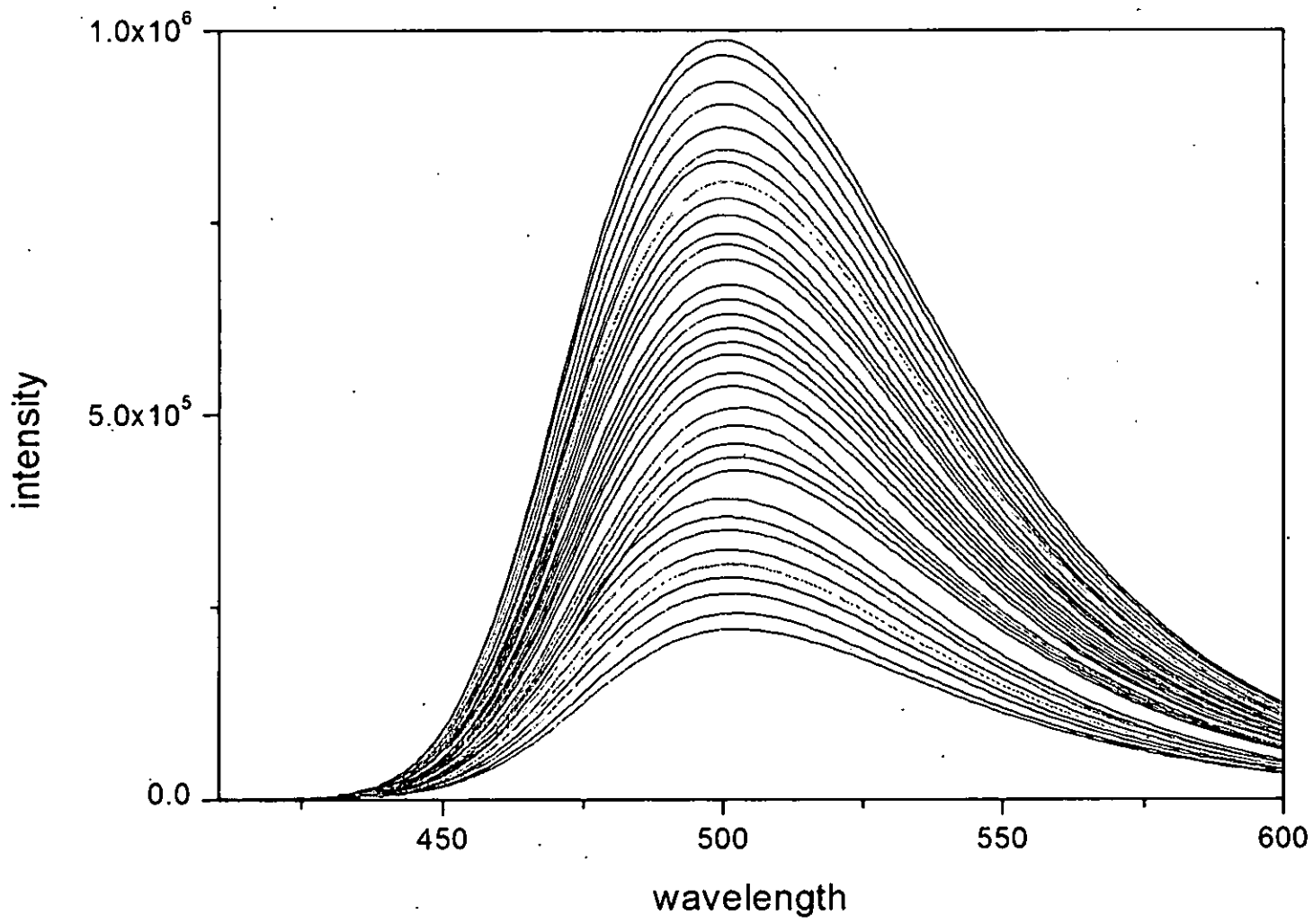

Figure:-3

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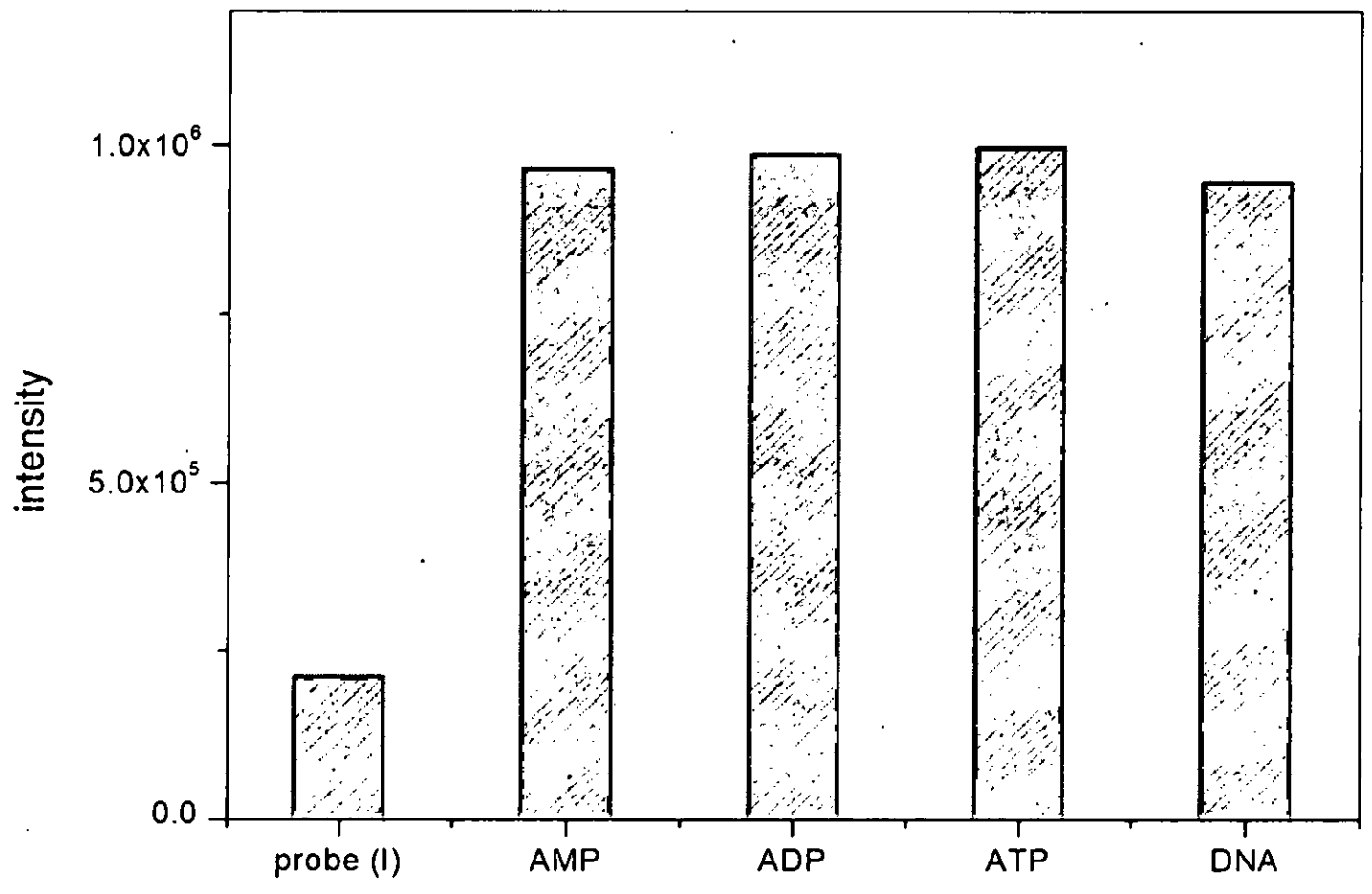

Figure:- 4

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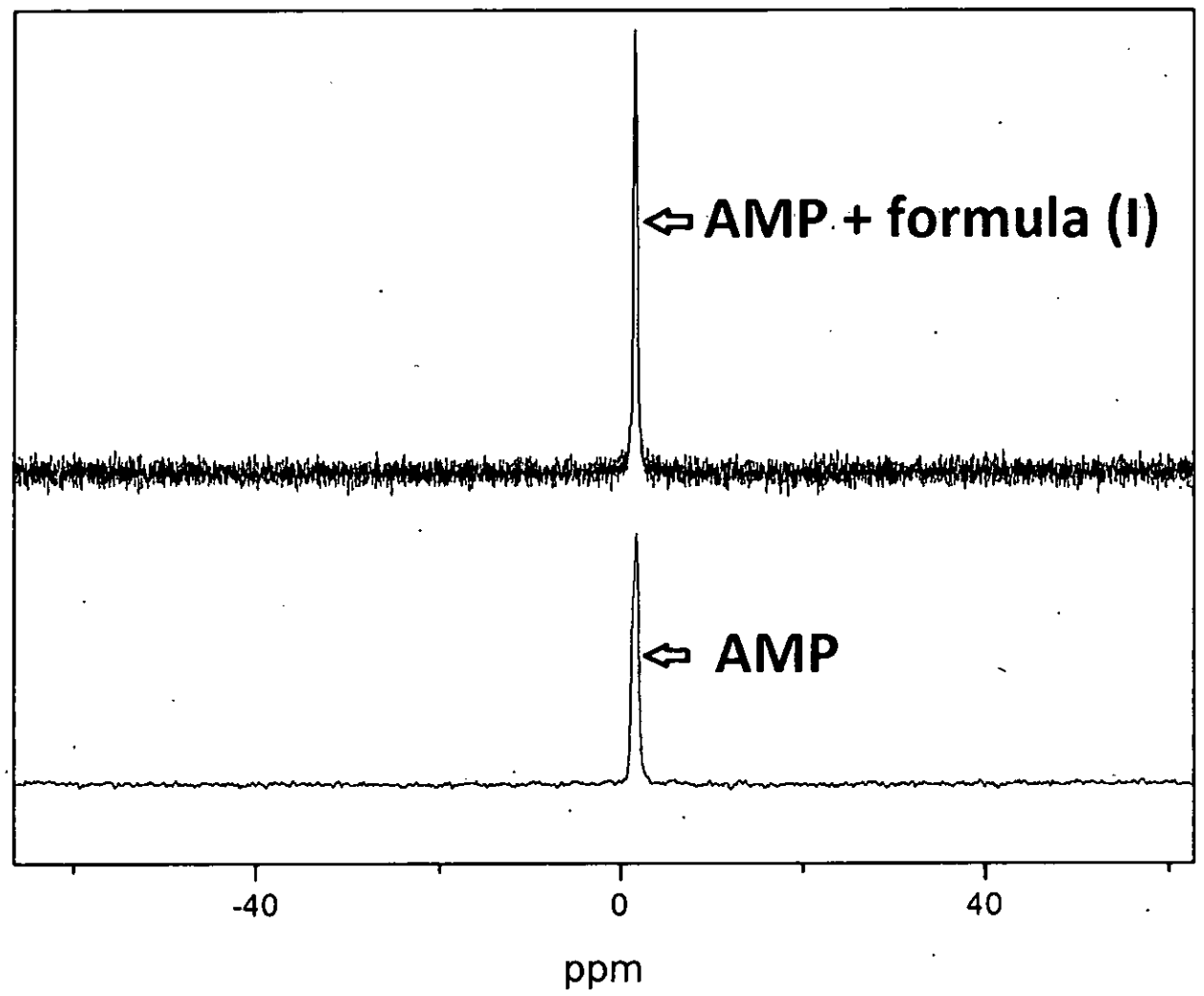

Figure:- 5

Kapil Arya

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