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**To Whom It May Concern:**

This is to certify that Dr. Tajo ABRAHAM was a fulltime employee as Manager, Research and Development at BENCHBIO PRIVATE LIMITED (BBIO) from September 2007 to March 2010.

BBIO is a contract service and research company offering solutions to agro-biotech industry. It is one of the group companies of United Phosphorus Limited (UPL), Mumbai. BBIO's core activity is based on a French technology developed and patented by INRA/URGV lab, Evry, France.

Dr. ABRAHAM was the key scientist responsible for genomic programmes of BBIO. He was the overall manager for scientific activities; therefore, Dr. ABRAHAM is well trained at URGV, France on Gemonics techniques. He has played leading role in technology transfer and establishment of 'TILLING' (non-GMO techniques for crop improvement) platform in India. He is well experienced in plant molecular techniques, especially in PCR, SNP Discovery, rDNA and transformation. He was in charge of project management and training of staff scientists. Under his guidance BBIO team could complete major European projects successfully.

He has pleasant personality and gets well along with colleagues and scientists under his supervision.

I wish him all the success for his career.

Dr. Manash CHATTERJEE  
DIRECTOR  
BENCHBIO PVT LTD

8 March, 2010

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**Fwd: Patent for Vibrator shaker granted**

3 messages

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**Tajo Abraham** <tajo.abraham@gmail.com>  
To: ashwani272@gmail.com

Fri, Nov 29, 2019 at 7:42 AM

----- Forwarded message -----

From: **anish kumar** <anishkumarpk@gmail.com>  
Date: Tue, 30 Jul 2019 at 12:53  
Subject: Patent for Vibrator shaker granted  
To: Tajo Abraham <tajo.abraham@gmail.com>

Dear sir,

I hope you and your family are doing good.. and hope that your work is going great.

The patent for the Vibrator shaker has been published and granted.

**Granted Application, Patent Number :312992**

and Patent Application number 2308/MUM/2009

<http://ipindiaservices.gov.in/PatentSearch/PatentSearch/ViewApplicationStatus>

This has reference to Indian Patent application No. 2308/MUM/2009 relating to method and apparatus for gravity assisted high throughput disruption of cellular material. Please note that the said application has been granted. The granted claims are attached for your ready reference.

<https://ipindiaservices.gov.in/PublicSearch/PublicationSearch/PatentDetails>Thanks & Regards,  
Anish

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 **granted claims.pdf**  
1189K

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**Ashwani kumar** <ashwani272@gmail.com>  
To: Tajo Abraham <tajo.abraham@gmail.com>

Fri, Nov 29, 2019 at 7:45 AM

thank you sir

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**Dr. Ashwani Kumar N***Assistant Professor**Department of Chemistry**Sir Syed College (Affiliated to Kannur University)**Karimbam Post**Taliparamba**Kannur District**Kerala, INDIA 670142**Mobile : +91-9744773662*  
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[Quoted text hidden]

**Tajo Abraham** <tajo.abraham@gmail.com>  
To: Ashwani kumar <ashwani272@gmail.com>

Mon, Jul 29, 2024 at 10:47 AM

[Quoted text hidden]

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**granted claims.pdf**

1189K





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सत्यमेव जयते

भारत सरकार  
GOVERNMENT OF INDIA

पेटेंट कार्यालय  
THE PATENT OFFICE

पेटेंट प्रमाणपत्र  
PATENT CERTIFICATE  
(Rule 74 Of The Patents Rules)

क्रमांक : 022104738  
SL No :



पेटेंट सं. / Patent No. : 312992  
आवेदन सं. / Application No. : 2308/MUM/2009  
फाइल करने की तारीख / Date of Filing : 06/10/2009  
पेटेंटी / Patentee : BENCH BIO PRIVATE LIMITED

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित METHOD AND APPARATUS FOR GRAVITY ASSISTED HIGH THROUGHPUT DISRUPTION OF CELLULAR MATERIAL. नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 6th day of October 2009 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled METHOD AND APPARATUS FOR GRAVITY ASSISTED HIGH THROUGHPUT DISRUPTION OF CELLULAR MATERIAL. as disclosed in the above mentioned application for the term of 20 years from the 6th day of October 2009 in accordance with the provisions of the Patents Act,1970.



अनुदान की तारीख : 21/05/2019  
Date of Grant :

पेटेंट नियंत्रक  
Controller of Patent

*OkSupte*

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, 6th day of October 2011 को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 6th day of October 2011 and on the same day in every year thereafter.



## **WE CLAIM:**

1. An apparatus for gravity assisted disruption of a plurality of organic cellular material including DNA within a plant cell, the apparatus being operated at a frequency of about 800 to 1200 revolutions per minute, the apparatus comprising:
  - (a) a motor (1) being initiated for a duration up to 20-30 seconds ;
  - (b) a rotatable motor shaft (2) connected to said motor (1) and having one end protruding out of said motor (1);
  - (c) a second rotatable shaft (4, 5) housed within an apparatus casing (11) and being rotatably connected to the motor shaft;
  - (d) a crank disposed on said second rotatable shaft (4, 5) which receives rotatory motion from the second shaft and converts the received rotatory motion into reciprocating motion of a connecting rod (8) connected thereto through a crank pin (7);
  - (e) a crank pin (7) disposed on said crank and adapted to accommodate a connecting rod (8);
  - (f) a connecting rod (8) being connected to said crank through said crank pin (7) at a first end such that the reciprocating motion generated by the crank is received by the connecting rod (8) through the crank pin (7) and transmitted to a piston shaft (9) connected at second end of said connecting rod (8) through a provided second crank pin (7);
  - (g) a piston shaft (9) having a first end connected to said connecting rod (8) through the second crank pin (7) and a second end protruding out of said apparatus casing;
  - (h) a platform (16) placed on said protruding end of the piston shaft (9) and adapted to hold a plurality of sample boxes;
  - (i) a clamping plate adapted to cover a plurality of sample boxes placed on the platform, said clamping plate having a plurality of apertures, each said aperture being threaded internally; and
  - (j) a plurality of tie rods (15) being externally threaded through a substantial length thereof such that said internal thread provided on said plurality of clamping plate apertures engages with said external thread provided on said tie rods (15) to hold said sample boxes firmly in place

such that a reciprocating motion of said piston shaft (9) causes a vertical motion of the sample box, each said sample box having a plurality of wells provided therein, each said well accommodating a vial containing an organic cellular material along with at least two metallic, preferably steel balls such that a vertical motion of the sample box causes the provided balls to impact each other thereby disrupting the organic cells placed in each vial accommodated within the wells and releasing the cellular material.

2. The apparatus as claimed in claim 1, wherein said motor has a power denomination of about 1 hp to about 2 hp, preferably about 1.5 hp.
3. The apparatus as claimed in claim 1 or claim 2, wherein protruding end of said motor shaft is connected to first end of said second rotatable shaft through a coupling.
4. The apparatus as claimed in claim 1, further comprising a supporting plate capable of supporting the apparatus casing along with the second rotatable shaft, the crank casing, the crank, the crank pin, the connecting rod and the piston shaft.
5. The apparatus as claimed in claim 4, wherein the bottom face of said supporting plate comprises a plurality of cushion springs adapted to absorb the vibrations generated during the operation of the apparatus.
6. A system for gravity assisted disruption of a plurality of organic cellular materials comprising:
  - (a) an apparatus according to any one of claims 1 to 4; and
  - (b) a control unit comprising at least a depressive start and a depressive stop button, a first display means displaying the number of oscillations per second conducted by the sample holder and adapted to allow an user of the system to digitally pre-set a predetermined oscillation frequency, a rotatable knob adapted to allow an user to vary the oscillation frequency during the operation of the machine unit, a second

display means displaying the time elapsed since the initiation of operation of the machine unit and adapted to allow an user to digitally pre-set a predetermined operation time, an emergency stop button to terminate the operation in between, such that upon the start button being depressed by a user, the motor (1) initiates a rotation in the motor shaft, coupling and the second shaft which is translated into a reciprocating motion of the connecting rod (8) and the piston shaft (9), the oscillating piston shaft (9) oscillates the sample box and the plurality of wells provided in said sample box, each said well accommodating a vial containing an organic cellular material along with at least two metallic, preferably steel balls such that a vertical oscillation of the sample box causes the provided balls to impact each other thereby disrupting the organic cells contained in said organic cellular material placed in each vial accommodated within the wells.

7. The system as claimed in claim 6, wherein said control unit is separately provided as an accompaniment or alternately, being attached to the apparatus such as, herein described.
8. A method for gravity assisted disruption of a plurality of organic cellular material comprising:
  - (a) providing an apparatus as claimed in any one claims 1 to 4;
  - (b) providing a control unit for said apparatus according to any one of claims 6 to 7;
  - (c) selecting at least one sample box having a plurality of wells provided therein;
  - (d) selecting a plurality of sample vials and placing a plurality of cellular material samples in said sample vials;
  - (e) freezing the cellular material samples by placing said at least one sample box in liquid nitrogen;
  - (f) upon reaching a predetermined freezing temperature, placing said at least one sample box on said platform (16) of provided apparatus and engaging said sample box between the platform (16) and clamping plate firmly in place with a provided plurality of tie rods;

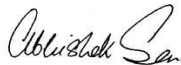
- (g) initiating the provided motor (1) for a predetermined amount of time which is less than about two minutes during which time the vertical oscillation of the sample box causes the provided balls to impact each other thereby disrupting the organic cells contained in said organic cellular material placed in each vial accommodated within the wells;
- (h) optionally reinitiating the provided motor (1) for another predetermined amount of time and allowing the motor (1) to stop after the passage of a predetermined amount of time; and
- (i) extracting the desired cellular material from said disrupted cellular material.

9 . The method as claimed in claim 8 wherein said apparatus is operated at a stroke length of 30 mm.

10.The method as claimed in claims 8-9, wherein extracting the desired cellular material from said disrupted cellular material comprises (a) adding an extraction buffer to the disrupted cellular material samples placed in said plurality of sample vials such that the disrupted samples are stabilized; and (b) storing the stabilized cellular materials.

11.The method as claimed in claims 8-10, wherein extracting the desired cellular material from said disrupted cellular material comprises (a) precipitating the cellular proteins and polysaccharides; (b) centrifuging the precipitated proteins and polysaccharides; (c) adding a binding buffer, in combination with ethanol, to cause the desired intracellular material to bind on a provided silica-based membrane; and (d) eluting the desired cellular material in a low salt buffer or deionized water.

Dated this the 5<sup>th</sup> day of October 2010.

  
Mr. Abhishek Sen  
IN/PA Reg. No.: 980  
Of S. Majumdar & Co.  
Applicant's Agent