
Fwd: Anti Firecracker Campaign Letter

Eco club delhi <ecoclub.delhi@gov.in>

Wed, Sep 27, 2017 at 3:25 PM

To: principalmsi@yahoo.co.in, pvkuhar@yahoo.co.in, amita_dev@hotmail.com, bobjos2001@yahoo.co.in, ap.delhi@nic.in, admin@rdias.ac.in, gautam.budha@rdias.ac.in, dean.usms@ipu.ac.in, dr_sanjivmittal@yahoo.co.in, info.delhi@iihmr.org, sanjivkumar@iihmr.org, divyaagarwal@iihmr.org, maitreyi1967@yahoo.co.in, slcm@shyamlal.du.ac.in, arkajagoswami@gmail.com, sunaina.zutshi@gmail.com, director@bciit.ac.in, adminofficer@bciit.ac.in, niranjana.soperna@awadh.org.in, krcollege@krcollege.in, sonia30111970@yahoo.co.in, kbasthana001@gmail.com, gndpoly.delhi@nic.in, achla001@hotmail.com, Bhaskaracharya.college@gmail.com, shvetambarivpci@gmail.com, director.ldims@gmail.com, directoracademics205@gmail.com, director.tecniaindia@gmail.com, directortias@tecnica.in, varunkumar@tecnica.in, director@iitmipu.ac.in, triptigautam@yahoo.co.in, salokaya@gmail.com, director@bcihmct.ac.in, rkbhandari@rediffmail.com, himanshu.anand@gmail.com, arvind@bcihmct.ac.in, poonam.himanshu.anand@gmail.com, info@mac.du.ac.in, principal@mac.du.ac.in, sondhisunil@yahoo.com, niraj658@gmail.com, jmcadmn@yahoo.co.in, rosilytjmc@gmail.com, sharda.bhatnagar25@gmail.com, sanjivgupta_india@yahoo.co.in, director@bcip.ac.in, jyotidhiya@bcip.ac.in, director@iitmjp.ac.in, monica.sharma.contact@gmail.com, vkag19@gmail.com, principal@aurobindo.du.ac.in, kaulsangeeta@hotmail.com, bhavnasharma007@yahoo.com, mait@mit.ac.in, mlgoyal@gmail.com, principaldihm@yahoo.com, rpihm11@gmail.com, acc.dihm@gmail.com, info@lbihm.com, principal@lbihm.com, principal.lbihm1@gmail.com, crrit.principal@gmail.com, mkjindal17@gmail.com, mca.hoda@gmail.com, pramod_200417@rediffmail.com, mca@bvicam.ac.in, shamsher@bcips.ac.in, admin@bcips.ac.in, gaura@bcips.ac.in, dminoffice@srcc.du.ac.in, principal@srcc.du.ac.in, srccant@gmail.com, kpwpoly.delhi@nic.in, sumanmann.2010@gmail.com, info@ssmi.in, ssmisunita@gmail.com, sirifortindia@gmail.com, sbcsprincipal@gmail.com, ramanavv@gmail.com, van.raman@sbs.du.ac.in, brijpalsingh101@gmail.com, kpc@msit.in, director@msit.in

Dear Principal,

Kindly find attached herewith the letter by **Deputy Chief Minister**, Govt. of NCT of Delhi on "**No Use of Fire Crackers**" campaign.

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Regards,

(Dr. B. C. Sabata)
Senior Scientific Officer
Department of Environment
Level-6, Wing-C,
Delhi Secretariat
New Delhi-110002
Tel.: 011-23392032
Mob.: 9717593506

 **Anti Fire Cracker Campaign.PDF**
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MANISH SISODIA
मनीष सिसोदिया



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GOVT. OF NCT OF DELH
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DELHI SECTT, I.P. ESTATE
दिल्ली सचिवालय, आई०पी०एस्टेट,
NEW DELHI-110002
नई दिल्ली-110002
Email : msisodia.delhi@gov.in

D.O. No. F.G./EC/Em/2016-17 ⁵⁰⁴⁰
Date : September, 2017

Dear Principal,

Greetings from the Government of NCT of Delhi on the eve of festive season.

You must be aware that air pollution affects the health of all living beings. During Diwali, which is a festival of light and happiness, the pollution levels increase manifold due to bursting of fire crackers/fireworks. The Department of Environment, Government of NCT of Delhi organizes Anti-Fire Cracker campaigns to control Air and Noise Pollution every year. Children play a major role in the success of this campaign.

The Eco-Clubs in schools/colleges always played an important role in the Anti-Fire Cracker and other environmental campaigns. The **"NO USE OF FIRE CRACKERS"** campaign may be spearheaded by your Eco-Club through Nukkad Nataks, Padyatras, Expert Lectures, Workshops etc. involving the children of your esteemed school.

Let us reach out to the citizens of Delhi through your activities and make the Anti-Fire Cracker campaign a huge success.

Also a Circular from Central Pollution Control Board (CPCB) is attached regarding chemical composition of fire-crackers.

The Government of NCT of Delhi wishes a **Safe and Happy Diwali** to all our citizens.


(MANISH SISODIA)



ए.बी. अकोलकर
सदस्य सचिव
A.B. AKOLKAR
Member Secretary

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
पर्यावरण एवं वन मंत्रालय
(भारत सरकार)

Central Pollution Control Board
Ministry of Environment & Forests
(Government of India)
Phone: 22307078/22303655

File. No 79/RD-FC/UPCD/2017 5722

Delhi Pollution Control Committee
Daily No. 8622
25 JUL 2017
MS
Sign. of Receiving Officer

Date: 14.07.2017

MS/568
25/07/17

To,

The Member Secretary
Delhi Pollution Control Committee
4th floor, ISBT Building, Kashmiri Gate
Delhi - 110006

Sub: Circulating of information on firecrackers for generating 'Public Awareness for firecrackers' as per the deliberations under the Writ Petition (Civil) No. 728/2015 regarding Chemical Composition of FIRECRACKERS in the Hon'ble Supreme Court - reg.

Sir,

This has reference to the deliberations of the last hearing dated: 07-07-2017 of the aforementioned case wherein the Hon'ble Supreme Court called upon the DPCC/Delhi Govt. to explore the possibility of generating 'Public Awareness regarding health hazards of firecracker' by circulating relevant information as highlighted in CPCB's Affidavit, that was submitted to Hon'ble Supreme Court as an Annexure (Page - 68 enclosed). The same may be circulated to all Schools in Delhi (all Govt., Private, NDMC, MCD and Delhi Cantonment Schools).

An intimation regarding action taken in this regard may kindly be forwarded to this office.

497/Lab(A)
27/07/2017

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SS(A)

Yours faithfully

(A B AKOLKAR)

Enclosed: as above

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A

Known Health Impacts From Bursting Firecrackers Caused Due To Their Chemical Composition

1. Ingredients used in FOUR commonly used sound producing fire crackers

The Hon'ble Supreme Court of India has banned the bursting of fire-crackers or any noise generating fireworks of high decibels to control the noise pollution. The Petroleum and Explosive Safety Organisation (PESO) (formerly Dept. of Explosives - DOE) has identified FOUR commonly used sound producing fire crackers namely:

- a. Atom Bomb
- b. Chinese Crackers (no related to any country)
- c. Maroons
- d. Garland crackers

The focus has been on the following four ingredients - aluminium powder, sulphur, KNO_3 & $BaNO_3$.

Table 1: Usage of ingredients in FOUR common firecrackers

| Ingredients | Major uses |
|---|--|
| Potassium nitrate (Oxidizers) | Oxidizer used as component of black powder. It is usually employed in safety fuses and lift charges |
| Barium nitrate (Oxidizers) | It can be used as oxidizer and green color agent in flames, smoke, and flash mixtures. It can produce white or silver effect with aluminium |
| Aluminium (Fuel) | It is the most widely used fuel. It produces brilliant flames and white sparks |
| Sulfur (Fuel) | Used in white and colored smoke composition, flash and sound blends. It is a component of black powder. It could also be used as oxidizer in some mixtures |

2. Chemical composition adds sparkle , colour & sound to firecrackers

Light and Colour are important aspects of fireworks which depend on two basic physico-chemical properties:

- a) Incandescence: Huge amount of heat is required to generate colour which needs instantly sets of chemical reactions within the ingredient mixture of the firecrackers. For example change of colours from red, orange, yellow, and white light as the mixture gets increasingly hot.
- b) Luminescence: This feature also needs energy

Table 2: Colour producing compounds used in firecrackers

| Metal & Its Compounds | Colour |
|---|----------------|
| Strontium Salts & Lithium Salts (Li_2CO_3 , $SrCO_3$) | Red |
| Calcium Salts ($CaCl_2$, $CaSO_4 \cdot 2H_2O$) | Orange |
| Incandescence of Iron or Charcoal | Gold |
| Sodium Compounds ($NaNO_3$, Na_3AlF_6) | Yellow |
| White Hot Metal (BaO) | Electric White |

| | |
|--|--------|
| Copper Compounds and Chlorine, $Cu_3As_2O_3Cu(C_2H_3O_2)_2$ | Blue |
| Mixture of Strontium (red) and Copper (blue) compounds | Purple |
| Burning aluminium, titanium or magnesium powder | Silver |

3. Chemistry of fireworks

Charcoal is the most commonly used fuel in the industry. The chemistry of fireworks is based on combusive features of the ingredients used and the lighting effects that are generated.

Based on literature survey the following are the key ingredients that go into making fireworks:

- i. Fuel: Charcoal i.e. black powder is the most common fuel used in fireworks.
- ii. Oxidizing Agents: The function of the oxidizing agent is to produce the oxygen needed in order to burn the mixture within the fireworks. It can be nitrates, chlorates or per-chlorates etc.
- iii. Reducing Agents: It needs to burn oxygen provided by the oxidizing agents. Common reducing agents are Sulphur and Charcoal and these react with oxygen to form sulphur dioxide and carbon dioxide respectively
- iv. Regulators: Metals (like aluminium, titanium, copper, strontium, barium etc.) can be added to regulate the speed of the reaction and colouring agents.
- v. Binders: Binders are used to hold the mixture of the firework together in a paste like mixture. The most commonly used binder is known as dextrin, a type of starch. Paron can also be used in binding, however it is less common and only used in conjunction with red and green fireworks as it helps to enhance their colour. The binders do not actually begin to work until the firework has been lit and are potentially dangerous.
- vi. Colouring Agents: Different chemicals are used to produce coloured fireworks.

Table 3 : Summary of chemicals used causing sparkling effects in firecrackers

| Chemical Compounds | Purpose usage | Chemical Compounds | Purpose usage |
|-----------------------------------|-------------------|----------------------|-----------------------|
| Lead Dioxide / Nitrate / chloride | oxidizer | Aluminium | Brilliant whites |
| Lithium compounds | blazing reds | Potassium Nitrate | In black powder |
| Mercury (Mercurous chloride) | chlorine donor | Ammonium & Potassium | propellant / oxidizer |
| Barium Nitrate | glittering greens | Copper compounds | blues |
| Arsenic compounds | Used as colorants | Antimony sulfide | glitter effects |

4. Non – stoichiometric ingredients in firecrackers impact health

The lighting effects and noise levels depend on the chemistry of fireworks and the combusive features of the ingredients, the major concern being inappropriate stoichiometric amounts of the ingredients in making common firecrackers. Firecrackers are made of chemicals/metallic agents some of which are toxic when they are burst. The major constituents of smog that forms from firecracker emissions contain SO_x, NO_x and significant dust load or particulate matter that may contain the any of the following

heavy metals ex. Pb, Hg, Sr, Li, Al etc. Table below provides an overview of immediate/long term effects of commonly used ingredients used in making firecrackers.

Table 4 : Environmental health Effects - Hazardous & toxic nature of ingredients used in firecrackers

| Compound | Environmental health Effects |
|------------------------------------|--|
| Aluminium | Contact dermatitis, bioaccumulation |
| Sulfur Dioxide | Acid rain from sulphuric acid affects water sources, vegetation & causes property damage. |
| Potassium Nitrate | Toxic dusts, carcinogenic sulfur-coal compounds |
| Perchlorate - Ammonium & Potassium | Can contaminate ground & surface waters, can cause thyroid problems in humans & animals |
| Barium Nitrate | Poisonous. Fumes can irritate respiratory tract. Possible radioactive fallout. |
| Copper compounds | Polychlorinated dioxins and di-benzofurans. Can bio-accumulate. Cancer risk. |
| Antimony sulfide | Toxic smoke, possible carcinogen |
| Lead Dioxide / Nitrate/Chloride | Bio-accumulation, developmental danger for kids & unborn babies, may remain airborne for days, poisonous to plants & animals |
| Lithium compounds | Toxic and irritating fumes when burned |
| Mercury (Mercurous chloride) | Toxic heavy metal. Can bio-accumulate. |
| Nitric oxide | Toxic by inhalation. Is a free radical |
| Nitrogen dioxide | Highly toxic by inhalation. |
| Ozone | Greenhouse gas that attacks & irritates lungs |
| Arsenic compounds | Toxic ash can cause lung cancer, skin irritation and wart formation. |
| Strontium compounds | Can replace calcium in body. Strontium chloride is slightly toxic. |

References:

1. C. Martín-Alberca, C. García-Ruiz/ Trends in Analytical Chemistry 56 (2014) 27-36 ; Analytical techniques for the analysis of consumer fireworks, (Elsevier : https://www.researchgate.net/publication/260030498_Analytical_techniques_for_the_analysis_of_consumer_fireworks)
2. http://www.backcountryattitude.com/toxic_fireworks.html)
