

**Environmental Health Risk Management Plan (EHRMP)**

**Indian Institute of Technology Delhi, (IIT Delhi)**

**Proposal entitled:** Development and evaluation of antigens to capture antibodies on Lateral flow immunoassay device for the screening of Covid19 infection

(i) Brief description of the proposed activity

The aim of the project is to develop and validate lateral flow immunoassay as a point of care test for capture antibodies IgG, IgM, and IgA on specific antigens for the screening of Covid19 infection.

To accomplish this aim, part of the work will be done at GGS-IPU, the other part at IIT Delhi and further the development and evaluation of Lateral flow device will be done at Medsource. IIT Delhi will be involved in comprehensive characterization of antigens (S1 and Rp3 nucleocapsid protein). These characterizations include RP-HPLC, aggregates analysis by SE-HPLC, Secondary structure analysis for consistency, Intact Mass and peptide mapping.

(ii) List of environment related regulatory clearances required for the activity.

We have an agreement with Biotic Waste solutions Pvt. Ltd. for collection, treatment and disposal of Biomedical waste.

**Institutional Arrangement**

Area of Risk		Yes	No	Details	Proposed Plan
1.	Is there a designated full-time staff for Environment Health and Safety (EHS) issues?	√		IIT Delhi has a Safety Officer	The safety officer will ensure that EHS issues are addressed properly.
2.	Does the EHS staff handle the following?			The Institute is also member of IBSC. Thus, constant regulatory clearances as well as record keeping of accidents is done.	Will suggest the competent authority for creating such a structure for data keeping.
	Occupational Health and Safety	√			
	Waste Management	√			
	List of consents and regulatory clearances	√			
	Record keeping of accidents and procedures	√			
	EHS trainings for staff		√		
	Environment Management Framework compliance for Innovate in India Project		√		
3.	Is there a reporting structure in place regarding EHS issues?	√		To be reported to Safety Officer	A proper reporting structure will always be ensured during the course of project.
4.	Are regular EHS trainings provided to staff?		√	Frequency: As and when required	We will try to formulate the frequency. At least for yearly trainings.
5.	Institutional Bio-Safety Committee (IBSC)	√		Review and approve	Now, we are switching

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				the projects related to biosafety with at least two meeting in a year	completely to digital one through IBKP portal of DBT.
6.	Ethics Committee (EC)	√		Review and approve the projects related to research involving human subjects with at least one meeting in a year	Project will begin only after getting approval from Ethics Committee (EC). Periodic review and meeting will be scheduled.
<b>General Occupational Health and Safety</b>					
	<b>Area of Risk</b>	<b>Yes</b>	<b>No</b>	<b>Details</b>	<b>Proposed Plan</b>
7.	Are there Standard Operating Procedures for accidents, hazards, and other emergencies (chemical spills, heat hazards, fire hazards, radioactive hazards etc.)?	Yes		Procedures for handling corrosive chemicals, chemical spill as well as fire extinguisher are in place	A structured system is not in place. However, we will try to set up structured quality system in a year or two. Display of Procedures at prominent places in the site will be ensured.
8.	Are the following in place?			All scientific and technical staff uses	We don't register small accidents and injuries. However, we will maintain a record in the future.
	Chemical spill kits	√		Lab apron. SOP for	
	Eye wash	√		handling & usage of	
	Shower stations	√		laboratory chemicals,	
	First Aid Kit	√		Chemical MSDS &	
	Fire Extinguishers	√		spill kits available for	
	Register of accidents and injuries		√	handling spillage, Segregated storage for acids & solvents	
9.	Are proper signage and storage system in place?	√		Till now, not required to display.	Yes we have dedicated storage area for flammable materials which will be maintained
	Display of Material Safety Data Sheet (MSDS) where relevant		√	However, MSDS are available and	
	Display of emergency numbers and procedures (Person to Contact, Doctor, Ambulance, Fire Emergency, Police) displayed in all critical places	√		maintained in file with core team members handling	
	Signage across the facility (labs, storage, hazardous areas, etc.)	√		chemicals.	
	Are flammable materials appropriately stored to prevent fire hazards?	√			

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					regularly.
10.	Are smoke detectors, fire alarms, automatic safety/shutoff systems, overflow preventors, etc. in place and regularly maintained?	√		We don't have automatic systems but systems are in place and run manually.	We will discuss the requirement and suggestion with competent authority. The SOP once put in place will be followed.
11.	Are there control measures for VOC, air emissions, high operating temperatures, pathogens/vectors etc. in place?	√		We have chemical hoods and Biosafety cabinets to handle VOC and air emissions and Pathogens	The SOP will be followed.
12.	Are regular mock drills conducted for emergency preparedness and safety?	√		Mock drills are conducted for fire safety once in year	We proposed to have mock drills/ training to handle other types of accidents also other than fire safety. This will be done as per schedule.
13.	Are staff provided with OHS training?	√		Students/regular staff during lab courses were taught about safety procedures	Temporary Staff/ visitor joining the lab will have training at the time of joining duty.
<b>Biomedical Waste (BMW)</b>					
	<b>Area of Risk</b>	<b>Yes</b>	<b>No</b>	<b>Details</b>	<b>Proposed Plan</b>
14.	Is there generation of biomedical waste (as described in Bio-Medical Waste Management Rules, 2016) in the grantee?	√		As part of research following biomedical waste is generated: Microcentrifuge tubes, tips, gloves and mask Microbiological plates, Cell culture flasks etc	The proposed plan is to dispose any kind of biomedical waste as per the BWM Rules, 2016.
15.	Is there trained staff to handle biomedical waste in the grantee?	√		Yes, staff working in the lab is trained to handle and segregate	Will ensure that this is followed regularly throughout the project.
16.	Has the grantee obtained authorization from State Pollution Control Board /Pollution Control Committee?		√		Agreements with SPCB/CPCB authorized agency for collection of

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					Biohazard waste in accordance with Bio Medical Waste Management Rules, 2016 and Collection and disposal of chemical hazardous waste in accordance with Hazardous Waste Management Rules, 2016 are in place.								
17.	Is the biomedical waste segregated at point of generation in the facility and stored in suitable containers?	√		<table border="1"> <tr> <td>Yellow</td> <td></td> </tr> <tr> <td>Red</td> <td></td> </tr> <tr> <td>White</td> <td></td> </tr> <tr> <td>Blue</td> <td></td> </tr> </table>	Yellow		Red		White		Blue		Yes all are in place and segregated at the point of generation. This process of segregation will be followed throughout the project.
Yellow													
Red													
White													
Blue													
18.	Is the bar code system for the segregated waste in place?		√	Amount of waste is very small i.e less than a kg per month. Inventory is not maintained for waste	In Case the waste generated exceeds the said limit appropriate measures as per rules and regulations will be followed.								
19.	Is the biomedical waste being sent to an <b>authorized</b> common BMW facility?	√		<p>Name and address of CBMWF: M/s Biotic Waste Solution Pvt. Ltd., 46 SSI Industrial Area, G.T. Karnal Road, Delhi-110033</p> <p>Distance from facility: 29 Km</p> <p>Frequency and Mode of transport: at least weekly through Road</p> <p>Who transports? BMW facility</p>	The BMW is carried away by an authorized company and we keep a record of the dated collection slips.								

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				personnel	
20.	Does the grantee have an in-house BMW treatment facility?		√		In house autoclaving is followed. The BMW will be carried and treated by the In house authorized people and we will keep a record of these.
	Is the treatment facility own (individual)?		√		
	Is the treatment facility a shared facility in an industrial park?		√		
21.	Are lab waste, microbiological waste and chemical liquid waste pre-treated before storing and sending to treatment facilities according to guidelines prescribed in BWM, 2016 regulations?	√		Autoclaving	The treatment techniques used currently will be followed in the future also.
22.	Is the liquid waste checked for active cells before sending to treatment plant?	√			All the liquid waste discarded with Sodium hypochlorite treatment.
23.	Are necessary waste pre-treatment equipment in place?	√		Autoclaves	Pre-Treatment will be done by decontamination by our staff regularly.
	Do the equipment adhere to prescribed norms by State Pollution Control Board (SPCB)?	√			
24.	Are chlorinated plastic gloves and bags phased out in the grantee?		√		Decomposed in regular waste after sodium hypochlorite treatment.
25.	Are grantee's personnel involved in handling BMW provided with regular training?	√		Weekly routine followed for handling BMW in lab	Regular training will be given to all the personnel and all the stakeholders will be trained to handle BMW.
26.	Are medical examination provided to personnel involved in BMW waste handling and are they provided with relevant immunization like Hepatitis B and Tetanus?		√	Frequency of medical examination:	A proper mechanism will be put in place with regular monitoring.

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27.	Is a daily register for biomedical waste maintained including accident reporting record?		√	Not. maintained	We will prepare a daily register with regular updates and maintenance of records.
28.	Are annual reports on BWM submitted to SPCB as per required form (see Bio-Medical Waste Rules 2016)?		√		Will ensure proper and regular submissions during the project.
<b>Hazardous Waste (HW)</b>					
	<b>Area of Risk</b>	<b>Yes</b>	<b>No</b>	<b>Details</b>	<b>Proposed Plan</b>
29.	Is there generation of hazardous waste (as per Hazardous Waste Rules, 2016) in the grantee?		√	No substantial amount of hazardous waste is generated	If any hazardous waste is generated as per rules it will be handled and disposed.
30.	Is there trained staff in the facility to identify and handle hazardous waste?		√		As and when required a staff will be trained to treat and handle the hazardous wastes.
31.	Does the grantee have authorization from SPCB for hazardous waste?		√		Necessary Authorizations will be taken if required.
32.	Is there a secure location for storage of HW with proper signage?		√		We will arrange proper storage facilities when required
	Are hazardous waste stored for more than 90 days in the grantee's premises?		√		
33.	Is the hazardous being send to an <b>authorized</b> disposal facility or user?	√		Name and address of facility: Bharat Oil and Waste management Ltd., Office 11, Basement Community Center, East of Kailash, New Delhi-110065	
	Is the disposal facility in house?		√		
	Is the disposal facility external/outsourced?	√			
34.	Is a register maintained on production and treatment, and a manifest system followed for transport of hazardous waste from the grantee to treatment		√		We will maintain the register when required

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	facility?				
<b>E-Waste and Batteries</b>					
	<b>Area of Risk</b>	<b>Yes</b>	<b>No</b>	<b>Details</b>	<b>Proposed Plan</b>
35.	Does the grantee generate e-waste, produce or manufacture electrical and electronic equipment?		√	No substantial electrical waste is generated in the lab	Procedures will be followed as per guidelines.
36.	Has the grantee obtained SPCB authorization on e-waste?		√	No substantial electrical waste is generated in the lab	Necessary Authorizations will be taken if required.
37.	Does the grantee channelize the e-waste to <b>authorized</b> recycling or disposal facility?		√	No substantial electrical waste is generated in the lab	
38.	Does the manufacturing grantee have Extended Producer Responsibility system and EPR-authorization in place?		√	No substantial electrical waste is generated in the lab	
39.	Does the grantee practice reduction in the usage of hazardous substances in the manufacture of electrical and electronic equipment and its parts?		√	No substantial electrical waste is generated in the lab	
40.	Does the grantee provide detailed information on the constituents of the equipment and their components/spares and declaration of conformation to Reduction in Hazardous Substances in the product user documentation?		√	No substantial electrical waste is generated in the lab	
41.	Does the grantee maintain a record of collection, storage, sale and transport of e-waste?		√	No substantial electrical waste is generated in the lab	
42.	Does the grantee submit annual reports on e-waste to SPCB?		√	No substantial electrical waste is generated in the lab	
43.	Is there accident reporting and records in place?		√	No substantial electrical waste is generated in the lab	
44.	Are PPEs available to staff?		√	No substantial electrical waste is generated in the lab	The stock status of PPE will be regularly monitored and procurement will be done in future if required.
45.	Is the grantee involved in manufacture of batteries?		√	No substantial electrical waste is generated in the lab	

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46.	Does the grantee generate battery waste?		√	No substantial electrical waste is generated in the lab	
47.	Does the grantee deposit the battery waste to <b>registered</b> recycler/dealer/manufacturer/reconditioner/collection center?		√	No substantial electrical waste is generated in the lab	
48.	In case of manufacturing, does the grantee comply to Battery Management Rules 2000 and ensure collection of old batteries?		√	No substantial electrical waste is generated in the lab	

**Community Health and Safety and risk mitigation**

		Yes	No	Details	Proposed Plan
49.	Safety Transportation Management System (for transport Of hazardous material)	√		Only autoclaved material is disposed off.	Will follow the safety transport management system if required
50.	Emergency preparedness and participation of local authorities and potentially affected communities		√		Will develop the emergency preparedness plan if required
<b>Other</b>					
	<b>Area of Risk</b>	Yes	No	Details	Proposed Plan
51.	Does the grantee use any radioactive materials (isotopes tracers, radiation equipment, etc)?		√		we don't use radioactive material
	Does the grantee have appropriate radioactive material and waste storage and disposal system in place?		√		If we use, then we will arrange for proper storage and disposal
	Are radioactive warning signs in place?		√		Will be implemented if required
52.	Is the lab/room air regularly checked for microbial contamination?	√		Fumigation is a regular activity and is being carried out after definite intervals of time.	The activity of fumigation will be continued.
53.	Are there any odor control measures in place?		√		Periodic checks will be done preventive measures will be taken if required
54.	Are fume hoods and exhausts regularly checked and maintained?	√		Fume hoods and exhausts are installed and regularly checked in the dedicated area	The regular checks will be done.
55.	Does the grantee use DG set > 15 KVA?		√	We use electricity	DG sets emissions will be



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	Does the grantee have consent for DG > 15 KVA?			supplied through state electricity distributors	regularly monitored as per CPCB norms if procured
	Are emissions from boilers and DG sets regularly monitored to be within the prescribed norms?				
56.	Does the grantee have proper disposal process for solid and plastic waste in compliance to Solid Waste Management Rules, 2016 and Plastic Waste Management Rules, 2016?		√	Describe : Plastic tips, micro-well plate, tarson tubes 50 ml, tarson tubes 15 ml, centrifuge vials etc.	It will be ensured that segregation rules are followed. This will be maintained and monitored
57.	Is wastewater treated separately by the grantee? (Liquid waste from laboratory, chemicals, fluids, solvents, medium and cultures, coolants, etc.)	√		Types of waste water: Culture waste, solvents buffers etc.  Treatment of wastewater: The process effluent which contains liquid biohazard waste generated from laboratory is being disinfected with sodium hypochlorite solution and then discharged in to the sewerage system for further treatment at STP	
	Are there sludge management and cut off drains in place for wastewater?			No, Regular waste is disposed in sewer drainage	
58.	Are necessary provisions for noise cancellation in place?	√			Preventive measures will be taken for reducing noise levels if generated
59.	Are there any settlements, water bodies, cultivated land, or any other eco-sensitive areas near the grantee's premises?		√		
60.	Are there any buffers, fire vehicle routes in the grantee's premises?	√			These facilities will be maintained throughout the project.

**COVID Precautions & Guidelines Implementation**

61.	Guidelines of CPCB/SPCB/GoI for Handling, Treatment, and Disposal of COVID Waste Generated is whether being	√		Training is provided on Covid to all the staff.	Masks and gloves are used inside the Institute. Will continue to ensure
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	followed?				this practice is followed.
62.	SOP on preventive measures to contain spread of COVID-19 issued by ICMR/GoI from time to time is whether being followed?	√		All the necessary procedures are followed	Regular sanitization in the premises, Thermal screening will be done adhering to the government norms throughout the project.

**Notwithstanding the above other risk (relevant to the project activities) that will be identified in the course shall be addressed as per standard mitigation monitoring parameters and manner of records keeping shall be in accordance to the recommendations of the project monitoring committee on subject experts engaged by BIRAC.**