Cliente: JPGR Energia Limitada	Report code: HA20-28102020
	Sample date: 10-21-2020
ON-SITE ANALYSIS, AT THE JPGR OFFICES	Reception date: 10-21-2020
Address: Provincia: San José, Cantón Central, Mata Redonda.	Reporting Date 10-28-2020

Sanitary Permit to Operate for Laboratorio San Martín # 34-2020, issued on 01/14/2020 expires 01/14/2022

Methodology of analysis Compendium of Methods for the Microbiological Examination of Foods, APHA, 5th. ed.

Methods of analyses credited by the ECA identified in this report through an asterisk (*).
For consultation of credited variables visit the page of the ECA (http://www.ecu.of in the link of Laboratorio San Martin.

OBJECTIVE OF THE STUDY

To evaluate the effectiveness of disinfection with Plasma in the air, for which a Plasma generator, from the brand PLASMA INNOVA is used and applied in a company office.

To **conduct the** test, the Impaction method is used, by means of a Sartorius device, which allows us to measure a cubic meter of air. The total count of Bacteria, Fungi and Leavenings/cubic meter is performed. A measurement is conducted before applying the plasma to the room environment, and another after 30 minutes of application to the environment. For room air samples before the process, the code HA20 - 0032 is assigned, and after the process, code HA-0035 is assigned.

RESULTS

Sample Code	**LSM-HA20-0032** Before applying plasma in the environment	LSM-HA20-0035 After applying plasma in the environment for 30 minutes	Efficiency
* Total Count ufc/cubic meter	270 ufc/m3	**< 1 ufc/m³.**	**100 %**
*Yeast and molds count ufc/m3 60 ufc/m3	60 ufc/m3	**12 ufc/m³.**	80 %

Conclusions:

The application of recharged plasma in the environment has an efficiency for bacteria of 100%; for fungi and yeasts an efficiency of 80% is obtained.

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Reference								
Test	**Matrix**	**Method**	**Limit of detection**					
1659_Bacilus cereus	Foods	Compendium of methods for the microbiological examination of foods APHL, 5th ed.,2015 Ch 31	<10 UFC/g					
Aerobic mesophilic bacteria	Water	Standard Methods APHA-AWWA-WEF, 23", 2017 Method-971S B y C	<1 UFC/mt					
	Foods	Compendium of methods for the microbiological examination of foods APHL 5th ed.2015.Chap 8	<10 UFC/g					
	Air	Compendium of methods for the microbiological examination of foods APHL 5th ed.2015. Method 3.7.1, Ch 3	<1 UFC/T/90mm Min 1 UFC/m					
	Surfaces	Compendium of methods for the microbiological examination of foods APHL 5th ed.2015. Method 3.51.ch 3	< 10 UFC/cm					
	Raw materials and pharmaceutical products	USP, 36 ed,2018, Test .61 y 62	<10 UFC/g					
Fecal coliforms	Chlorinated water	Standard Methods APHA-AWWA-WEF, 23", 2017 Método-9221 A, B, C, D, E, F, G	< 1.8 NMP/100 ml					
	Nonchlorinated water	Standard Methods APHA-AWWA-WEF, 23", 2017 Method-9221 A, B, C, D, E, F, G	< 1.8 NMP/100 ml					
	Foods	Compendium of methods for the microbiological examination of foods. APHL 5th ed.2015, Ch 9	<10 UFC/g					
	Total coliforms	Chlorinated water	Standard Methods APHA-AWWA-WEF, 23", 2017 Method-9221 A, B, C, D, E, F, G	< 3 NMP/g				
Nonchlorinated water		Standard Methods APHA-AWWA-WEF, 23", 2017 Method-9221 A, B, C, D, E, F, G	< 1.1 NMP/100 mt					
Foods		Compendium of methods for the microbiological examination of foods. APHL 5th ed.2015, Chap 9	<10 UFC/g					
			< 3 1IMP/g					
Marine waters		Standard Methods APHA-AWWA-WEF, 23' 2017 Method 9221 A-B-C- E	< 1.8 NMP/100 ml					
Enterobacteria	Foods	Compendium of methods for the microbiologican examination of foods. APHL 5th ed.2015, Ch 9	<10 UFC/g					
Enterococus	Waters	Standard methods APHA-ASWJA-V/EF, 7, 2012. Method 9230 B	< 1.8 NMP/100 ml					
Esterichia coli	Chlorinated water	Standard Methods APHA-AWWA-WEF, 23", 2017 Method-9221 A, B, C, D, E, F, G	<1,1MP/100ml.					
	Nonchlorinated water		< 1.8 NMP/100 ml					
	Foods	Compendium of methods for the microbiological examination of foods. APHL 5th ed.2015, Chap 9	<10 UFC/g					
			< 3 NMP/g					
	Marine waters	Standard Methods APHA-AWWA-WEF, 23 ", 2017 Method-9221 A, B, C, D, E, F, G	< 1.8 NMP/100 ml					
	Raw materials and pharmaceutical products	USP, 36 ed, 2018, Test .61 and 62	Absence or presence/10 UFC/g					
Fungi and yeasts	Food Products	Compendium of methods for the microbiological examination of foods APHL 5th ed.2015. Method 3.7.1, Ch 21	<10 UFC/g					

	Air	Compendium of methods for the microbiologican examination of foods APHL 5th ed.2015. Method 3.7.1, Ch 3	<1 UFC/T/90mm < UFC/M3					
	Surfaces	Compendium of methods for the microbiologican examination of foods APHL 5th ed.2015. Method 3.51.ch 3	<10 UFC/CM3					
	Raw materials and pharmaceutical products	USP, 36 ed, 2018, Test, 61 and 62	<10 UFC/g					
Legionella	Water	Standard Methods APHA-AWY.1, 911, 23", 2017 Method 9260 1	<1 UFC/ml					
Listeria monocytogenes	Foods	Vides "Listeria DUO (DUO Ref 30225. Compendium of methods for the microbiologican examination of foods APHL 5th ed. 2015. 35	Absence o presence/25g					

Pseudomona aeruginosa	Water	Standard Methods APHA-AWWA-WEF, 23", 2017 Method, 9213 F	< 1.8 álh1R/ICa mi.					
	Raw materials and pharmaceutical products	Farmacopea Americana, análisis microbiológicos exámenes 61 and 62	Absence or presence/g					
Salmonella sp.	Foods	Compendium of methods for the microbiological examination of foods APHL 5th ed. 2015. Vides salmonella 15k 1,9 RaF 30202.	Absence or presence/25g					
	Raw materials and pharmaceutical products	Farmacopea Americana, análisis microbiológicos exámenes 61 and 62 Vides `Salmonella(SLM) Ref 30702	Absence or presence/10g					
Staphylocucus aureus	Water and marine waters	Standard Methods APHA-AWY.1, 911, 23", 2017 Method, 9213 B	<1 UFC/ml					
	Foods	Compendium of methods for the microbiological examination of foods APHL, 5th ed.,2015 Ch. 39	<10 UFC/g					
	Raw materials and pharmaceutical products	USP, 36 ed,2018, Test .61 and 62	Absence or presence/g					