Certificate of Analysis

Product: **Ghassoul Lava Clay (40 Microns)**

Edition Date 16.10.2017
Batch Number 4326306
Best Before End June 2023

Analysis Report of Organolyptic Analysis And Physical Parameters

Designation	Result
Physical Aspects	Powder
Colour	Brown
Odour	Odourless
pH	7
Granulometry	<500µm
Density	1.7
Total ash resulting from compléte calcination at 600°C	18%
Cationic Exchange Rate	75 méq/100g

Analysis Report of Chemical Elements

Parameters	SiO2	Al2O3	Fe2O3	FeO	TiO2	Cao	MgO
Percentage Result	58	2.2	0.9	0.2	0.15	2.2	26.75
Parameters	**Na2O**	**K2O**	**MnO**	**P2O5**	**P-F**	**Total**	
Percentage Result	0.5	0.64	<0.01	0.02	8.3	99.87	

The product marketed under the name "Ghassoul" must consist essentially of silicon, magnesium and oxygen ions which, expressed as oxides, must have the following contents, on the product dried at 110 °C:

- SiO2 of between 55 and 61%,
- MgO greater than 21%,
- MgO / SiO2 higher than 0.45,
- Al 2 0 3 less than 5%,
- Fe2O3 less than 2%,
- Cao less than 3

References: Moroccan Official Decree No. 3202 of 18 Safar 1394 (13 March 1974) page 362 Decree No. 2-73-370 of 10 Safar 1394 (5 March 1974) defining the product known as "Ghassoul" for its marketing.

Analysis Report of Heavy Metals

Designation	Method	Result
Cadmium ppm	NF EN 14083 Août 2003	< 5
Chrome ppm	NF EN 14083 Août 20 03	24
Plomb ppm	NF EN 14083 Août 2003	13
Molybdéne ppm	NF EN 14083 Août 2003	<5
Mercure ppb	NF EN 13806 Janvier 2003	<10
Arsenic inorganique ppm	NF EN 14627 Août 2005	<10
Cuivre ppm	NF EN ISO 6869 Mars 2002	9

SAFETY DATA SHEET

Review date 20.07.2017
Date of print 24.10.2016

GENERAL INFORMATION

Item Name	**Ghassoul Clay**
INCI	Montmorillonite
Chemical Formula	Si3.78Al0.22Mg2.92Fe0.09Na0.08K0.08O10(OH)2 4H2O. (magnesium Montmorillonite)
Supplier	**MADAR Corporation Ltd.** 19-20 Sandleheath Industrial Estate Fordingbridge Hampshire SP6 1PA
Tel	**01425 655555**
E-mail	sales@madarcorporation.co.uk

1.4. Emergency telephone number

Emergency contact number (office hours)	01425 655555

INGREDIENTS/IDENTITY INFORMATION

Ingredient:	Minerals and Trace Elements
CAS Number	12417-86-6
Physical/Chemical Characteristics	
Appearance and Odour:	Brownish Fine Powder, un-fragranced.
Vapour Pressure (MM Hg/70 F):	negligible
Vapour Density (Air=1):	N/A
Specific Gravity:	
Evaporation Rate	N/A
Solubility in Water:	None, but absorbs water.
Percent Volatiles by Volume:	0 %

FIRE AND EXPLOSION HAZARD DATA

Flash Point	N/A
Lower Explosive Limit	Unknown
Upper Explosive Limit	Unknown
Extinguishing Media	Water
Special Fire Fighting Procedures:	None
Unusual Fire and Explosion Hazards	None

REACTIVITY DATA	
Conditions to Avoid (Stability)	N/A
Materials to Avoid	None
Hazardous Decomposition Products	None (biodegradable)
Can Hazardous Polymerisation Occur	No

PROTECTION DATA	
Signs/Symptoms of Overexposure	
Lungs	Move to fresh air
Eyes:	Flush with plenty of water for about 15 minutes. Seek medical care if symptoms persist.
Skin contact:	N/A

PRECAUTIONS FOR SAFE HANDLING AND USE	
Steps if Material is Released/Spill	Scoop up powder, mop up wet clay.
Waste Disposal Method	MAINS DRAINAGE, or LANDFILL
Precautions-Handling/Storing	Store in a dry and well ventilated room in a closed container.

CONTROL MEASURES	
Respiratory Protection	Use dust mask or respirator
Ventilation	Provide adequate ventilation
Protective Gloves	Type as required for task
Eye Protection	Safety goggles
Other Protective Equipment	As required to prevent prolonged contact
Occupational Exposure limit	Not determined.
Carcinogen	Not determined.

Transportation Data

Ship as a foodstuff, not to be loaded with incompatible materials including poisons.

CHEMICAL COMPOSITION AND PHYSICAL CHARACTERISTICS.

9.1 Information on the basic physical and chemical properties

The Ghassoul is a purely natural mineral product mostly composed of stevensite. It is a clayey mineral made of magnesium silicate.

Optical microscope aspect.	Under the optical microscope the prepared Ghassoul looks like a grey shapeless colloidal base on which we can see fine micelles. No trace of vegetable waste has been observed.
Electron microscope aspect.	The electron microscope shows that the Ghassoul crystalline structure is similar to the other minerals belonging to the stenvensite and the montmorillonites group.
Density	The rough Ghassoul density is around 1.7 in the pycnometer
Water content	The water content is found at 180 degrees Celsius by attaining a constant weight. The loss of weight by desiccation is nearly 13% of the total weight.
Ashes content	The total ashes resulting from a complete combustion at 600 degrees Celsius, in a

ceramic crucible containing the sample already dry by desiccation at 180 degrees Celsius is about 18% of the total weight.

Chemical analysis:

The silicon contents formulated in silicate represents 55% of the Ghassoul.

Echt	SiO_2	Al_2O_3	Fe_2O_3	FeO	TiO_2	CaO
N°	%	%	%	%	%	%
Beige	58.38	2.21	0.89	0.22	0.17	2.21

MgO	Na_2O	K_2O	MnO	P_2O_5	P_Feu	Total
%	%	%	%	%	%	%
25.75	0.53	0.67	<0.01	0.02	8.65	99.69

Ag	AS	Ba	Be	Bi	Cd
Ppm	ppm	ppm	ppm	ppm	ppm
<0.5	<10	56	14	<5	<5

	Ce	Co	Cr	Cu	Li
	ppm	ppm	ppm	ppm	ppm
	34	8	25	7	940

Mo	Nb	Ni	Pb	Sb	Sr
ppm	ppm	ppm	ppm	ppm	ppm
<5	<5	25	14	<10	191

		V	Y	Zn	Hg
		ppm	ppm	ppm	ppb
		45	<5	60	<10

Indice de Blancheur	Humid %	Indice de Gonflement	pH 1/10	Matiére Organique %
51.05	10.96	12ml	8.2	<0.01

Indice de sédimentation (en ml)

1H	2H	3H	24H	48H	72H
20.0	18.0	17.0	15.0	15.0	15.0

This information is based on our present knowledge and is intended to describe our products from point of view of the safety requirements. It should not be construed as guaranteeing specific properties.
The user must satisfy himself that the product is entirely suitable for his purpose.

Chemical analysis:
The silicon contents formulated in silicate represent 55% of the Rhassoul

Echt N°	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	FeO %	TiO_2 %	CaO %
Beige	58,38	2,21	0,89	0,22	0,17	2,21

MgO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	P_Feu %	Total %
25,75	0,53	0,67	<0,01	0,02	8,65	99,69

Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm
<0,5	<10	56	14	< 5	< 5

Ce ppm	Co ppm	Cr ppm	Cu ppm	Li ppm
34	8	25	7	940

Mo ppm	Nb ppm	Ni ppm	Pb ppm	Sb ppm	Sr ppm
< 5	<5	25	14	<10	191

V ppm	Y ppm	Zn ppm	Hg ppb
45	<5	60	<10

Indice de Blancheur	Humid %	Indice de Gonflement	pH 1/10	Matière Organique %
51,05	10,96	12 ml	8,2	<0,01

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1H	2H	3H	24H	48H	72H
20,0	18,0	17,0	15,0	15,0	15,0