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MECK PHARMACEUTICALS & CHEMICALS PVT LIMITED, SANAND, AHMEDABAD.

QUALITY ASSURANCE DPT.		FINISHED SPECIFICATION AND TESTING PROCEDURE		Page 3 of 12	
DOC. No: TQC/GH38/145-00		Issue Date: 1/06/15	Effective date: 15/06/15	Next Review date: 15/06/18	CC No. 00
Ref.: In house/USP 38		Revision no:00		Supersedes no: 00	
Name	Prepared by Bhumika	Reviewed by Jigar	Approved by M.R.Patel		
Designation	Chemist QA	Sr. Chemist QA	Quality Head		
Signature	<i>Bhumika</i>	<i>J.Patel</i>	<i>M.R.Patel</i>		
Date	11/06/15	14/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38 <i>24/01/17/008</i>					

Sr No	Test	Standard testing procedure						
01	Appearance	<p>White to off white crystalline powder.</p> <p>Procedure: Take the <u>5.0009</u> (5.0 g) of the material in Petri dish and record its appearance.</p> <p>Observation: <u>White crystalline powder -</u> <i>Ⓢ</i></p> <p>Remark: <u>Complies</u> <i>M.R. - 02/07/17</i> <i>Ⓢ</i> <i>02/07/17</i></p>						
02	Identification	<p>Infrared Absorption <197K> By HPLC test: Procedure: The retention time of the principal peak in the sample preparation is match with the Standard preparation in the test of Assay by HPLC.</p> <p>Observation:</p> <table border="1"> <tr> <td>RT of 1st Standard injection</td> <td><u>3.704</u></td> </tr> <tr> <td>RT of 1st Sample Injection</td> <td><u>3.706</u></td> </tr> <tr> <td>RT of 2nd Sample Injection</td> <td><u>3.708</u></td> </tr> </table> <p>Remark: <u>Complies</u> <i>M.R. - 02/07/17</i> <i>Ⓢ</i> <i>02/07/17</i></p> <p>Identification by Chloride test: Reagents: 10 % w/w solution of Nitric Acid . 25 % w/w solution of 13.5 M Ammonia solution, 5 % w/v solution of silver nitrate</p> <p>Procedure: Weighing the accurately <u>0.0122</u> (0.0122 g) substance in <u>2</u> (2 ml) water and acidify with the 10 % w/w solution of Nitric Acid , add <u>0.5</u> (0.5 ml) of 5 % w/v solution of silver nitrate, shake and allow to stand ; a curdy ,white precipitate is formed , which is insoluble in Con. Nitric acid but soluble , after being well washed with water, in 25 % w/w solution of 13.5 M Ammonia solution, from which it is precipitate by the addition of 10 % w/w solution of Nitric Acid.</p> <p>Observation: <u>A curdy white ppt is formed</u> <i>✓</i></p> <p>Remark: <u>complies</u> <i>M.R. - 02/07/17</i> <i>Ⓢ</i> <i>02/07/17</i></p>	RT of 1 st Standard injection	<u>3.704</u>	RT of 1 st Sample Injection	<u>3.706</u>	RT of 2 nd Sample Injection	<u>3.708</u>
RT of 1 st Standard injection	<u>3.704</u>							
RT of 1 st Sample Injection	<u>3.706</u>							
RT of 2 nd Sample Injection	<u>3.708</u>							

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DOC. No: TQC/GH38/145-00		Issue Date: 1/06/15	Effective date: 15/06/15	Next Review date: 15/06/18	CC No. 00
Ref.: In house/USP 38		Revision no:00		Supersedes no: 00	
Prepared by Name: Bhumika		Reviewed by Name: Jigar		Approved by Name: M.R.Patel	
Designation: Chemist QA		Designation: Sr. Chemist QA		Designation: Quality Head	
Signature: <i>Bhumika</i>		Signature: <i>Jigar</i>		Signature: <i>M.R.Patel</i>	
Date: 11/06/15		Date: 14/06/15		Date: 15/06/15	
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38 @H1117006					

Sr No.	TEST	Standard testing procedure																												
03	Specific Optical Rotation (2.5 % Solution in water.)	<p>Between +70.0° and +73.0°</p> <p>Procedure: Accurately weighing <u>2.5230</u> (2.5g) of the substance in <u>100</u> (100ml) clean and dried volumetric flask. And dissolve it in <u>water</u> (water) and dilute up to the mark with the water. And corrected for the solvent blank, measurements the optical rotation in <u>1</u> (1 dm) Polarimeter tube for the Blank solution and sample solution at 589nm at <u>25°</u> (25° ± 0.5°) for five time and take the average reading for the calculation.</p> <table border="1"> <thead> <tr> <th>No. of Reading</th> <th>Blank Reading</th> <th>No. of Reading</th> <th>Sample Reading</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>0.00°</td> <td>01</td> <td>1.78°</td> </tr> <tr> <td>02</td> <td>0.00°</td> <td>02</td> <td>1.77°</td> </tr> <tr> <td>03</td> <td>0.00°</td> <td>03</td> <td>1.78°</td> </tr> <tr> <td>04</td> <td>0.00°</td> <td>04</td> <td>1.78°</td> </tr> <tr> <td>05</td> <td>0.00°</td> <td>05</td> <td>1.79°</td> </tr> <tr> <td>Average</td> <td>0.00°</td> <td>Average</td> <td>1.78°</td> </tr> </tbody> </table> <p>Calculation:</p> $[\alpha]_D^{25} = \frac{100 \times \alpha}{l \times c \times (100 - LOD)} \times 100$ <p> α - Average corrected observation rotation, in degrees at 25° L - Length of the Polarimeter tube - 1 dm LOD - Loss on drying of sample. c - Concentration of substance in % w/v D- D line of sodium light ($\lambda = 589.3\text{nm}$) </p> $= \frac{100 \times 1.78^\circ}{2.5230 \times 1 \times (100 - 0.22)} \times 100$ <p>Observation: <u>+70.70°</u> Remarks: <u>complies</u></p> <p style="text-align: right;"><i>[Signature]</i> 21/07/17 <i>[Signature]</i></p>	No. of Reading	Blank Reading	No. of Reading	Sample Reading	01	0.00°	01	1.78°	02	0.00°	02	1.77°	03	0.00°	03	1.78°	04	0.00°	04	1.78°	05	0.00°	05	1.79°	Average	0.00°	Average	1.78°
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Designation	Chemist QA	Sr. Chemist QA	Quality Head		
Signature	<i>Bhumika</i>	<i>J.Patel</i>	<i>M.R.Patel</i>		
Date	11/06/15	14/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38 <i>Or H/GH/145/006</i>					

Sr No.	TEST	Standard testing procedure									
04	Residue on ignition	<p>Not More Than 0.1 % w/w</p> <p>Procedure: Take the Silica crucible and ignite at <u>650°</u> (650± 25°C) for 30 minutes. Allow to cool in a desiccator over silica gel and weigh.(W1) Place the <u>1.1312</u> (1.0 g) of substance in the crucible and weigh (W2). Moisten the substance to be examined with a small amount of Sulphuric acid (usually <u>2</u> 2 ml) and heat gently at as low temperature as practicable until the sample is thoroughly charred. After cooling moisten the residue with a small amount of Sulphuric acid, heat gently until white fumes are no longer evolved and ignite at 650°C±25°C until the residue is completely incinerated. Ensure that flames are not produced at any time during the procedure. Allow the crucible to cool in a desecrator over silica gel, weigh again (W3), ignite for <u>15</u> (15 minutes) and repeat this procedure until two successive weighing do not differ by more than 0.5 mg / g. and calculate the wt of the residue. And calculate the residue by following formula.</p> $\% \text{ of ROI} = \frac{W3 - W1}{W2 - W1} \times 100$ <table border="1"> <tr> <td>W1</td> <td>Weight of crucible in g</td> <td>34.9469</td> </tr> <tr> <td>W2</td> <td>Weight of crucible + sample in g (Before ignition)</td> <td>36.0781</td> </tr> <tr> <td>W3</td> <td>Weight of crucible + sample in g (After ignition)</td> <td>W1 34.9479 W2 34.9479</td> </tr> </table> <p>$\% \text{ of ROI} = \frac{0.0010}{1.1312} \times 100$ Observation: <u>0.088%</u> Remarks: <u>Complies</u></p> <p style="text-align: right;"><i>Review</i> <i>9</i> <i>02/07/17</i></p>	W1	Weight of crucible in g	34.9469	W2	Weight of crucible + sample in g (Before ignition)	36.0781	W3	Weight of crucible + sample in g (After ignition)	W1 34.9479 W2 34.9479
W1	Weight of crucible in g	34.9469									
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Designation	Chemist QA	Sr. Chemist QA	Quality Head		
Signature	<i>Bhumika</i>	<i>Jigar</i>	<i>M.R.Patel</i>		
Date	11/06/15	14/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38 <i>Q4/01/17/006</i>					

Sr No.	TEST	Standard testing procedure
05	pH (2.0 % solution in water)	<p>Between 3.0 and 5.0</p> <p>Procedure: Weighing the accurately <u>2.0010</u> (2.0 g) of the substance in <u>100</u> (100 ml) clean and dried volumetric flask. Dissolve it <u>Water</u> water up to the mark. And measured the pH of the solution at <u>25°</u> (25°±2° C).</p> <p>Observation: <u>3.98</u></p> <p>Remarks: <u>Complies</u></p> <p><i>mlh</i> 02/07/17</p> <p><i>Review</i> <i>P</i> 02/07/17</p>
06	Loss on Drying (at 105°C for 2 Hrs.)	<p>Not more than 1.0%w/w</p> <p>Procedure: Take the weighing bottle (bottom flat) complete with the lid previously dried at <u>105°</u> (105°±2° C) for 30 minute (W1) After drying is completed put the bottle in desiccator at room temperature to avoid the moisture. Weighing accurately the LOD bottle and transfer the <u>1.0013</u> (1.0 g) substance in LOD bottle and take the gross weight (W2) . Then transfer the LOD bottle in drying oven and keep the lid aside at 105°±2°C temperature for 2 hr. After the drying is completed, open the drying oven closed the bottle promptly and allow it to cool to room temperature in a desecrator before weighing. Weight the bottle and the contents (W3) , for conformation of the LOD, further put the LOD bottle in drying oven and keep it above condition for 30 minute.</p> <p>The difference of the constant weight should not be more than 0.5 mg/g and calculate the LOD by following formula.</p> $\% \text{Loss on Drying} = \frac{W2 - W3}{W2 - W1} \times 100$ <p>W1= Weighing of the LOD bottle in g W2 = Weighing of the LOD bottle + sample (Before drying) In g</p>

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Date	11/06/15	14/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38 <i>Q.H/G/17/006</i>					

Sr No.	TEST	Standard testing procedure
		<p>W3= Weighing of the LOD bottle + sample (After drying) in g</p> <p>Observation: <u>0.22%</u></p> <p>Remarks: <u>Complies</u> <i>rlh</i> <i>Review</i> <i>02/07/17</i> <i>02/07/17</i></p>
07	Sulfate content	<p>Sulfate:</p> <p>Not more than 0.24%</p> <p>Reagents:</p> <p>3N HCl solutions. 25 % w/v of Barium Chloride solution. 0.02 N Sulphuric acid solutions.</p> <p>Sample preparation: Weighing accurately <u>0.1001</u> (0.1 g) of substance in <u>50</u> (50 ml) colour comparison tube, add <u>30</u> (30 to 40 ml) of water and if necessary neutralize the solution with hydrochloride to litmus. Add <u>1</u> (1 ml) of 3 N hydrochloride acid, <u>3</u> (3 ml) of 25 % w/v of Barium chloride solution and sufficient water to make <u>50</u> (50 ml). Mix and allow to stand for <u>10</u> (10 minutes)</p> <p>Standard preparation: Pipette out <u>0.25</u> (0.25 ml) of 0.02 N Sulphuric acid in <u>50</u> (50 ml) colour Comparison tube, add <u>30</u> (30 to 40 ml) of water and Add <u>1</u> (1 ml) of 3 N hydrochloride acid, <u>3</u> (3 ml) of 25 % w/v of Barium chloride solution and sufficient water to make <u>50</u> (50 ml). Mix and allow to stand for <u>10</u> (10 minutes)</p> <p>Procedure: Compare the turbidity of sample preparation against the standard preparation. The turbidity of the sample is not more than the standard preparation.</p> <p>Observation: <u>Complies</u></p> <p>Remarks: <u>Complies</u> <i>rlh</i> <i>Review</i> <i>02/07/17</i> <i>02/07/17</i></p>

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Name	Bhumika	Jigar	M.R.Patel		
Designation	Chemist QA	Sr. Chemist QA	Quality Head		
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Date	11/06/15	14/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38 <i>21/01/17/006</i>					

Sr No.	TEST	Standard testing procedure
08	Assay by HPLC (On dried Basis)	<p>Between 98.0% and 102.0% Glucosamine hydrochloride WRS B. No. <u>WS/GH/15/002</u></p> <p>Buffer: In a 1 – L Volumetric flask, dissolve 3.5 g of dibasic potassium phosphate in water. Add 0.25 ml of ammonium hydroxide, dilute with water to volume, and mix. Adjust with phosphoric acid to a pH of 7.5. <i>Mobilephase Annexure Attached</i></p> <p>Mobile phase : Acetonitrile and Buffer (75 : 25) Diluent : Acetonitrile and water (50 : 50) Standard Solution : 3.8 mg/ml of USP Glucosamine Hydrochloride RS in Diluent Sample Solution: 3.8 mg/ml of Glucosamine Hydrochloride in Diluent. [NOTE – Shake by mechanical means to aid dissolution.]</p> <p>Chromatographic system</p> <p>Mode : LC Detector : UV 195 nm Column : 4.6 mm × 15 cm ; 5 µm packing L8 (NH₂ Inertsil) C/N 5020 – 05545 S/N 3B180002 IN HOUSE NO . CL – 01 Column temperature : 35° Flow rate : 1.5 ml/min Injection size : 10 µl</p> <p>System suitability : Sample : Standard solution [NOTE – The peak for the glucosamine moiety elutes at above 10 min. The chromatogram shows a large additional peak near the void volume , due to the chloride ion.]</p> <p>Suitability requirements : Tailing factor : NMT 2.0 for the glucosamine peak- <u>1.285</u> Efficiency ; NLT 1000 theoretical plates- <u>4706.614</u> RSD of replicate five standard injection: NMT 2%- <u>0.101672</u></p> <p style="text-align: right;"><i>PD 02/01/17</i></p>

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Date	11/06/15	14/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38 (41/01/17/006					

Sr No.	TEST	Standard testing procedure																																																
		<p>Analysis Sample : Standard solution and sample solution Calculate the percentage of glucosamine hydrochloride (C₆H₁₃NO₅. HCL) in the portion of Glucosamine Hydrochloride taken :</p> <p>Result = (r_U/r_S) × (C_S/C_U) × 100</p> <p><i>★ calculation sheet attached</i></p> <table border="1"> <tr> <td>r_U</td> <td>=</td> <td>peak response from the sample solution.</td> </tr> <tr> <td>r_S</td> <td>=</td> <td>peak response from the standard solution.</td> </tr> <tr> <td>C_S</td> <td>=</td> <td>concentration of USP Glucosamine Hydrochloride RS in the Standard solution (mg/ml)</td> </tr> <tr> <td>C_U</td> <td>=</td> <td>concentration of Glucosamine Hydrochloride in the sample solution (mg/ml)</td> </tr> </table> <table border="1"> <thead> <tr> <th colspan="2">Standard Details</th> <th colspan="2">Sample Details</th> </tr> <tr> <th>Standard</th> <th>Standard Area</th> <th>Sample</th> <th>Sample Area</th> </tr> </thead> <tbody> <tr> <td>Std-1</td> <td>755319</td> <td>Sample Inj.-1</td> <td>753345</td> </tr> <tr> <td>Std-2</td> <td>754641</td> <td>Sample Inj.-2</td> <td>753234</td> </tr> <tr> <td>Std-3</td> <td>753526</td> <td>Sample Inj.-3</td> <td>753842</td> </tr> <tr> <td>Std-4</td> <td>753792</td> <td>Average</td> <td>753474</td> </tr> <tr> <td>Std-5</td> <td>753666</td> <td></td> <td></td> </tr> <tr> <td>Average</td> <td>754188.8</td> <td></td> <td></td> </tr> <tr> <td>RSD</td> <td>0.101672</td> <td></td> <td></td> </tr> </tbody> </table> <p>% of Assay = $\frac{753474}{754188.8} \times \frac{190.0}{190.1} \times 100$</p> <p>Observation: <i>99.839961</i> % Assay $\times \frac{100}{100-0.22} = 99.874$</p> <p>Remark: <i>Complies</i></p>	r _U	=	peak response from the sample solution.	r _S	=	peak response from the standard solution.	C _S	=	concentration of USP Glucosamine Hydrochloride RS in the Standard solution (mg/ml)	C _U	=	concentration of Glucosamine Hydrochloride in the sample solution (mg/ml)	Standard Details		Sample Details		Standard	Standard Area	Sample	Sample Area	Std-1	755319	Sample Inj.-1	753345	Std-2	754641	Sample Inj.-2	753234	Std-3	753526	Sample Inj.-3	753842	Std-4	753792	Average	753474	Std-5	753666			Average	754188.8			RSD	0.101672		
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Date	15/06/15	15/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38					

Sr No.	TEST	Standard testing procedure
09	Chloride Content	<p>Chloride: Between 15.5% - 17.5%</p> <p>Reagents: 1N AgNO₃(Silver nitrate) Solution, Eosin</p> <p>Procedure: Take About 0.2 gm weight of the test sample in conical flask. Add 5 ml distilled water dissolve it , Add 5 ml Acetic acid & 50 ml methanol. Then add 2-3 drops of Eosin Indicator titrate against 0.1N AgNO₃.</p> $\% \text{ of chloride} = \frac{\text{B.R} \times \text{Normality} \times 35.55}{\text{Wt} \times 10}$ <p>Where, B.R = Burette reading <u>16.6 ml</u> N = Normality of 0.1 N AgNO₃ <u>0.1015 N</u> Wt = Weight of Sample in g <u>0.3790g</u></p> <p>Observation: <u>16.10%</u> Remarks: <u>Complies</u></p> <p><i>mls</i> <u>Review</u> <u>02/07/17</u> <u>02/07/17</u></p>
10	Particle size	<p>As per party specification. Take 10 gm sample and pass through selected mesh sieve and calculate the return wet.</p> <p>Observation: <u>Complies</u> Remark: <u>Complies</u></p> <p><i>mls</i> <u>Review</u> <u>02/07/17</u> <u>02/07/17</u></p>

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Ref.: In house/USP 38		Revision no:00		Supersedes no: 00	
Name	Prepared by Bhumika	Reviewed by Jigar	Approved by M.R.Patel		
Designation	Chemist QA	Sr. Chemist QA	Quality Head		
Signature	<i>Bhumika</i>	<i>Jigar</i>	<i>M.R.Patel</i>		
Date	11/06/15	14/06/15	15/06/15		
NAME OF PRODUCT: GLUCOSAMINE HYDRO CHLORIDE USP -38					

Sr No.	TEST	Standard testing procedure
11	Heavy Metals	*As per ICPMS Lead Arsenic \$ COA Attached Cadmium \$ B. No GH/01/17/006 Mercury REPOST NO ÷ CLF/2806017012
12	Microbial Test	As per TQC/MBL/135-00 <i>CLF/2806017015</i>

3/A KAILASH IND. ESTATE VILL-IYAVA, TA-SANAND DIST-AHMEDABAD

Gujarat Laboratory

AN ISO 9001 : 2008 CERTIFIED LABORATORY

F-17, MADHAVPURA MARKET, SHAHIBAUG, AHMEDABAD - 380 004.
Tele Fax : (079) 25626040, 25624821, 25625436, 25620753
Email : gujlab@gmail.com • Website : www.gujaratlaboratory.com



APPROVED BY :

◆ "Agmark" Directorate of Marketing and Inspection, Govt. of India.
◆ Solvent Extractors Association of India.

TEST REPORT

Report No. GL/F/2806017012
Sample submitted by Meck pharmaceutical & chemical p. ltd.
606, Harikrupa Tower,
S. M. Road Ellisbrige,
Ahmedabad - 380006
Date of Receipt 28/06/17
Batch No. GH/01/17/006
Sample Described as GLUCOSAMINE HYDROCHLORIDE
USP
Mode of packing Sample packed in plastic bag
Sample condition Satisfactory
Mfg. Date NM
Exp. Date NM
Sample Qty.: 25gm
Marking -----
Analysis Date 04/07/17

Sl.	Test Name	Result	Test Method
Heavy metals			
1	Arsenic (as As) ppm	ND (D.L.=0.005)	GL/SOP/I-120
2	Cadmium (as Cd) ppm	N.D.(D.L.=0.01)	GL/SOP/I-119
3	Mercury (as Hg) ppm	N.D.(D.L.=0.02)	GL/SOP/I-120
4	Lead (as Pb) ppm	0.1 (D.L.=0.08)	GL/SOP/I-119

N.M. = Not Mentioned, N.D. = Not Detected, D.L. = Detection Limit

Date of Issue : 04/07/17

For GUJARAT LABORATORY

Rupesh Desai


Autho. Signatory

End of Report

Note

1. The result refer only to be tested sample & applicable parameters, endorsement of product is neither inferred nor implied.
2. Total liability of our institution to be invoice amount/testing charges.
3. This report is not to be reproduced wholly or in part and cannot be used as an evidence in the court of law and should not be used in any advertising media without our special permission in writing.
4. Sample drawn & submitted by the party for analysis unless otherwise stated.
5. Gujarat laboratory maintains strict confidentiality of all the analysis and test result and customer supplied product and will not reveal this information to third party unless required by the statutory or legal requirement.
6. Subject to Ahmedabad jurisdiction
7. Perishable sample will be destroyed after testing, others after three weeks from the data of issue of the report, unless otherwise agreed with the customer.
8. The sample is accepted by us subject to our general condition of services which is displayed at reception notice board & is also available on request
9. Customer requested for the above test only.

Gujarat Laboratory

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APPROVED BY :

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◆ Solvent Extractors Association of India.

TEST REPORT

Report No. GL/F/2806017015
Sample submitted by Meck pharmaceutical & chemical p. ltd. Date of Receipt 28/06/17
606.Harikrupa Tower, Batch No. GH/01/17006
S. M. Road Ellisbrige.
Sample Described as Ahmedabad - 380006
GLUCOSAMINE HYDROCHLORIDE
USP
Mode of packing Sample packed in plastic bag
Mfg. Date NM
Sample condition Satisfactory Exp. Date NM
Sample Qty.: 25gm
Marking -----
Analysis Date 03/07/17

MICRO REPORT

Sr. No.	Test	Result	Specification
1	Total Aerobic Microbial count	30 cfu / gm	Not more than 500 cfu / gm
2	Total yeast & mold count	10 cfu / gm	Not more than 100 cfu / gm
3	Escherichia coli	Absent	Should be absent
4	Pseudomonas aeruginosa	Absent	Should be absent
5	Salmonella spp.	Absent	Should be absent
6	Staphylococcus aureus	Absent	Should be absent
7	Bile tolerant gram negative bacteria	Absent	Should be absent

N.M. = Not Mentioned, N.D. = Not Detected, D.L. = Detection Limit

For GUJARAT LABORATORY

Date of Issue : 03/07/17

Rupesh Desai
Autho. Signatory

Note:

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8. The sample is accepted by us subject to our general condition of services which is displayed at reception notice board & is also available on request.
9. Customer requested for the above test only