

# DNA Analysis of Building

## DNA Mould Test



**Address** Garðaskóli, Víflsstaðavegi, 210 Garðabæ

Case nr. 3.161.348

Requester Mannvit hf, Rekvirent

Lab nr. 2023002400

Test ID 8049, 8050, 8051 og 8052

Sample date 24.05.2023    Receipt date 02.06.2023    Analysis date 09.06.2023

**8049 Garðaskóli, Vífilsstaðavegi, 210 Garðabæ**  
**2. hæð, bókasafn, sýni tekið ofan af hillu, 785**

DNA tests may reveal whether there are microorganisms (mould) in dust originating from moisture damaged building materials or concealed water damages. Microbiologic material from concealed constructions may over time be released to the residential zone, where it will sediment with the dust. The result of the DNA analysis is an indication of the extent of which the room is affected by microbiologic material.

## CONCLUSION

Based on the analysis results for the test made in 2. hæð, bókasafn, sýni tekið ofan af hillu, Garðaskóli, Vífilsstaðavegi, 210 Garðabæ, our evaluation is that the rate of mould in the building is at a normal, expected level for dry, clean and undamaged buildings. No occurrence of mould indicates that the indoor environment should not be affected by concealed water damages.

However, we would like to point out that the evaluation is merely based on the analysis results. As the results only form part of our evaluation basis, these results should always be compared to observations and moisture measurements on site, before drawing a final conclusion.



The results for the individual species/groups are given as DNA units per cm<sup>2</sup>. The division into classes A-F is based on internal references and is an expression of the probability that the building is affected by atypical occurrences of mould.

A-B	The species composition and concentration of DNA-units is at the level normally expected for dry, clean and not damp-damaged buildings
C-D	The species composition and concentration of DNA-units is at a slightly elevated to elevated level for dry, clean and not moisture-damaged buildings
E-F	The species composition and concentration of DNA-units is at a higher than expected level for dry, clean and not damp-damaged buildings.

## RESULT

### The amount of organisms per. cm<sup>2</sup>

<i>Total antal skimmelsvamp</i>	41713	100,00%
<i>Wallemia sebi</i>	0	0,00%
<i>Cladosporium cladosporioides</i>	0	0,00%
<i>Cladosporium herbarum</i>	144	0,35%
<i>Cladosporium sphaerospermum</i>	72	0,17%
<i>Mucor/Rhizopus grp.</i>	0	0,00%
<i>Rhizopus stolonifer</i>	0	0,00%
<i>Acremonium strictum</i>	0	0,00%
<i>Aspergillus og Penicillium arter</i>	1884	4,52%
<i>Aspergillus fumigatus</i>	0	0,00%
<i>Penicillium chrysogenum</i>	0	0,00%
<i>Tricoderma viride</i>	0	0,00%
<i>Aspergillus glaucus</i>	62	0,15%
<i>Aspergillus niger</i>	0	0,00%
<i>Aspergillus versicolor</i>	114	0,27%
<i>Alternaria alternata</i>	41	0,10%
<i>Ulocladium chartarum</i>	0	0,00%
<i>Stachybotrys chartarum</i>	0	0,00%
<i>Chaetomium globosum</i>	0	0,00%
<i>Streptomyces</i>	0	0,00%

The evaluation is based on the assumption that the test has been made correctly according to OBH's guide lines.

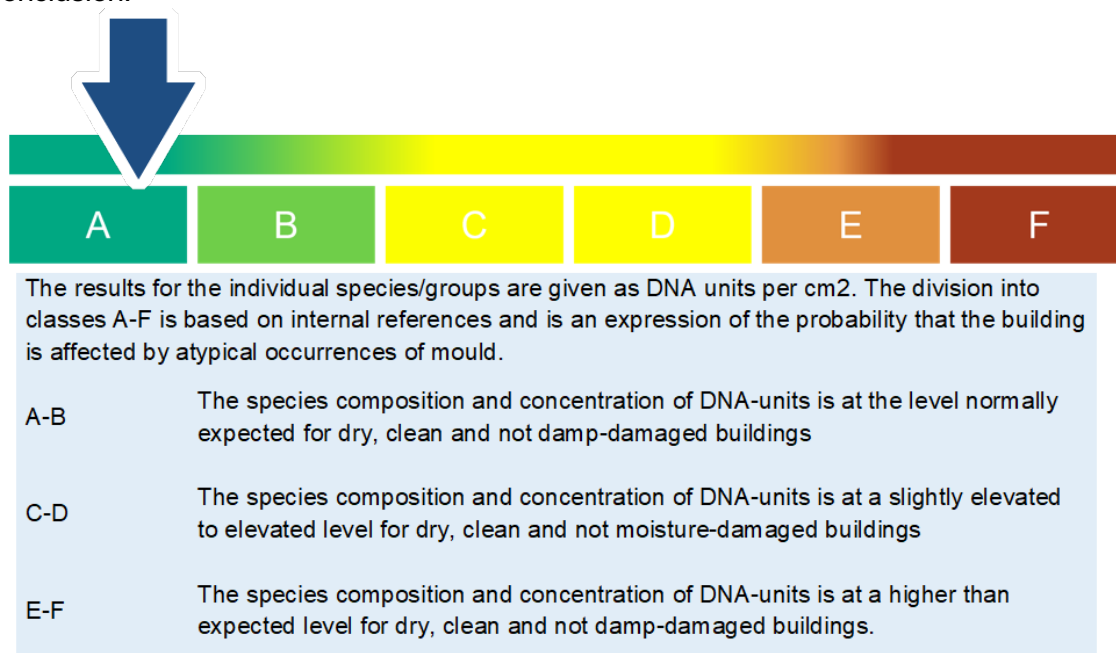
**8050 Garðaskóli, Vífilsstaðavegi, 210 Garðabæ**  
**2. hæð, sýni tekið ofan af mynd á vegg í tölvurými, 761**

DNA tests may reveal whether there are microorganisms (mould) in dust originating from moisture damaged building materials or concealed water damages. Microbiologic material from concealed constructions may over time be released to the residential zone, where it will sediment with the dust. The result of the DNA analysis is an indication of the extent of which the room is affected by microbiologic material.

## CONCLUSION

Based on the analysis results for the test made in 2. hæð, sýni tekið ofan af mynd á vegg í tölvurými, Garðaskóli, Vífilsstaðavegi, 210 Garðabæ, our evaluation is that the rate of mould in the building is at a normal, expected level for dry, clean and undamaged buildings. No occurrence of mould indicates that the indoor environment should not be affected by concealed water damages.

However, we would like to point out that the evaluation is merely based on the analysis results. As the results only form part of our evaluation basis, these results should always be compared to observations and moisture measurements on site, before drawing a final conclusion.



## RESULT

### The amount of organisms per. cm<sup>2</sup>

<i>Total antal skimmelsvamp</i>	138643	100,00%
<i>Wallemia sebi</i>	0	0,00%
<i>Cladosporium cladosporioides</i>	0	0,00%
<i>Cladosporium herbarum</i>	735	0,53%
<i>Cladosporium sphaerospermum</i>	183	0,13%
<i>Mucor/Rhizopus grp.</i>	0	0,00%
<i>Rhizopus stolonifer</i>	0	0,00%
<i>Acremonium strictum</i>	5	0,00%
<i>Aspergillus og Penicillium arter</i>	5118	3,69%
<i>Aspergillus fumigatus</i>	3	0,00%
<i>Penicillium chrysogenum</i>	0	0,00%
<i>Tricoderma viride</i>	0	0,00%
<i>Aspergillus glaucus</i>	0	0,00%
<i>Aspergillus niger</i>	0	0,00%
<i>Aspergillus versicolor</i>	362	0,26%
<i>Alternaria alternata</i>	74	0,05%
<i>Ulocladium chartarum</i>	0	0,00%
<i>Stachybotrys chartarum</i>	0	0,00%
<i>Chaetomium globosum</i>	0	0,00%
<i>Streptomyces</i>	0	0,00%

The evaluation is based on the assumption that the test has been made correctly according to OBH's guide lines.

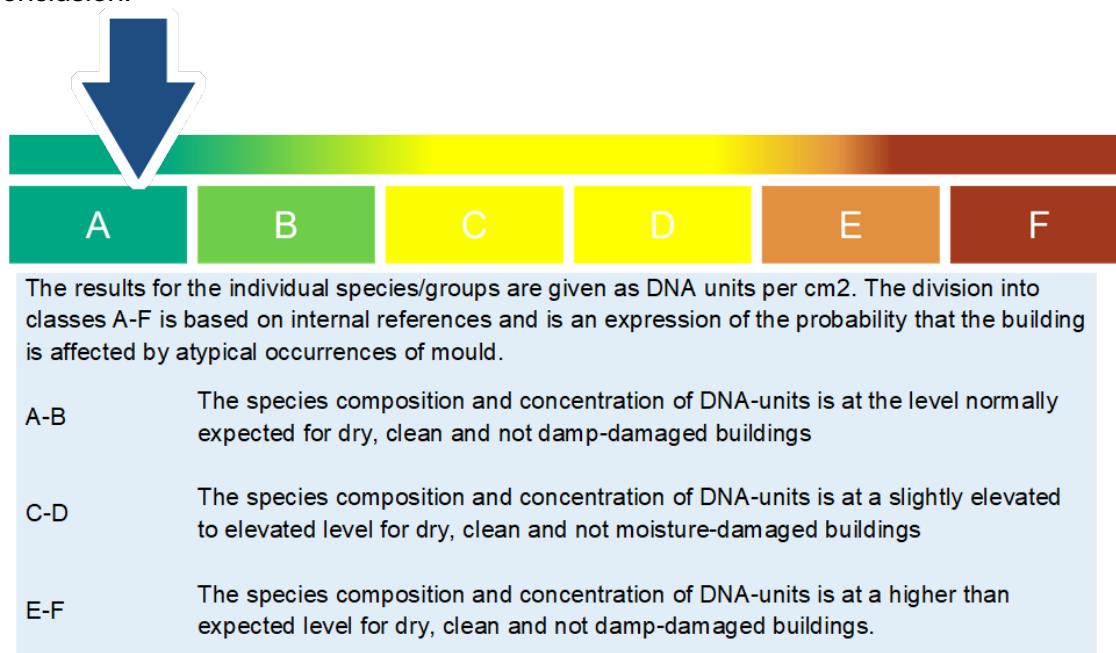
**8051 Garðaskóli, Vífilsstaðavegi, 210 Garðabæ**  
**1. hæð, tónlist ofan af klukku, 776**

DNA tests may reveal whether there are microorganisms (mould) in dust originating from moisture damaged building materials or concealed water damages. Microbiologic material from concealed constructions may over time be released to the residential zone, where it will sediment with the dust. The result of the DNA analysis is an indication of the extent of which the room is affected by microbiologic material.

## CONCLUSION

Based on the analysis results for the test made in 1. hæð, tónlist ofan af klukku, Garðaskóli, Vífilsstaðavegi, 210 Garðabæ, our evaluation is that the rate of mould in the building is at a normal, expected level for dry, clean and undamaged buildings. No occurrence of mould indicates that the indoor environment should not be affected by concealed water damages.

However, we would like to point out that the evaluation is merely based on the analysis results. As the results only form part of our evaluation basis, these results should always be compared to observations and moisture measurements on site, before drawing a final conclusion.



## RESULT

### The amount of organisms per. cm<sup>2</sup>

<i>Total antal skimmelsvamp</i>	8702	100,00%
<i>Wallemia sebi</i>	0	0,00%
<i>Cladosporium cladosporioides</i>	0	0,00%
<i>Cladosporium herbarum</i>	19	0,22%
<i>Cladosporium sphaerospermum</i>	7	0,08%
<i>Mucor/Rhizopus grp.</i>	0	0,00%
<i>Rhizopus stolonifer</i>	0	0,00%
<i>Acremonium strictum</i>	0	0,00%
<i>Aspergillus og Penicillium arter</i>	321	3,69%
<i>Aspergillus fumigatus</i>	0	0,00%
<i>Penicillium chrysogenum</i>	0	0,00%
<i>Trichoderma viride</i>	0	0,00%
<i>Aspergillus glaucus</i>	19	0,22%
<i>Aspergillus niger</i>	0	0,00%
<i>Aspergillus versicolor</i>	26	0,30%
<i>Alternaria alternata</i>	0	0,00%
<i>Ulocladium chartarum</i>	0	0,00%
<i>Stachybotrys chartarum</i>	0	0,00%
<i>Chaetomium globosum</i>	0	0,00%
<i>Streptomyces</i>	0	0,00%

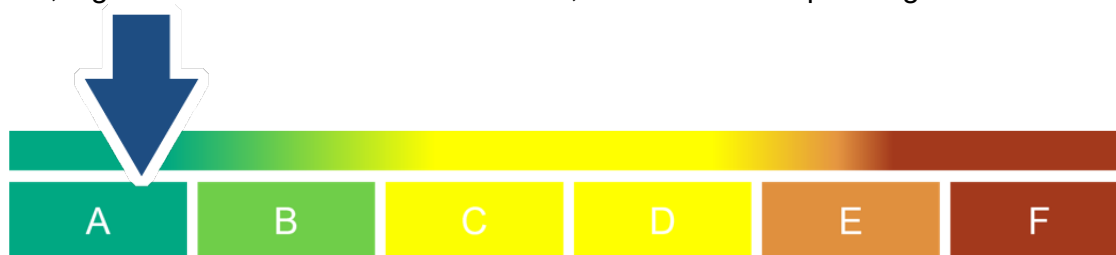
The evaluation is based on the assumption that the test has been made correctly according to OBH's guide lines.

**8052 Garðaskóli, Vífilisstaðavegi, 210 Garðabæ**  
**2. hæð, í viðbyggingu, ofan af brunabjöllu, 793**

DNA tests may reveal whether there are microorganisms (mould) in dust originating from moisture damaged building materials or concealed water damages. Microbiologic material from concealed constructions may over time be released to the residential zone, where it will sediment with the dust. The result of the DNA analysis is an indication of the extent of which the room is affected by microbiologic material.

## CONCLUSION

On the basis of the analysis results for the test made from 2. hæð, í viðbyggingu, ofan af brunabjöllu, Garðaskóli, Vífilisstaðavegi, 210 Garðabæ, our evaluation is that the rate of mould in the building is somehow above the normal, expected level for dry, clean and undamaged buildings. When looking at the mould species there are relatively few moisture damage indicators. No occurrence of mould indicates that the indoor environment is not affected by severe water damages. The few moisture damage indicators present in the test may be originating from small areas of condensation on walls, e.g. cold basement walls or from an old, small and dried up damage.



The results for the individual species/groups are given as DNA units per cm<sup>2</sup>. The division into classes A-F is based on internal references and is an expression of the probability that the building is affected by atypical occurrences of mould.

A-B	The species composition and concentration of DNA-units is at the level normally expected for dry, clean and not damp-damaged buildings
C-D	The species composition and concentration of DNA-units is at a slightly elevated to elevated level for dry, clean and not moisture-damaged buildings
E-F	The species composition and concentration of DNA-units is at a higher than expected level for dry, clean and not damp-damaged buildings.



## RESULT

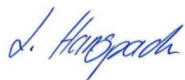
### The amount of organisms per. cm<sup>2</sup>

<i>Total antal skimmelsvamp</i>	75492	100,00%
<i>Wallemia sebi</i>	57	0,08%
<i>Cladosporium cladosporioides</i>	300	0,40%
<i>Cladosporium herbarum</i>	1142	1,51%
<i>Cladosporium sphaerospermum</i>	484	0,64%
<i>Mucor/Rhizopus grp.</i>	0	0,00%
<i>Rhizopus stolonifer</i>	0	0,00%
<i>Acremonium strictum</i>	26	0,03%
<i>Aspergillus og Penicillium arter</i>	4626	6,13%
<i>Aspergillus fumigatus</i>	2	0,00%
<i>Penicillium chrysogenum</i>	0	0,00%
<i>Tricoderma viride</i>	24	0,03%
<i>Aspergillus glaucus</i>	0	0,00%
<i>Aspergillus niger</i>	0	0,00%
<i>Aspergillus versicolor</i>	510	0,68%
<i>Alternaria alternata</i>	0	0,00%
<i>Ulocladium chartarum</i>	0	0,00%
<i>Stachybotrys chartarum</i>	0	0,00%
<i>Chaetomium globosum</i>	0	0,00%
<i>Streptomyces</i>	0	0,00%

The evaluation is based on the assumption that the test has been made correctly according to OBH's guide lines.

Contact the undersigned regarding questions to the report

Med venlig hilsen



Lena F. Hanspach  
Laborant  
OBH Rådgivende Ingeniører  
Environment and Health

## ANALYSIS METHOD

The analysis was developed by EPA, USA's Environmental Protection Agency (pat 6 387 652). The organisms are washed out of the test, and the DNA is extracted. Accordingly, the DNA is amplified in a sequential PCR process, until the light from an attached fluorescence molecule can be seen in the detector. The number of sequences are calculated and compared to a synthetic standard DNA, after which the number of original DNA sequences are calculated. As the DNA is unique for any organism the species and quantity of specific organisms can be determined. By this precise method you will rapidly be informed how much mould, respective indicator organisms which the test contains per square unit.

## ANALYSIS EXPLANATION

The above evaluation applies for the test made, and not for the building as such. The analysis response should always be included as part of a total evaluation of the conditions on site together with other observations and measurements. The responsibility for correct testing always lies with the tester. Evaluations and good advice given here or in connection with interpretation of these results apply for the normal cases and are based on the assumption that the test is representative and made according to OBH's guide lines.

## TAKING A DUST TEST

The purpose of the test is to evaluate whether in the indoor air there are microorganisms to indicate moisture damaged building parts. Mould releases particles, spores, cells, and other fungus components containing DNA, to the air. These microparticles float in the air and are sedimented with dust in the living area. Collecting dust is thus an expression of whether the air of the room has been effected by particles from mould over an extended period of time.

## INDICATION OF QUANTITY

The DNA analysis distinguishes between 20 groups/species.

The test result states the number of DNA sequences for respective species and groups per cm<sup>2</sup>.

Any colour markup states the level of each species or group, deviating according to the levels of dry, clean and undamaged buildings.

Yellow	Above normal
Orange	Far above normal
Red	Very far above normal

## HEALTH

Mould in our indoor environment may affect our health, most commonly with respiratory irritation. Further symptoms are irritation of eyes, nose and upper respiratory tract, headache, fatigue, coughing, and rashing. These symptoms will be more severe for persons with hay fever and asthma. Asthmatic symptoms may occur in connection with a long-term stay in an indoor environment with massive mould problems. The DNA result does not reveal anything about the health risk of residing in the building.

## THE HEALTH DAMAGING EFFECT

In order to evaluate the health risk of residing in a building, a construction technical and healthcare evaluation must be made. According to the Danish National Board of Health the health risk is among others characterized by the unhealthy circumstances as well as the moisture and mould conditioned health problems of the residents/users.

## READ MORE

[www.obh-gruppen.dk](http://www.obh-gruppen.dk)

[www.sst.dk](http://www.sst.dk)

[www.astma-allergi.dk](http://www.astma-allergi.dk)

[www.indeklimaportalen.dk](http://www.indeklimaportalen.dk)