



LUND UNIVERSITY
Faculty of Science

Certificate of

POLLEN ANALYTICAL STANDARD

Batch 101023 231

Combined Nomenclature, CN, **3822 90 00** – *a certified reference material*

The pollen analytical standard is used as an internal standard in scientific research of microfossils. The spores from *Lycopodium clavatum*, a club moss, are acetolysed to remove all dissolvable organic matter. This means that the spores consist only of resistant, sporopolleninous, empty cysts that cannot germinate and are not in any way harmful to any environment. The standard contains no living spores. The cysts are placed in ethanol (96%) and sent to Skanderborg Apotek in Denmark, where they are mixed with Lactose Monohydrate, Calciumcarbonate and Macrogol 3000, and pressed into tablets. The number of spores per tablet is determined at the Department of Geology, Lund University, Sweden, by coulter counter measurements on dissolved tablets. When applied by the end user, the standard is added to geological or archaeological samples, and the total number of pollen in the sample can be calculated.

The material does not contain any animal or cell culture derived products and it is not derived from any animal or cell culture derived products. The standard is NOT a health product and should not be eaten.

The standard production is managed and quality insured by Lund University, Department of Geology, Lund, Sweden. Lund University is the only distributor of this type of pollen standard for scientific analysis.

Lund December, 2023

A blue ink signature of Raimund Muscheler.

Raimund Muscheler, Professor

Chair of Quaternary Sciences
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Pollen Analytical Standard Batch 101023-231 (96 000 tablets)

This batch is produced based on the original recipe by Stockmarr 1971. The tablets can be dissolved in HCl. For the calibration, 100 samples of 1 tablet each were taken from different places in the batch. The tablet was dissolved in 5 ml HCl (10%) and mixed with 95 ml Isoton II solution in 100 ml flasks. 20 counts of 1 ml were made on each sample.

The spore concentration has been determined with an electronic particle counter, Coulter Counter ZB (cf. Stockmarr 1973), tube size 140 μm .

The tablets consist of acetolysed spores of *Lycopodium clavatum*, Lactose Monohydrat, Calciumcarbonat and Macrogol 3000.

Result of the calibration, 1 tablet: $X = 20\ 408$ $s = \pm 543$ $V = \pm 2.66 \%$

Mean and standard deviation for different numbers of tablets (After Maher 1981):

Number of tablets	Group Mean	Group S.D.	Coefficient of Variation
1	20408	543	2.66
2	40817	768	1.88
3	61225	941	1.54
4	81633	1087	1.33
5	102041	1215	1.19
6	122450	1331	1.09
7	142858	1438	1.01
8	163266	1537	0.94
9	183674	1630	0.89
10	204083	1718	0.84

References

- Maher, L., J., 1981: Statistics for Microfossil Concentration Measurements Employing Samples Spiked with Marker Grains. *Review of Palaeobotany and Palynology* 32:153-191.
- Stockmarr, J., 1971: Tablets with spores used in absolute pollen analysis. *Pollen et Spores*, Vol. 13, No 4, p. 615-621.
- Stockmarr, J., 1973: Determination of spore concentration with an electronic particle counter. *Danm. Geol. Unders.*, Årbog 1972, p. 87-89.