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Certificate of

POLLEN ANALYTICAL STANDARD

Batch 050220211

Classification (BKB) reference issued by Tullverket (Swedish Customs) is SE TIL 2011-5523, and the Combined Nomenclature, CN, is **3822 00 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.

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Pollen Analytical Standard Batch 050220211 (91 000 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 2.5 ml HCl (10%) and mixed with 97.5 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*, Ethanol, Lactose Monohydrat, Calciumcarbonat and Macrogol 3000.

Result of the calibration, 1 tablet: **X = 18 407** s = ± 592 V = ± 3.22 %

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

Number of tablets	Group Mean	Group S.D.	Coefficient of Variation
1	18407	592	3,22
2	36814	837	2,27
3	55221	1025	1,86
4	73627	1184	1,61
5	92034	1324	1,44
6	110441	1450	1,31
7	128848	1566	1,22
8	147255	1675	1,14
9	165662	1776	1,07
10	184069	1872	1,02

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.