

DETERMINATION OF REPEATABILITY AND REPRODUCIBILITY OF THE REVISED METHOD FOR GERMINATIVE CAPACITY

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The method for the determination of germinative capacity of barley using hydrogen peroxide and peeling technique (EBC 3.5.2) was revised in 1995. The revised procedure has been collaboratively tested by the EBC Analysis Committee. The repeatability (r_{95}) and reproducibility (R_{95}) values were dependent upon mean values, $r_{95} = (64.23-0.64m) \%$ and $R_{95} = (51.74-0.50 m) \%$.

INTRODUCTION

The Analysis Committees of EBC, Institute of Brewing and MEBAK have harmonized the method for germinative capacity of barley (EBC 3.5.2, IoB 1.4.1.1 and MEBAK 2.4.1.2). The differences between the previous procedures were the number of grains taken for the analysis and the germination time. In the revised version the sample size has been changed from 500 grains to 200 grains and germinated grains are counted after 3 days instead of 4 days. The EBC Analysis Committee adopted the revised version in May 1995.

EXPERIMENTAL

The organisation of the collaborative trial and the statistical treatment of the data were carried out according to the procedures given in ISO 5725¹. Six barley samples were sent to members of the Barley Subcommittee to obtain the repeatability and reproducibility values of the revised procedure. In order to have a few poor samples a barley was artificially destroyed by steeping over night in water and by drying at 80°C. Germination capacity after the treatment was 0%. Samples A, B and C were natural barley samples and samples D, E and F were mixtures of sample A and the artificially destroyed barley.

RESULTS AND DISCUSSION

The results received from 12 laboratories are presented in Table I. Laboratory 3 was identified as an outlier ($P < 1 \%$) at level A and laboratory 9 was a straggler ($5\% > P > 1\%$) at level B. The statistical treatment of the data is summarized in Table II. For the range of germination capacity 92–100% the following equations for r_{95} and R_{95} were obtained:

$$r_{95} = 64.23 - 0.64m$$

$$R_{95} = 51.74 - 0.50m$$

CONCLUSION

The EBC Analysis Committee (May 1997) accepted the repeatability and reproducibility values of the revised method for germinative capacity of barley and they are included in the updated version of Analytica-EBC².

REFERENCES

1. International Standard. ISO 5725. Precision of test methods, 2nd edition, 1986
2. Analytica-EBC, Method 3.5.2 Germinative Capacity of Barley: Hydrogen Peroxide and Peeling Technique, Getr(nke-Fachverlag Hans Carl, 1997.

TABLE I. Germinative capacity (%), summary of the raw data

Collaborator	A		B		C		D		E		F	
	1	2	1	2	1	2	1	2	1	2	1	2
1	100.0	100.0	100.0	100.0	100.0	100.0	97.0	99.0	93.0	93.0	92.0	93.0
2	99.5	99.0	98.5	98.0	97.5	97.5	97.5	98.0	95.0	95.0	95.5	94.0
3	96.0	96.5	98.0	99.5	97.5	97.0	98.0	97.0	92.5	92.0	91.5	89.5
4	99.5	100.0	99.0	99.0	99.0	99.5	98.5	96.0	96.0	93.5	91.0	91.5
5	99.5	100.0	98.0	99.0	98.0	99.5	97.5	97.5	92.0	92.5	91.5	94.0
6	100.0	100.0	100.0	100.0	98.0	99.5	97.0	97.0	95.0	93.0	96.0	94.5
7	99.0	99.0	98.0	98.5	98.0	98.0	99.0	97.5	92.5	91.0	88.0	92.0
8	99.5	99.5	99.5	99.0	98.5	100.0	98.0	99.0	94.5	93.5	88.5	93.0
9	99.0	99.0	97.0	96.0	98.0	98.0	99.0	99.0	92.0	95.0	90.0	95.0
10	100.0	100.0	99.0	100.0	100.0	99.0	99.0	98.0	93.0	94.0	93.0	95.0
11	99.0	99.0	99.5	99.0	99.0	99.0	97.0	97.5	94.5	94.0	93.0	92.0
12	99.5	99.0	98.5	98.0	98.0	98.5	98.5	97.5	91.0	93.5	91.0	93.0

TABLE II. Summary of statistical treatment of the data

Sample	No of labs	Mean %	r_{95} %	R_{95} %
A	11	99.5	0.60	1.25
B	12	98.8	1.46	2.87
C	12	98.6	1.67	2.62
D	12	97.9	2.36	2.38
E	12	93.4	3.16	3.74
F	12	92.4	5.31	5.95