Apeldoorn

TECHNOLOGIEKRING PAPER & BOARD

20-21 November 2024

NCR BIOCHEMICAL

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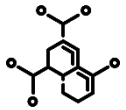
RENZYME PCR9 – PM23

ENZYMATIC TECHNOLOGY APPLIED TO RECYCLED PULP

PROGRAM

1

ENZYMATIC TREATMENT



2

LABORATORY STUDY

3

INDUSTRIAL TEST

4

TECHNICAL CONCLUSION

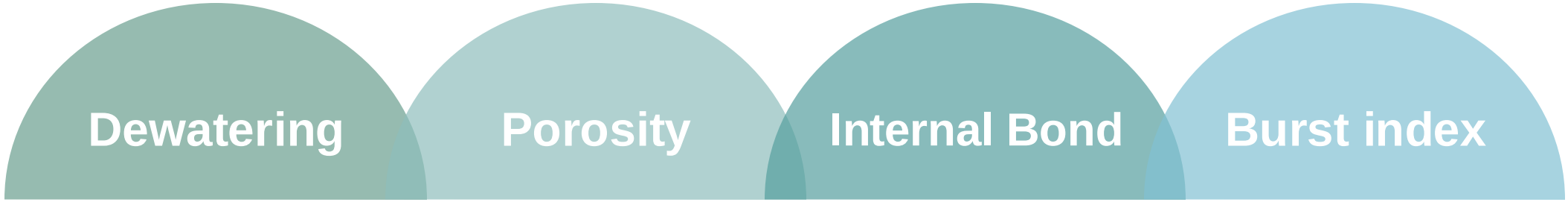
1. ENZYME APPLIED TO THE WASTE PAPER PRODUCTION

The production of paper from waste paper pulp plays a very important role in today's industry and the evolution of this sector increasingly requires a technical and innovative approach to improve its characteristics according to market demands.

1. RENZYME PCR 9 – RENZYME PM23

Enzyme formulations specifically studied and developed for applications **on waste paper pulp**.

Their innovative technology allows **to improve** the following **operating parameters**:



RUNNABILITY

Increase of production

ENERGETIC SAVING

Reduction of steam consumption

FINISHED PRODUCT QUALITY

Improveme mechnical properties

2. LABORATORY STUDY

Tests conducted on waste mix taken from the machine head circuit, adding the products in function at an approximate density of the dense mix of 4.7%.

The dosage taken into consideration for each enzyme was 100 ppm calculated on the dry pulp.

A N A L Y S I S P E R F O R M E D

Dewatering

Mixture diluted at a concentration of approximately 1% with first water

SZP Potential

High density pulp

PCD Potential

High density pulp

Torbidity

Drained

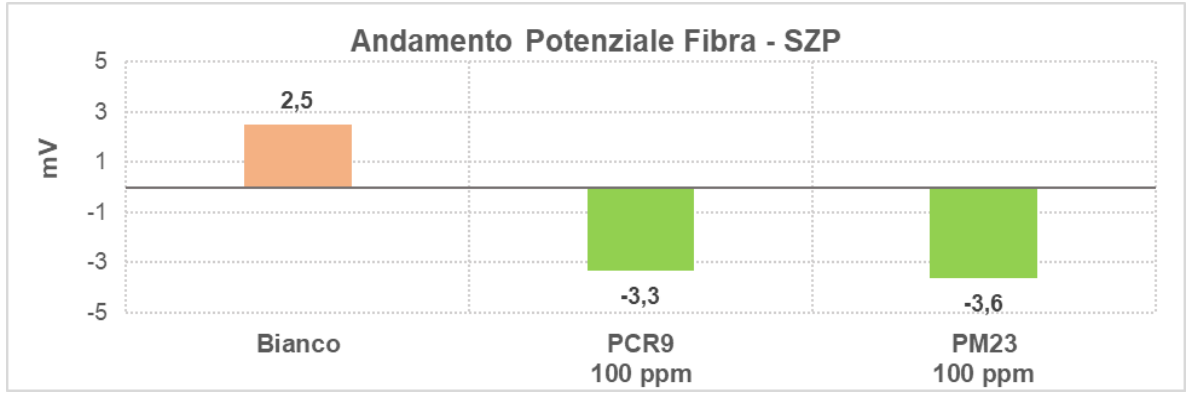
Lab Sheets

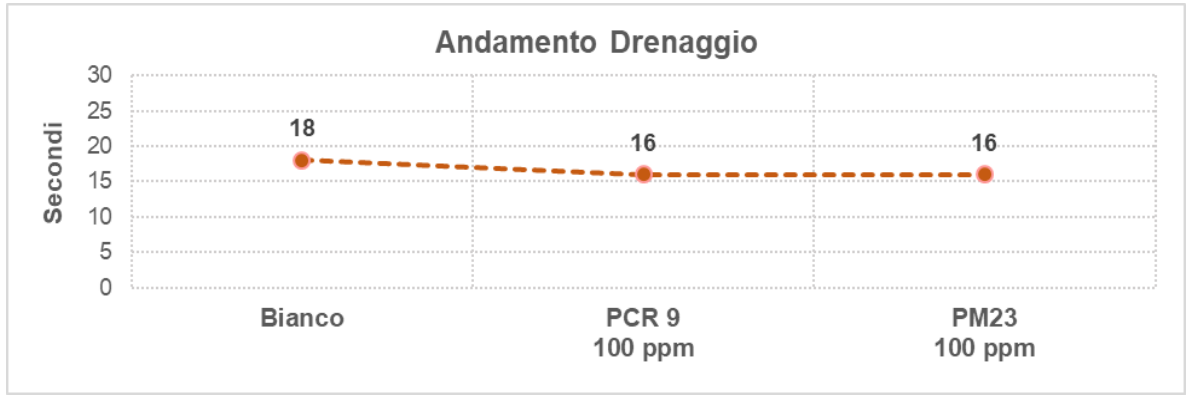
Verification of mechanical properties

2. LAB TEST RESULTS

Analysis	White ref.	Renzyme PCR9	Renzyme PM23
Dosage (ppm)	-	100	100
Drainage (200 cc)	18 sec.	16 sec.	16 sec.
SZP (mV)	+2,5	-3,3	-3,6
PCD (µeq/l)	-200	-500	-580
Torbidity (FAU)	1520	3850	4250

Tab 1. Chemical-physical parameters

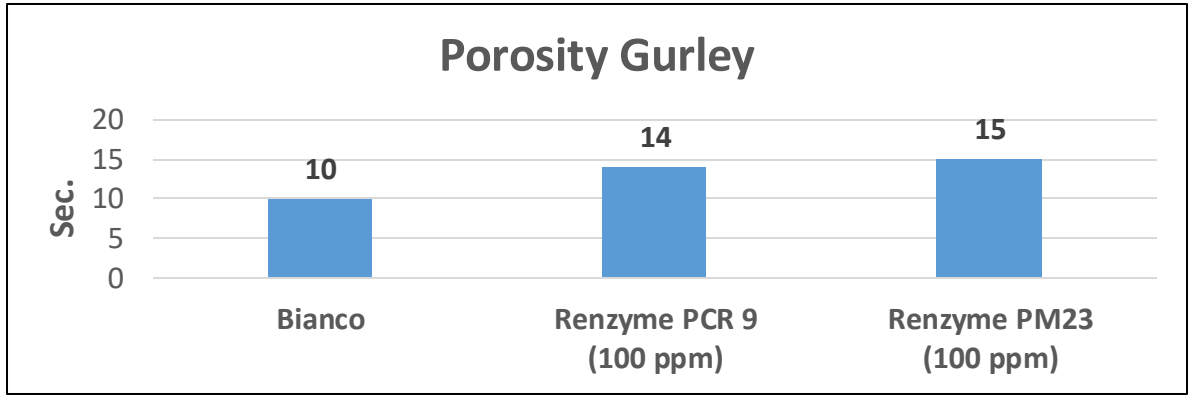


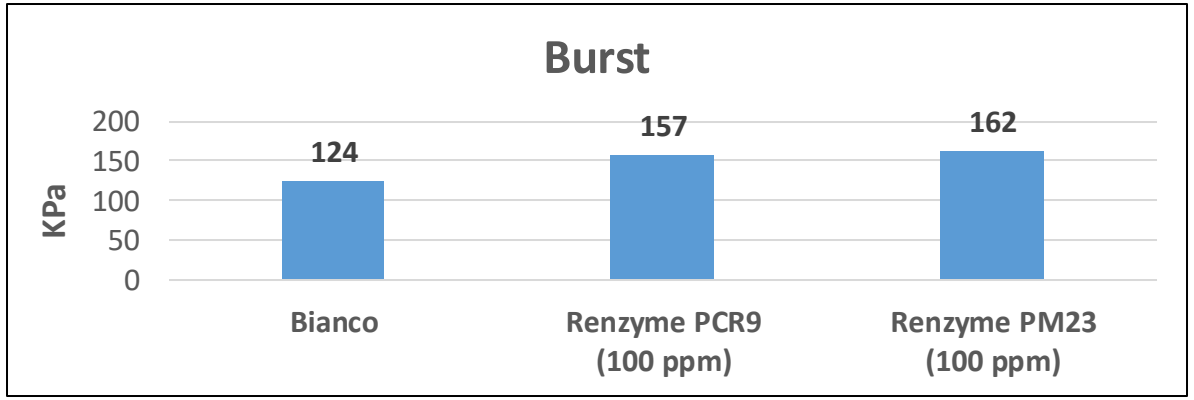


2. LAB TEST RESULTS (80 g/m²)

Analysis	White Ref.	Renzyme PCR9	Renzyme PM23
Dosage (ppm)	-	100	100
Nominal basis weight (g/m²)	80	80	80
Porosity Gurley (sec.)	10	14	15
Burst (KPa)	124	157	162
Burst Index (KPam²/g)	1,60	1,99	2,05

Tab. 2a. Mechanical Properties 80 g/m²

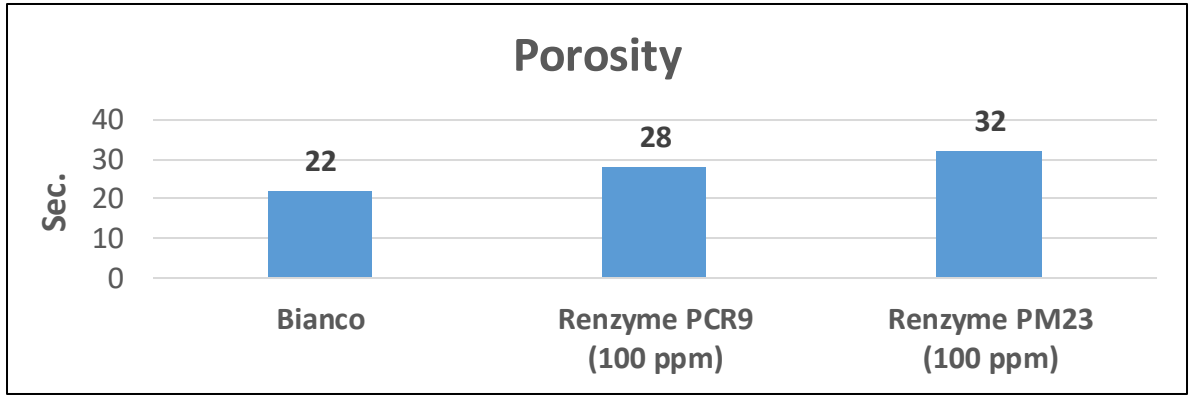


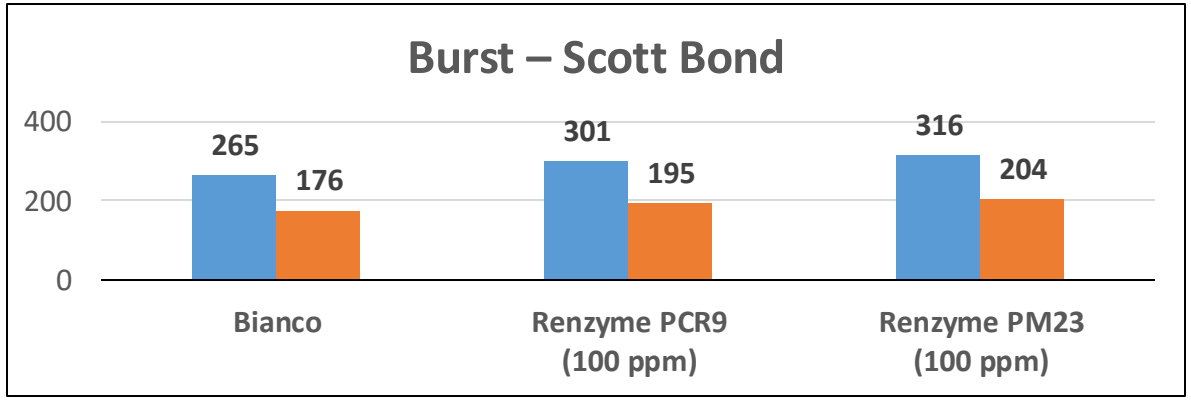


2. LAB TEST RESULT (120 g/m²)

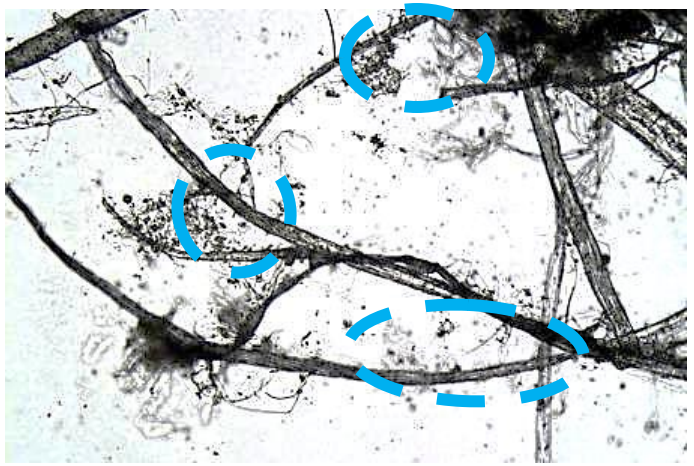
Analysis	White Ref.	Renzyme PCR9	Renzyme PM23
Nominal basis weight (g/m²)	120	120	120
Porosity Gurley (sec.)	22	28	32
Burst (KPa)	265	301	316
Burst Index (KPam²/g)	2,07	2,43	2,47
Scott Bond (J/m²)	176	195	204

Tab 2b. Mechanical Properties 120 g/m²

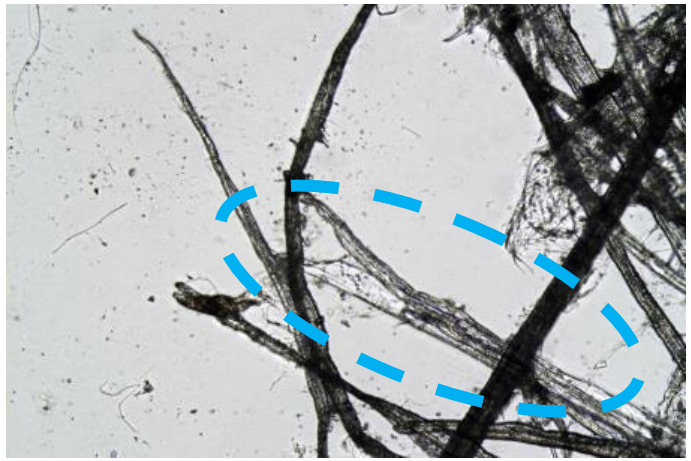




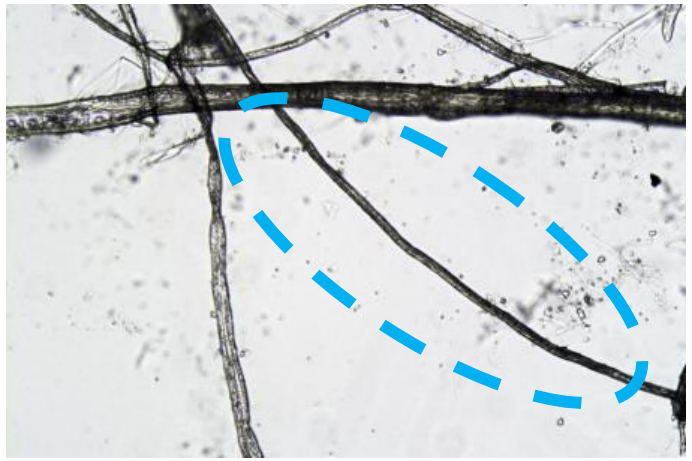
2. MICROSCOPIC ANALYSIS



White Reference Sample



Renzyme PCR 9 (100 ppm)



Renzyme PM 23 (100 ppm)

2. PRELIMINARY TECHNICAL CONSIDERATIONS

The laboratory analyses carried out have highlighted and confirmed the following:

	RENZYME PCR 9	RENZYME PM 23
DEWATERING	✓	✓
POROSITY	✓	✓
BURST	✓	✓
SCOTT BOND	✓	✓
SZP AND PCD FIBER REGENERATION	✓	✓

3. SHORT INDUSTRIAL TEST

Type paper production:

Test 1: 140 g/m^2

Test 2: 170 g/m^2

Enzyme selected:

Renzyme PM 23

Parameters analyzed:

140 g/m^2

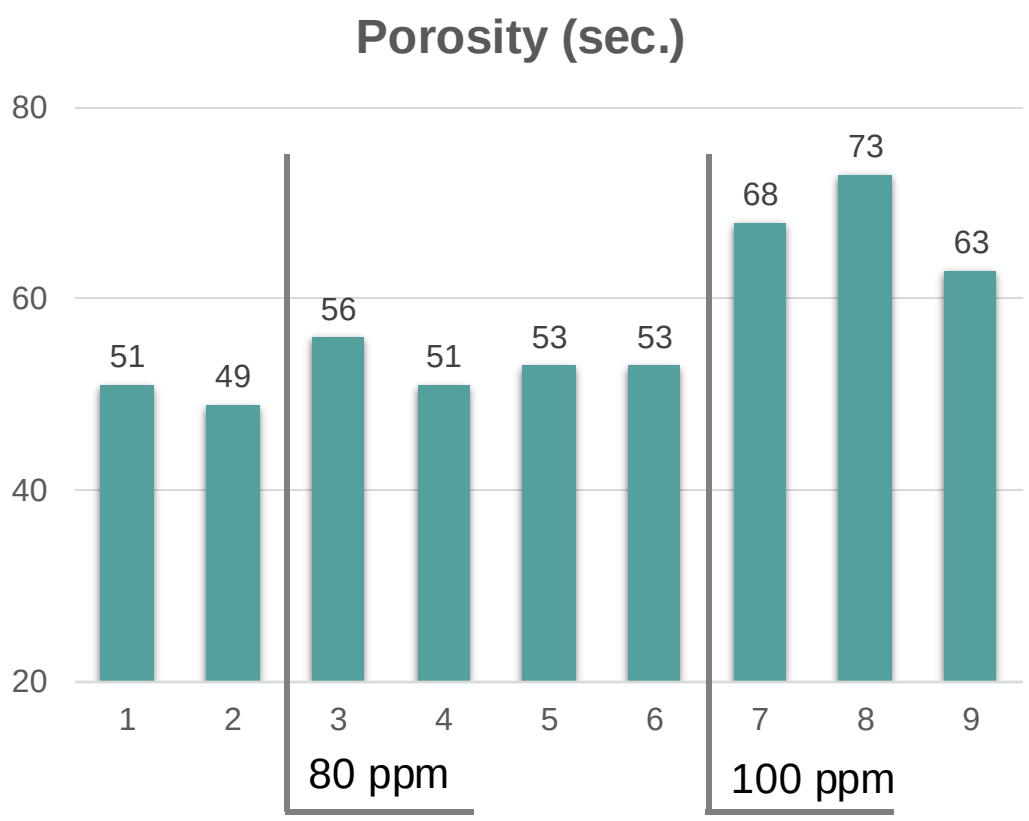
Porosity (sec.) - Burst (KPa) - Scott Bond (J/m^2)

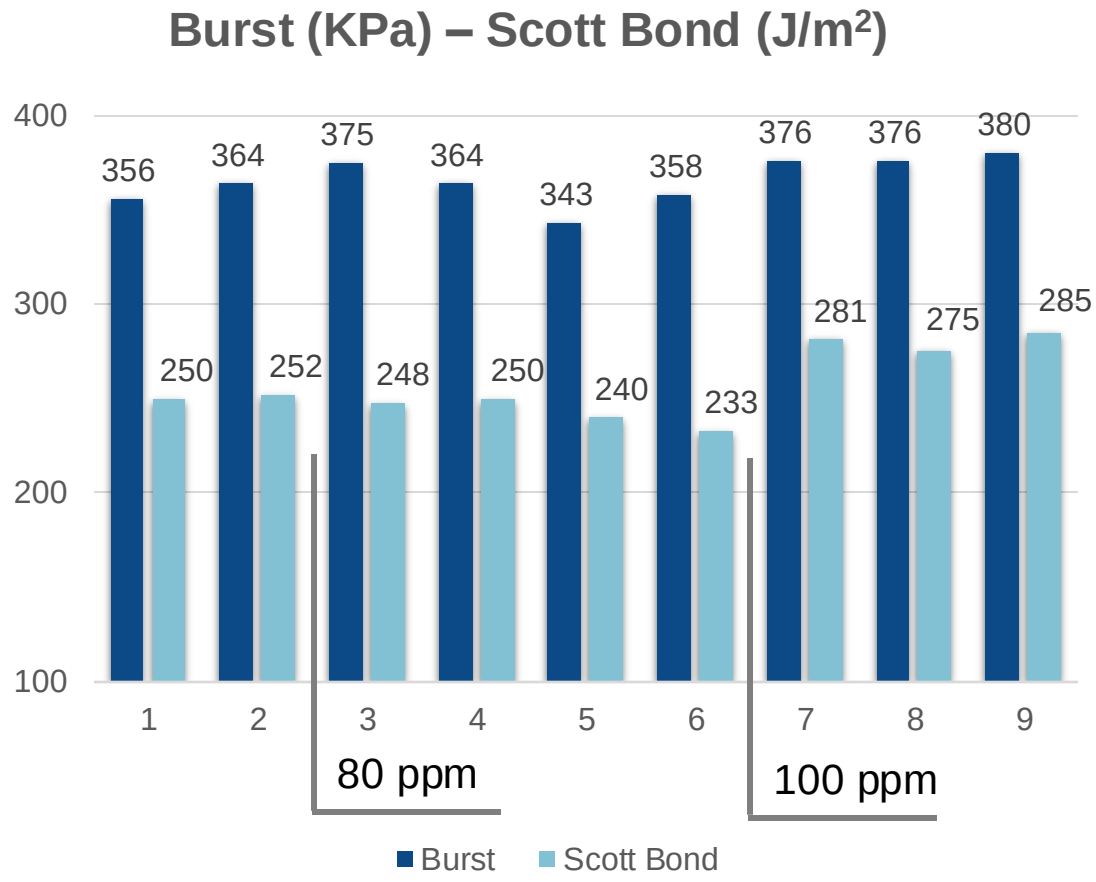
170 g/m^2

Porosity (sec.) - Burst (KPa)

3. SHORT INDUSTRIAL TEST

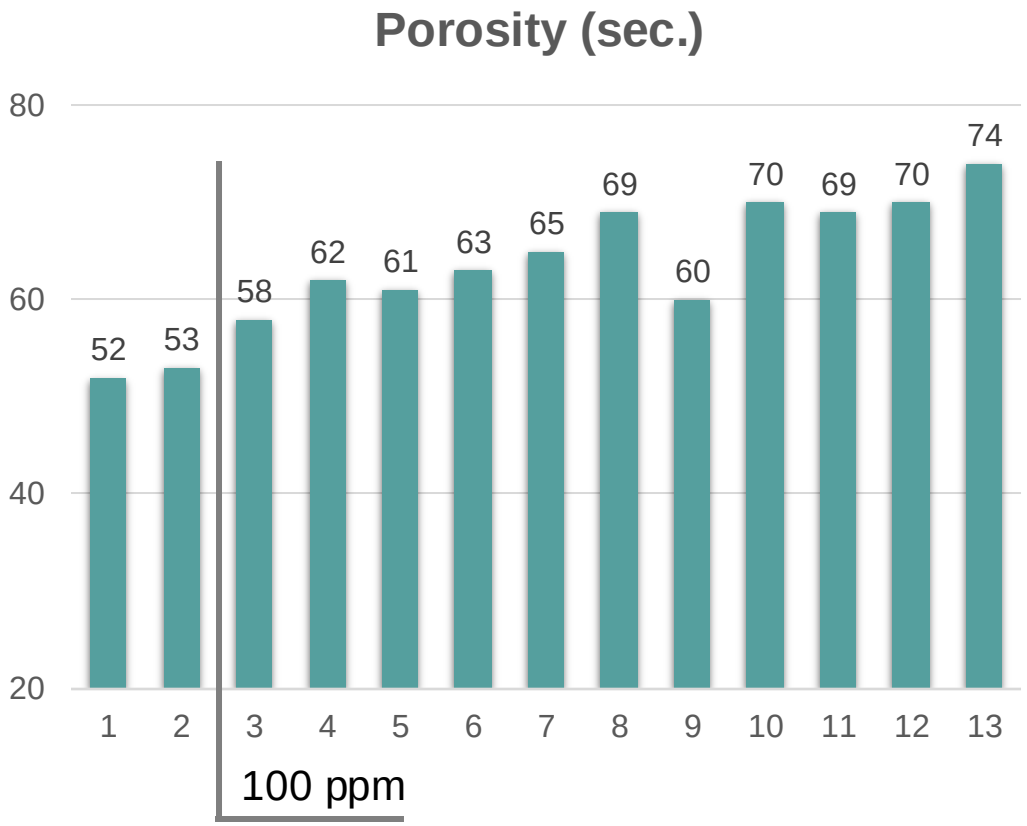
Test 1 (140 g/m²): Trend Porosity – Burst – Scott Bond

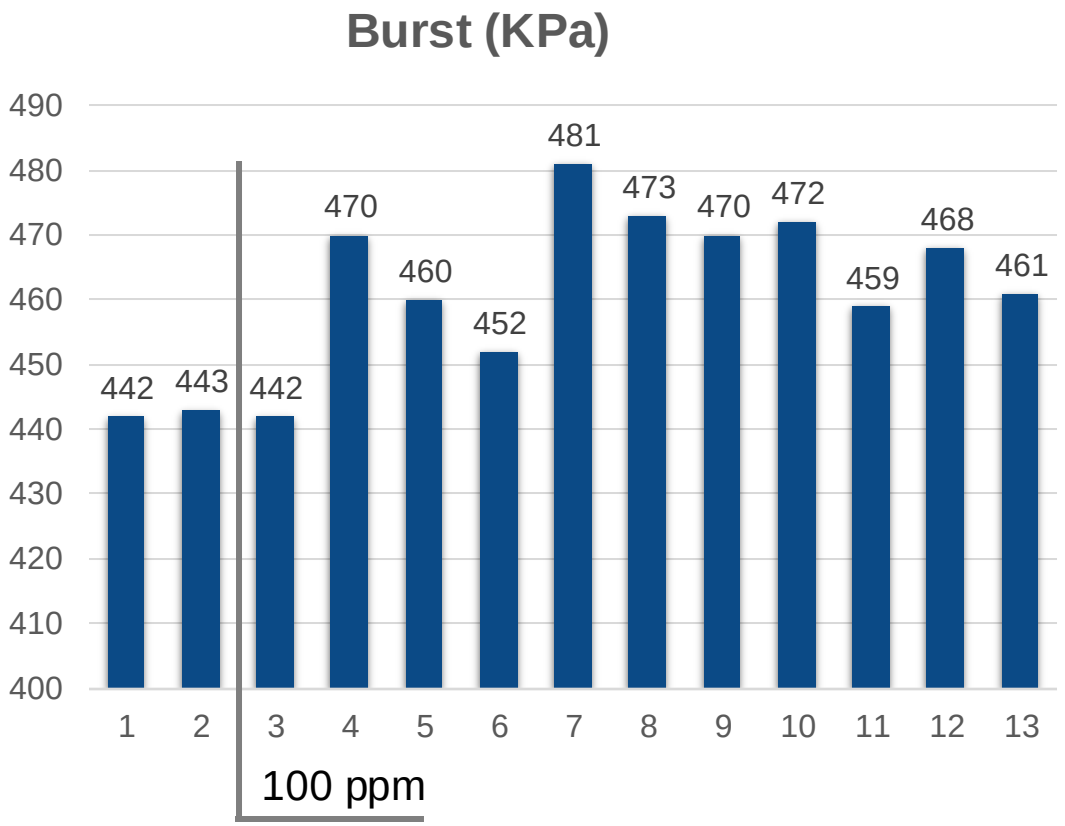




3. SHORT INDUSTRIAL TEST

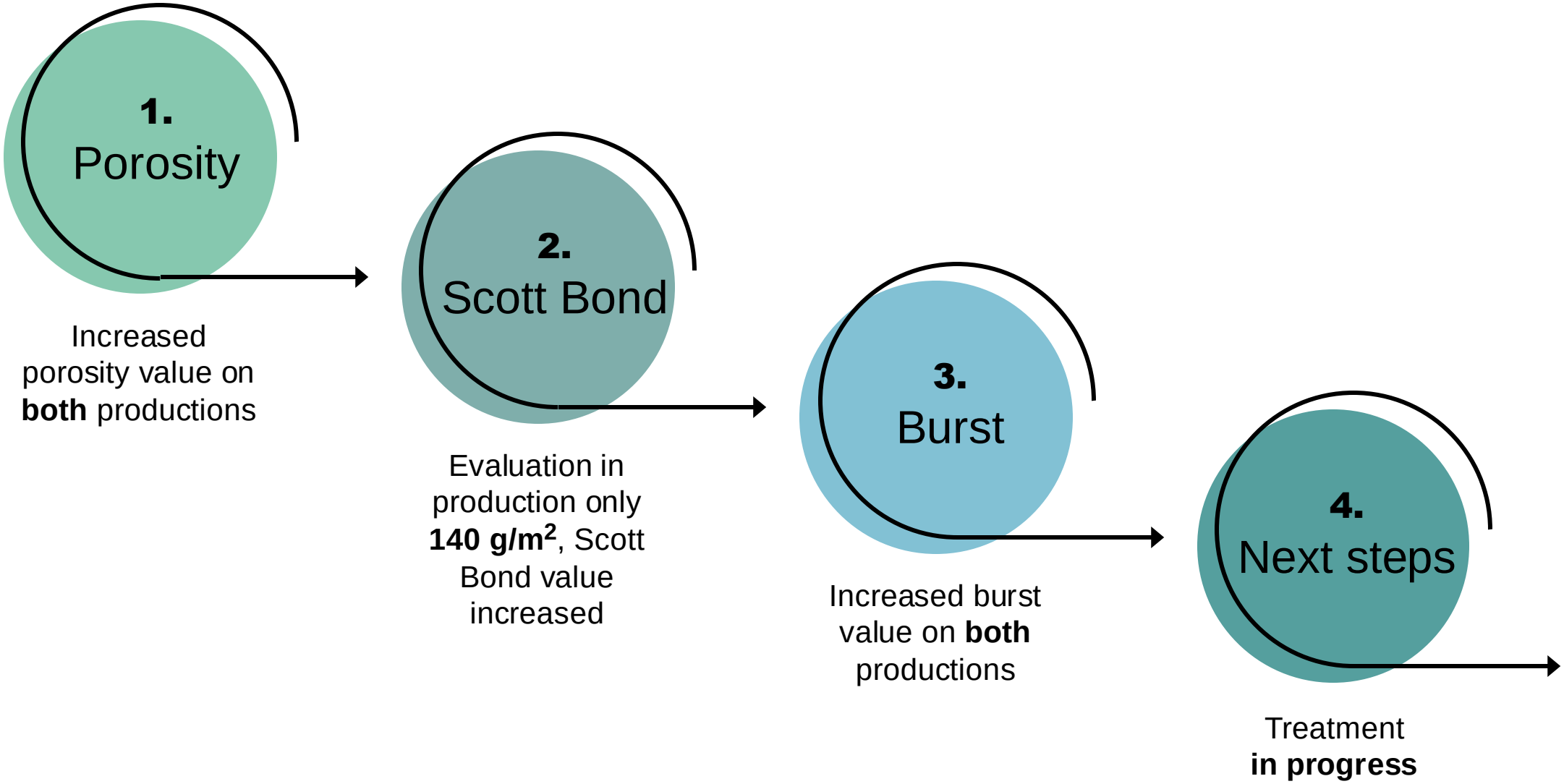
Test 2 (170 g/m²): Trend Porosity – Burst





4. TECHNICAL CONCLUSIONS

Results obtained following short industrial tests carried out with **Renzyme PM 23**:



Thank you for your attention

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