Dedicated OLISA™ Biochips

for Multiple GMO

Detection and Identification

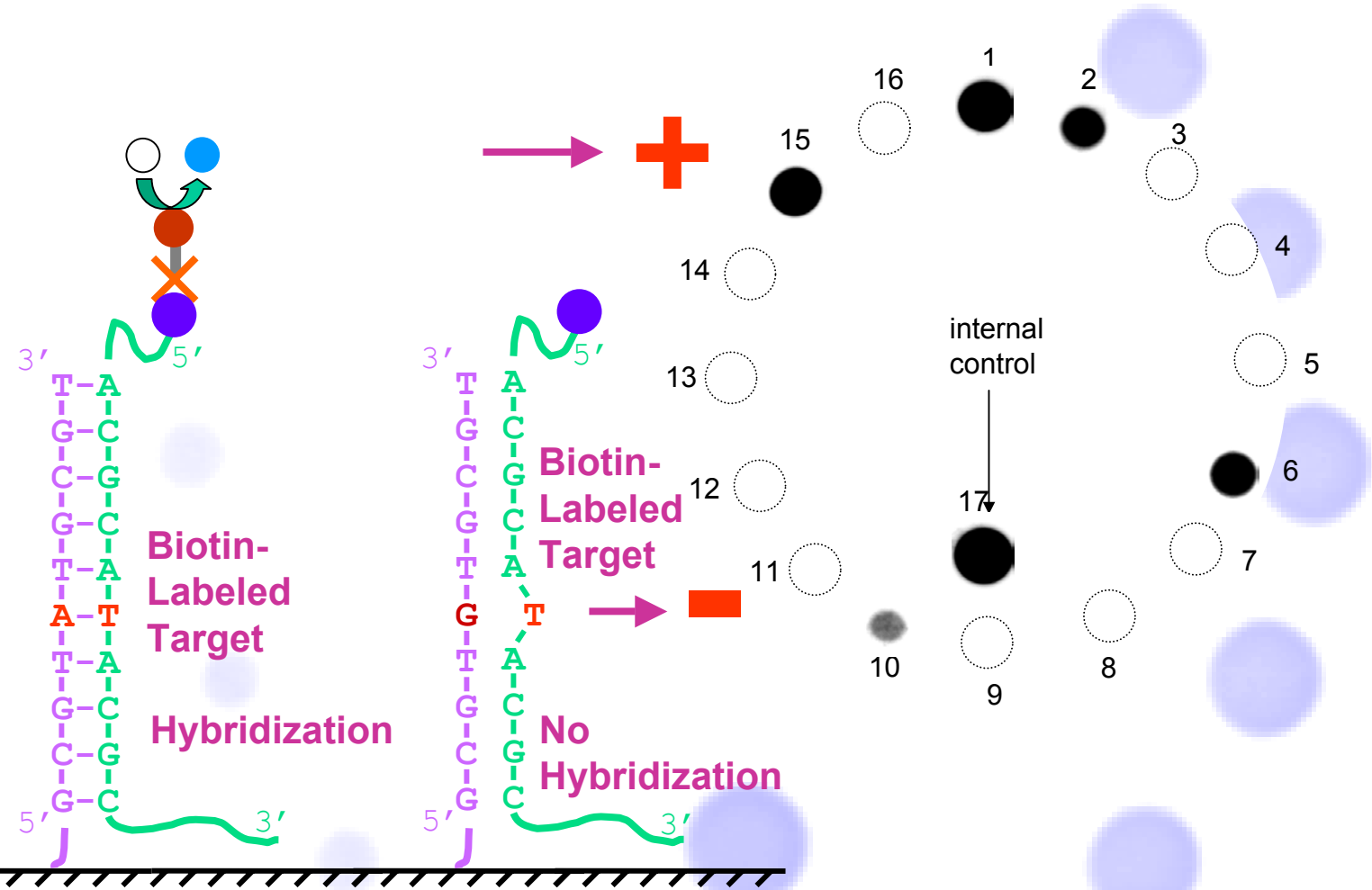## *E. Bufflier,*

emmanuel.bufflier@apibio.com

http://www.apibio.com

OLISA™ Biochips for Multiple GMO Detection and Identification

- Principle of OLISA™ Biochip Technology

- Example of a dedicated GMO OLISA™ Biochip

- OLISA™ : an integrated system

Principle of OLISA™

Spot A

Spot B

Biotin-Labeled Target

Hybridization

Biotin-Labeled Target

No Hybridization

1
16
2
15
3
14
4
13
5
12
internal control
6
11
17
7
10
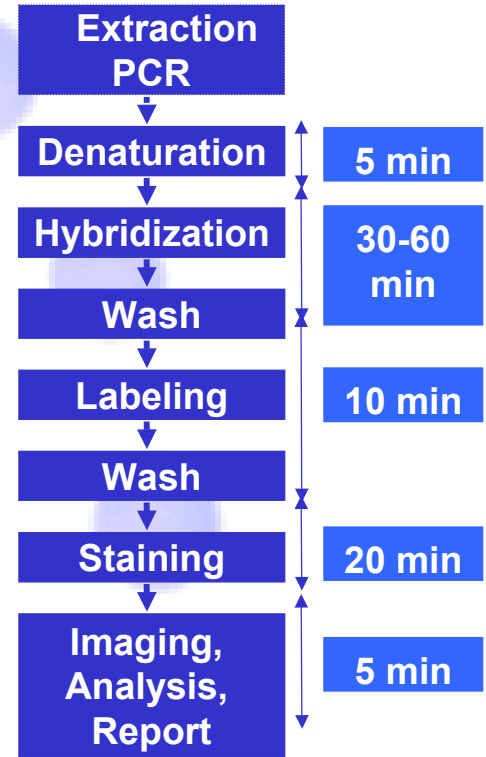8
9

Specific Hybridization

Schematic OLISA™ Protocol

DNA extraction

PCR amplification

OLISA™ Reactions (automatable)

Imaging

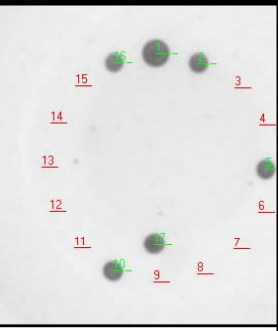| Extraction PCR	
Denaturation	**5 min**
Hybridization	**30-60 min**
Wash	
Labeling	**10 min**
Wash	
Staining	**20 min**
Imaging, Analysis, Report	**5 min**

1-2 hours

Hands-on time : 30 min.

OLISA™ GMO Detection and Identification Biochip

GMO	2030900001	6,2004	T1
19/09/2003			D01
	Sample4 : B63-806		

Sample contains corn BT11

Parameters	Results	Values	Mode	Positions
Controls +	+	32603	DO.A	P1: 1,17
p35S	+	25674	DO.A	P1: 2
676-678-680	-	0	DO.A	P1: 3
DLL25	-	0	DO.A	P1: 4
ADH	+	22563	DO.A	P1: 5
BT176	-	0	DO.A	P1: 6
MON 802-809	-	0	DO.A	P1: 7
MS3-MS6	-	0	DO.A	P1: 8
676-678-680	-	0	DO.A	P1: 9
BT11	+	24987	DO.A	P1: 10

Principle of OLISA™ technology in DNA analysis and Genotyping

- **Hybridization probe : SNP detection resolution**

- **Post amplification detection (PCR, NASBA, RCA, others), biotin-labeled target.**

- **Enzyme-mediated densitometric detection.**

Advantages of OLISA™

- **Miniaturization and Multidetection**

  1 sample ➔ *1 experiment* ➔ *up to 16 results*
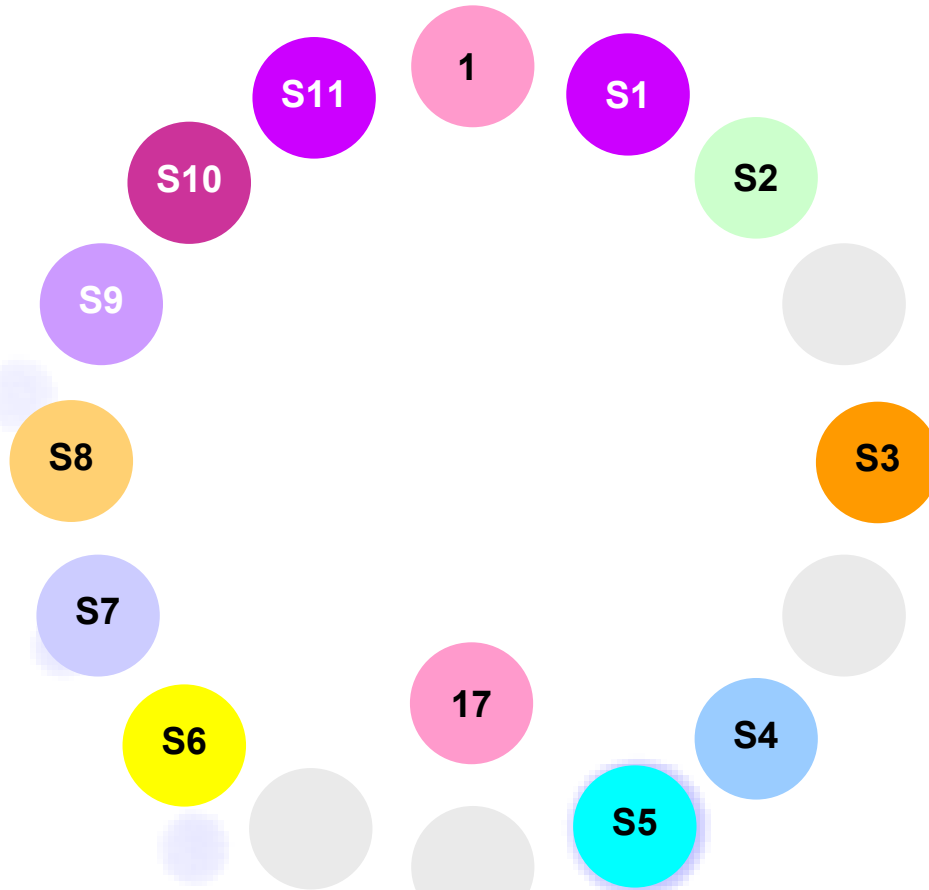
- **High-Throughput compatible 96 wells format**

  – 500 tests per day manually (500 tests)

  – 3000-7000 tests per day using liquid handling robotic system

- **Customizable & Flexible Manufacturing (Easy Array Update)**

- **Routine biochip application compatible with market prices**

Example of a dedicated GMO OLISA™ chip

Probe	Target
S1	tNOS
S2	ADH
S3	Bt176
S4	T25
S5	MON810
S6	GA21
S7	CBH351
S8	BT11
S9	RR
S10	Lectin
S11	p35S

Limit of sensitivity

🔴 **Smaller concentrations detected**

p35S and tNOS :   **20 copies**

ADH standard maize :   **100 copies**

Lectin standard soybean : **20 copies**

Standard Maize ADH
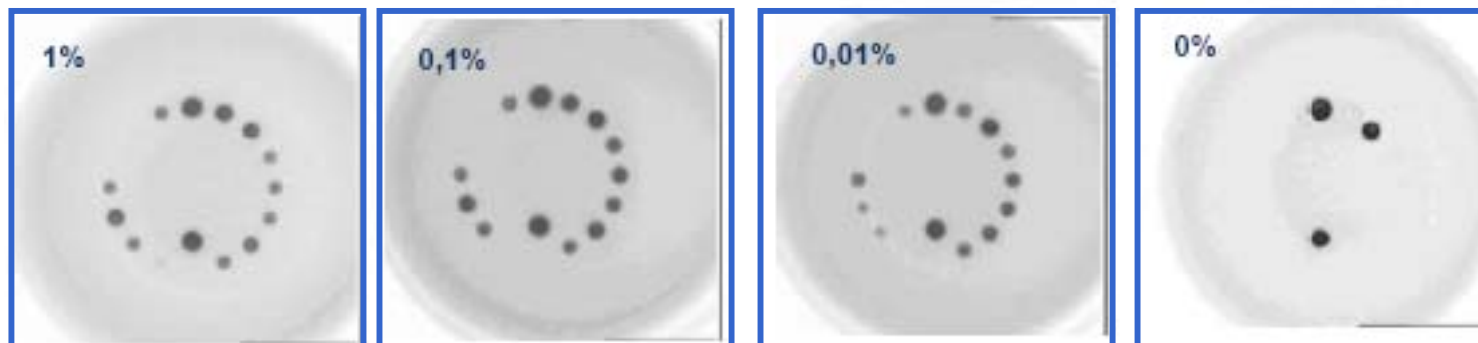
100 copies

← **ADH**

0.1 copies

← **ADH**
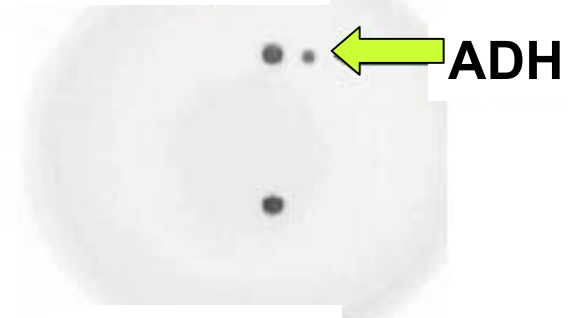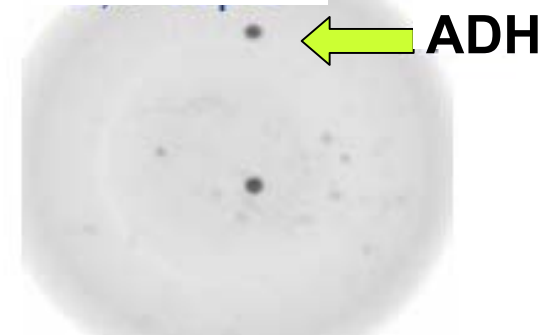
Intra-test Reproducibility

- 4 concentrations (0 ; 0.01 ; 0.1 and 1%)
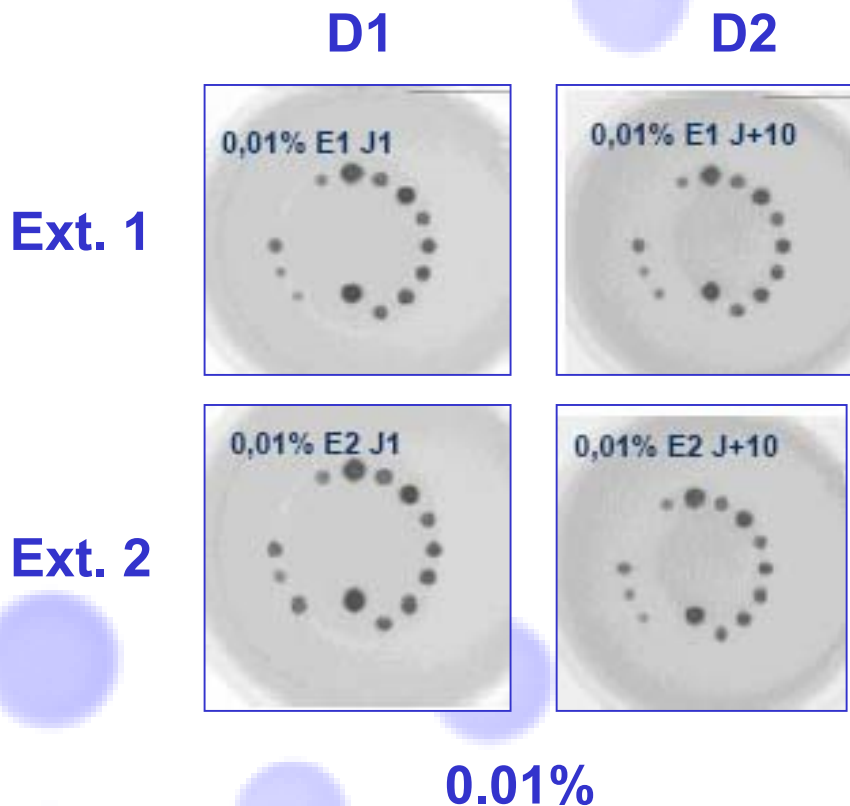
- 2 repetitions

Pool of all transgenic Maize lines

Inter-test Reproducibility

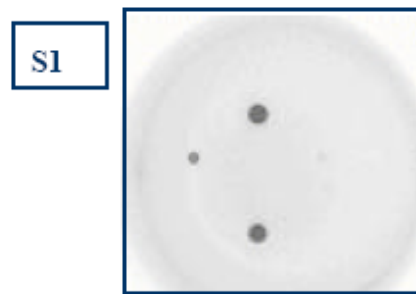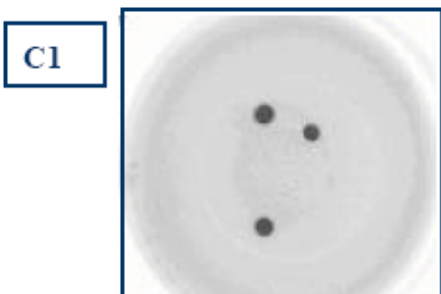- **4 concentrations (0 ; 0.01 ; 0.1 and 1%)**

- **2 extractions**

- **2 independent tests (different days)**

D1   **D2**

Ext. 1

0,01% E1 J1

0,01% E1 J+10

Ext. 2

0,01% E2 J1

0,01% E2 J+10

0.01%

Test Reliability

● **Results with reference method/Results with OLISA**

Samples	S35	Nos	Corn B	T25	Mon810	Bt176	Bt11	CBH351	GA21	Lectine	RR
C1	-/-	-/-	+/+	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
C2	+/+	+/+	+/+	-/-	-/-	-/-	-/+	+/+	-/-	-/-	-/-
C3	+/+	+/+	+/+	+/+	+/+	+/+	-/-	-/-	-/-	-/-	-/-
S1	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	+/+	-/-
S2	+/+	+/+	-/-	-/-	-/-	-/-	-/-	-/-	-/-	+/+	+/+

C1   C2   S1   S2

Dedicated Software Development : Report

- **General report for the whole experiment :**

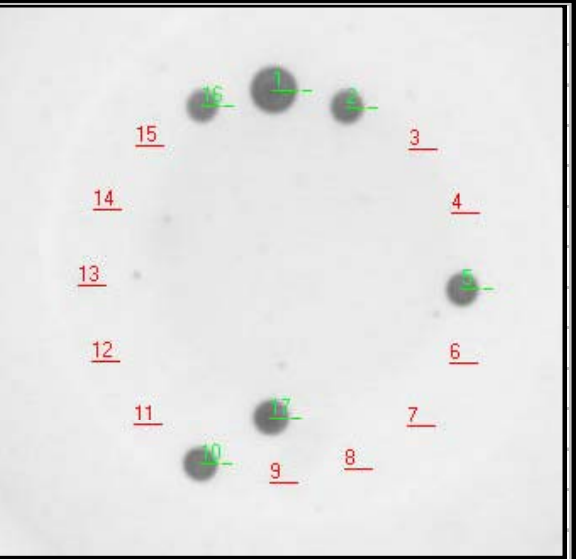|	01	02	03	04	05	06	07	08	09	10	11	12
A	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12
B	B01	B02	B03	B04	B05	B06	B07	B08	B09	B10	B11	B12
C	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12
D	D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12
E	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11	E12
F	F01	F02	F03	F04	F05	F06	F07	F08	F09	F10	F11	F12
G	G01	G02	G03	G04	G05	G06	G07	G08	G09	G10	G11	G12
H	H01	H02	H03	H04	H05	H06	H07	H08	H09	H10	H11	H12

No chips (no strips)

- **Green : GMO-free sample, Red: Sample contains GMO(s)**

Dedicated Software Development : Report

● **Dedicated report for each sample :**

OLISA™ GMO Detection and Identification Biochip			
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19/09/2003			D01
Sample4 : B63-806			

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676-678-680	-	0	DO.A	P1: 9
BT11	+	24987	DO.A	P1: 10
NK603	-	0	DO.A	P1: 11
TC1507	-	0	DO.A	P1: 12
DBT418	-	0	DO.A	P1: 13
T14-T25	-	0	DO.A	P1: 14
MON 863	-	0	DO.A	P1: 15
tNOS	+	26246	DO.A	P1: 16

Custom development and production

- **All GMO chips,**

- **Authorized/Non authorized GMO chips,**

- **Dedicated Gene-Maker/Seed Developer GMO chips,**

- **… your GMO chips**

- **Easy Array Update (New GM crops launching)**

Current customers in GMO field

- **Seed developers …**

  syngenta

- **Bioanalytical Services Labs …**

  Genolife

Other Applications of Apibio Chips

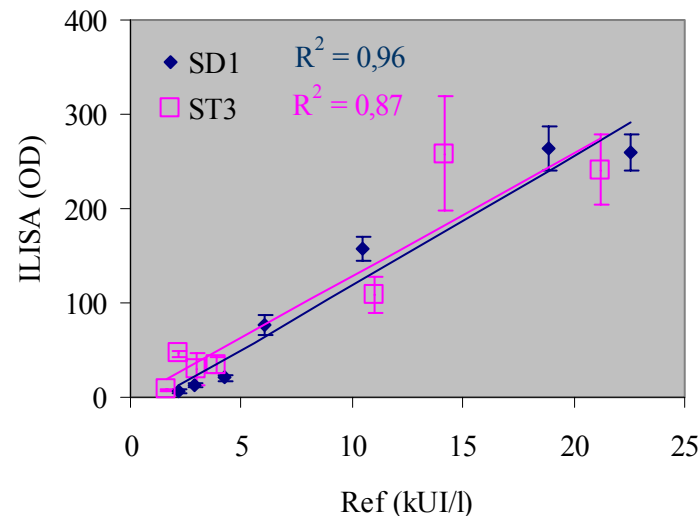- **ILISA : protein based biochips (multidetection ELISA principle)**

Principle
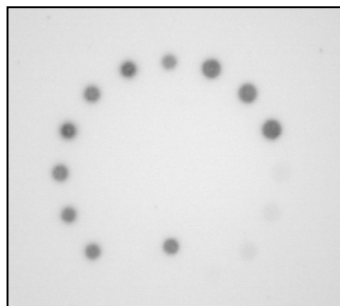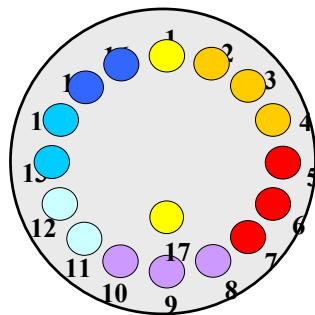
Pattern and Result of a Food Allergen ILISA™ Biochip

CORRELATION ASSAY

Comparison with a Reference Method

Contact us ...

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Meet us at our Booth today !   Thank you