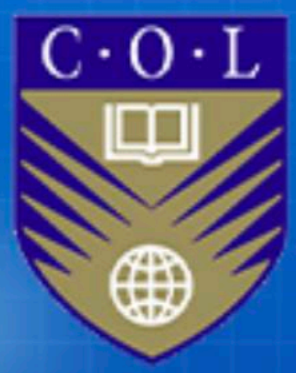


Feed Toxins, their analysis and interpretation

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There are problems due to mycotoxins in ingredients and feeds

Poor management in feed manufacturing ✓

Diseases ✓

Wet litter ✓

Increased cost of feed ingredients

Fluctuations in environment

Compromise on immunity ✓

High Transit loss ✓

Low dressing percentage ✓

High mortality ✓

Variations in body weights ✓

Wet litter ✓

✓ = *Mycotoxin oriented*



Type of mycotoxins causing problems all over the world

Aflatoxin B1, B2, G1 and G2

Aflatoxin M1

Ochratoxin A

Fumonisin

Citrinin

T2 -toxin

Zearalenone

De-Oxy Nivalenol (DON)

**Of those mycotoxins, Aflatoxins are
the most ubiquitous**

Aflatoxin B1, B2, G1 and G2

Of those Aflatoxins, aflatoxin B1 is the most harmful and economically important

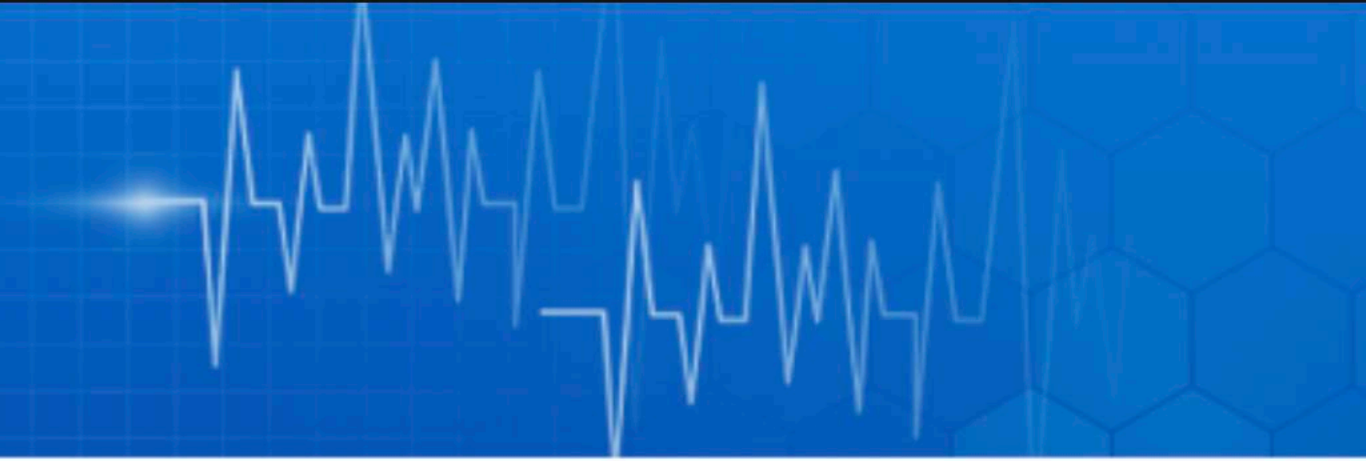
Aflatoxin B1

Aflatoxin B1 is metabolized in liver and kidney to more toxic and carcinogenic mycotoxin in milk

Aflatoxin M1

**In our class, we discuss only aflatoxin B1,
the most observed and commonest
in tropical countries**

Aflatoxin B1



First documented case of known feed contamination was in England when 100,000 turkeys died after ingestion of a Brazil groundnut cake, leading to discovery of Aflatoxin B1 in 1960

– Known as Turkey X Disease

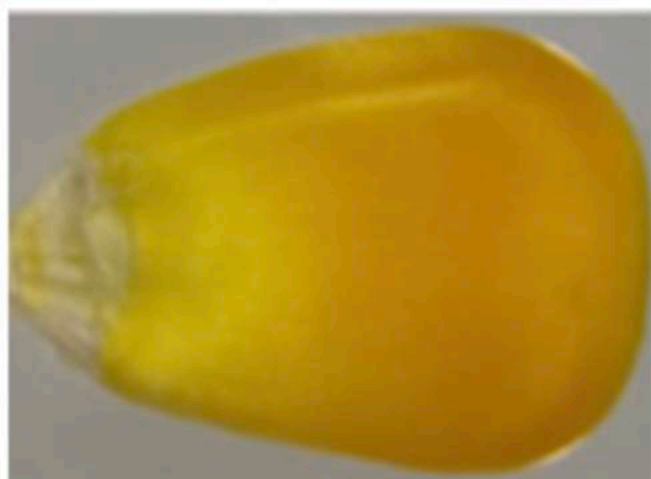
How safe is a aflatoxin for animals / poultry?

Is it the level

- ▶ which is not causing mortality?
- ▶ which is not causing health disorders?
- ▶ which is not causing any production problems ?
- ▶ which is not causing egg breakages?
- ▶ which is not causing growth disturbance?
- ▶ which is not increasing the FCE?



Indian Scenario of Maize for Aflatoxin – 20 years



Toxin level (in ppb)	AFLATOXIN B1	
	Samples	Per cent to Total
Negative	5696	46.54
0-20	4127	33.72
21-50	887	7.25
51-100	521	4.26
101-200	448	3.66
201-500	385	3.15
>500	174	1.42
Total	12238	100.00

20 %



Maize – Aflatoxin B₁

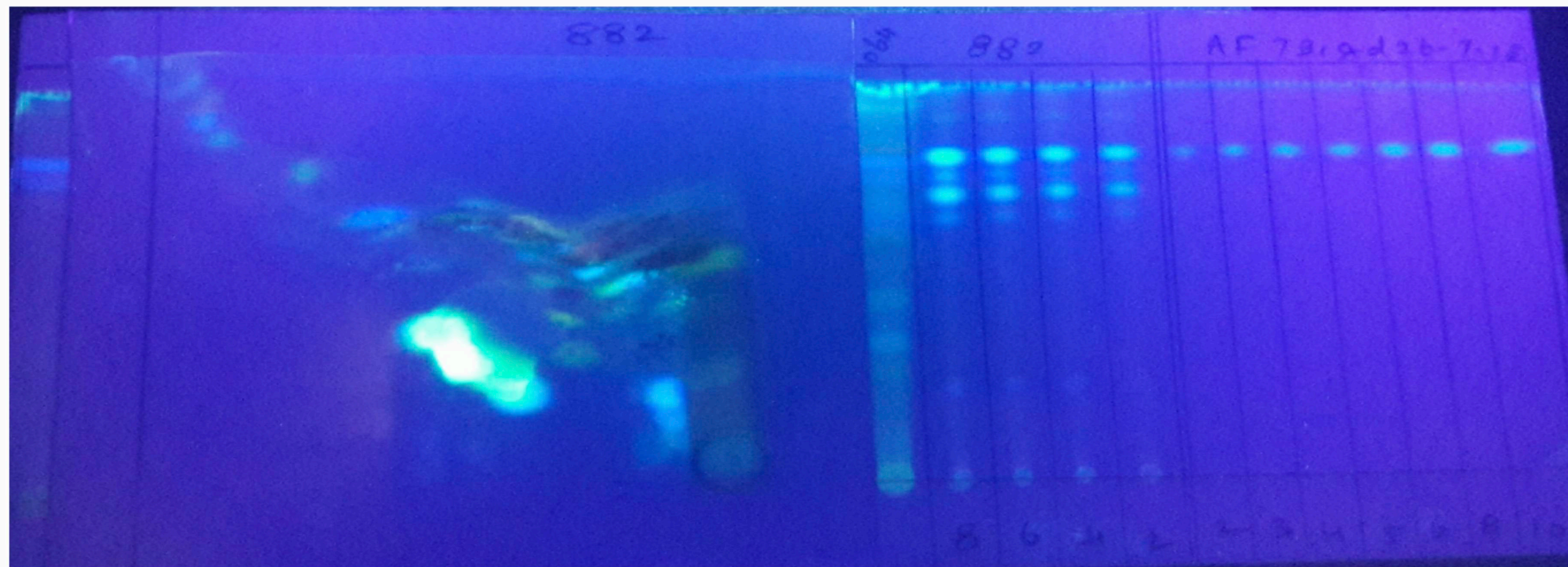
Level	Total	Negative	Positive	1-20 ppb	21-50 ppb	> 51 ppb
Period						
Before	64	39	25	20	2	3
Rainy Month	54	13	39	26	5	8
Rainy Month	68	8	60	20	11	29
Rainy month	100	25	75	40	7	28
Less rainy	153	54	99	55	10	34
No rains	114	45	69	39	5	25

Occurrence of Aflatoxin B1 in De-oiled Groundnut Cake (Peanut Meal)

	Total	0-10 ppb	<100 ppb	> 100 ppb
Total No of Samples	11098	73	793	10232
%	100.0	0.7	7.1	92.2



Highest AFTB1 – 6250 ppb in peanut meal





Soybean Meal

No. of samples	Negative for aflatoxins	B1 – up to 20 ppb	> 20 ppb
10758	7373 (68.5%)	3298 (30.7%)	87 (0.8%)

Least contaminated
Often replaces DOGNC for fear of this toxin

Compounded Feed

No. of samples	Negative	B1 – up to 20 ppb	> 20 ppb
19910	3316 (16.7%)	11158 (56.0%)	5436 (27.3%)

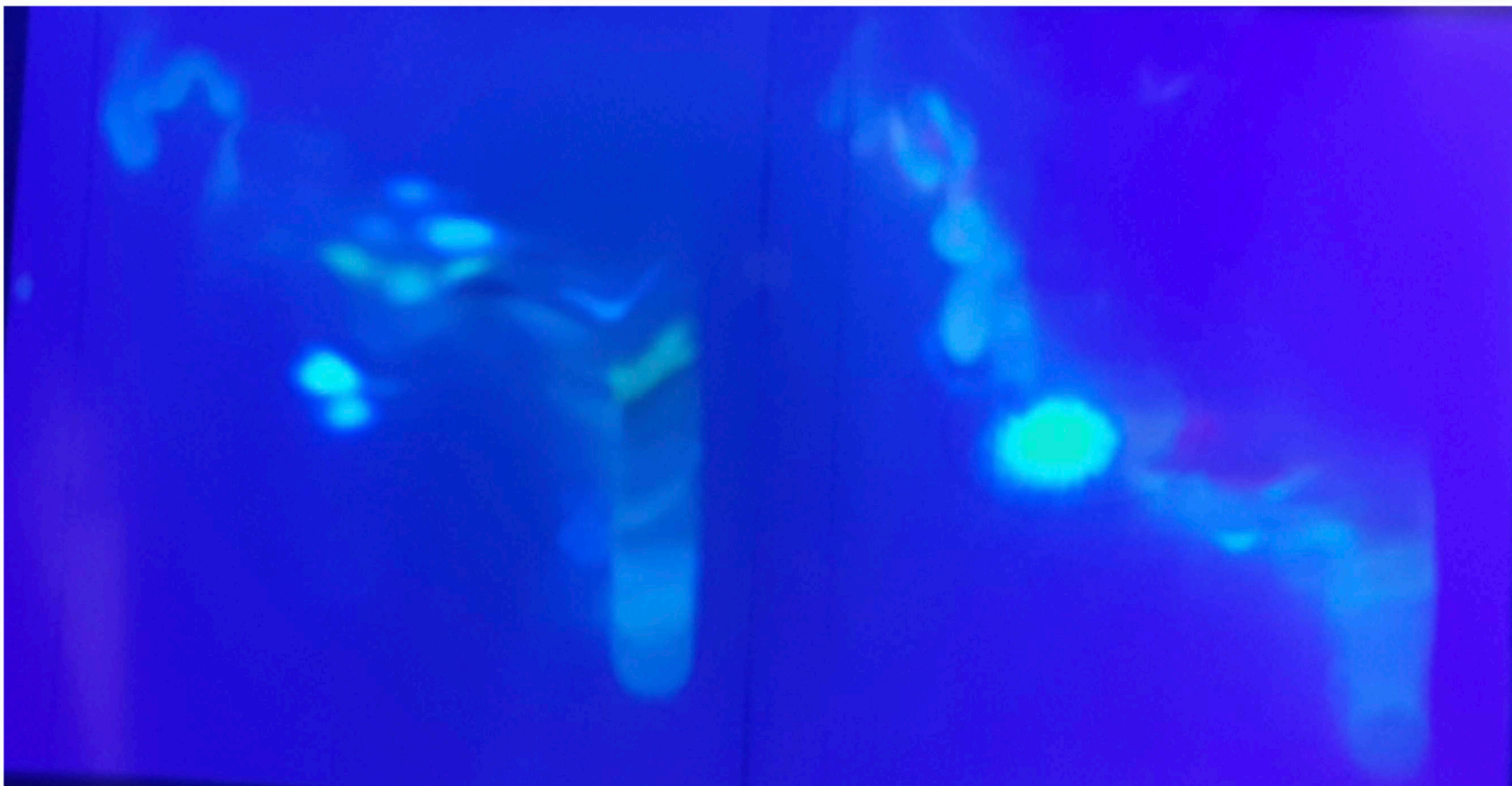
“ Only 16.7 % is free from all mycotoxins
³/₄th are usable with < 20 ppb AFTB1 ”

The Problem was solved

- ▶ **By cleaning the mill**
 - ▶ **By cleaning the feed distribution equipment**
 - ▶ **Crevices and corners of the grinding instruments should have been contaminated**
 - ▶ **Fine-tuning mill and machine operations is a must.**
-
- ▶ **Every level of AFT carries with it some risk.**
 - ▶ **Under field conditions, the objective should be to reduce the**
 - ▶ **AFT level to very minimum ie 6-12 ppb**
 - ▶ **To ensure that it does not occur frequently**



Aflatoxin in 2D method – Note the difference



Maximum tolerance levels (ppb) for aflatoxins in 1987, 1995 and 2003

Aflatoxin/ Matrix Combination	1987		1995		2003	
	Tolerance ppb	No of Countries	Tolerance ppb	No of Countries	Tolerance ppb	No of Countries
B1 in foodstuffs	50	29	30	33	20	61
M1 in milk	0.10	13	0.10	17	0.15	60
B1 in feedstuffs	200	16	50	25	20	39

Tips for Prevention and control

- ▶ **Moulds can invade the seeds / grains** while the crop is still in the field or they can grow during storage at the mill or farm
- ▶ **Good Agronomic Practices** prevent mould growth and toxin formation
- ▶ **Sensitizing the agricultural farmers** about the premium pricing of quality materials and awareness of Aflatoxin problems that downgrade the quality of the materials
- ▶ **Physical examination thoroughly prevents the occurrence by 90 %.** A qualified and experienced persons can do this perfectly
- ▶ However, **nothing is equal to chemical analysis** to prevent the occurrence to the minimum



Thank you