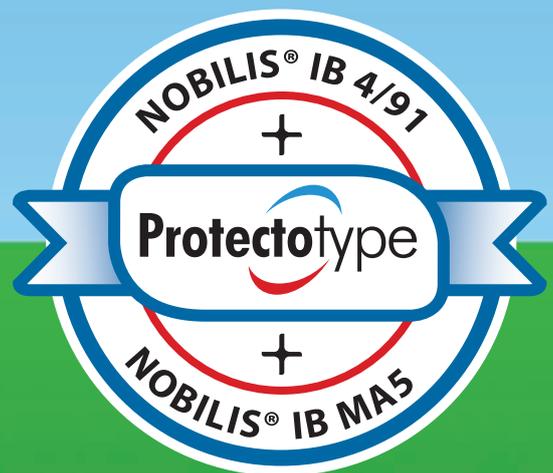




BROADEN

YOUR IB PROTECTION



**Protectotype
broadens IB
protection**

**Tried & Tested
+ Efficacy**

**Efficacy against
QX challenge**

NOBILIS® IB 4/97
+

Protectotype

+

NOBILIS® IB MA5

**Extensive
safety
profile**

**Ma5 more
immunogenic
than H120**

The far reaching effects of IB

(Cook, Orbell, Woods, & Huggins, 1999)

IB causes disease and economic losses in all parts of the world. It is unlikely that this highly infectious disease will ever be eradicated.

In **broilers** the disease causes respiratory infection and is often complicated by secondary bacterial infections that result in high morbidity and variable mortality; it also results in increased condemnations at slaughter.

In **layers and breeders**, IB is associated with a drop in egg production – one that may never return to the pre-infection level. The virus also can lead to poor eggshell quality, colour and internal egg quality (watery albumin). Respiratory infection may occur.

The emergence of IB variant strains

(Health, 2011)

Control of IB is challenging due to the many types of IB viruses. In the 1990s, a new variant – **4/91** – was identified and continues to be an important respiratory pathogen throughout Europe and other regions of the world. In France, it is still the dominant variant IB virus. More recently, two other IB virus variants that have emerged in Europe are Italian O2 and QX (D388).



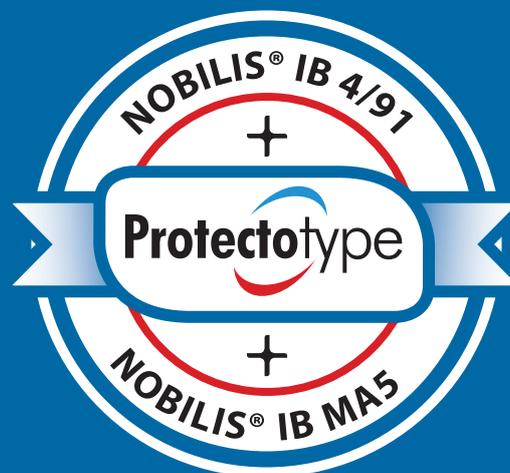
IB in 30 seconds

- IB virus is highly infectious and affects chickens of all ages, types and breeds in all countries where there is a developed poultry industry.
- Variants of IB virus continue to emerge.
- **No single vaccine can effectively control all strains of IB viruses** but using currently available vaccines of two different serotypes in the program can very often provide protection against many different IB variants.



Control of Infectious Bronchitis (IB) remains challenging in poultry due to the emergence of variants. However, research shows that some IB virus serotypes are Protectotypes – meaning they cross-protect against other IB serotypes – and that the use of IB vaccines from more than one serotype can provide broad IB control.

(Health, 2011)



**BROADEN YOUR
IB PROTECTION**

Thinking in terms of Protectotypes rather than serotypes

(Cook, Orbell, Woods, & Huggins, 1999)



// A new concept for protecting poultry against IB variants //

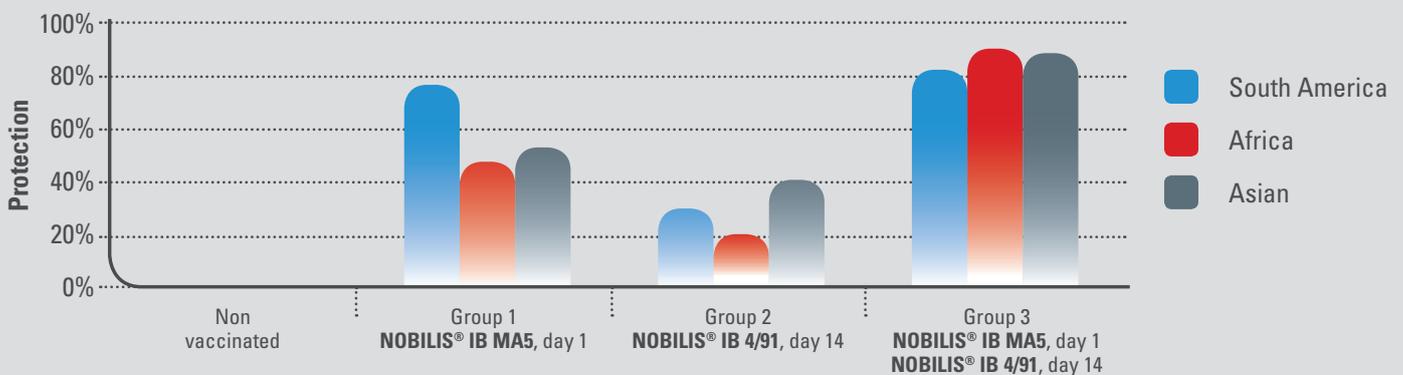
New serotypes of Infectious Bronchitis Virus (IBV) can emerge as a result of a few amino-acid changes in the genome of the virus.

As most of the virus genomes remain unchanged there is a level of cross protection between different strains.

Ciliostasis test

The ciliostasis test measures the effect of a virus on the tracheal mucosa. The test is also used to evaluate protection after vaccination. Level of protection is expressed as a percentage; values of 50% or above imply an active cilia layer with good protection. Values below 50% imply poor protection. A vaccinated bird that is subsequently challenged will have an active cilia layer if adequately protected.

Protection against: IBV isolates on Ciliostasis test
South America, Africa and Asia



Evaluation of Cross Protection

Four groups each of 10 SPF birds

- Vaccinated with **NOBILIS® IB MA5** at day 1 (Massachusetts serotype and highly immunogenic)
- Vaccinated with **NOBILIS® IB 4/91** at 14 days (Antigenically different from Ma5)

- Vaccinated with **NOBILIS® IB MA5** at day 1 & **NOBILIS® IB 4/91** at day 14

- Non vaccinated

Challenged with different field isolates at 5 weeks of age.
Ciliostasis test 5-7 days post challenge.

Conclusion

Broad protection is achieved through the use of **NOBILIS® IB MA5** at day 1 and **NOBILIS® IB 4/91** at day 14.

Spacing out vaccines

(Cook, Orbell, Woods, & Huggins, 1999)

“While it would be more convenient to give two IB vaccines together at 1 day of age, this isn’t always the most effective.” (Cook, JKA)

“If the challenge is homologous, then protection is good if the two vaccines are given together at 1 day old. But if the challenge is with a different serotype or genotype of virus, then it is beneficial to leave about 14 days between the two” Dr Jane Cook says.

However, if challenge is anticipated to occur at a very early age, or if the other vaccines included in the program make any other option difficult, application of both vaccines at 1 day old may well provide good protection.

Why use **NOBILIS® IB MA5** rather than **NOBILIS® IB H120** as part of the protectotype concept?

(Aris Malo)

A study conducted indicated that **NOBILIS® IB MA5** may be more immunogenic than **NOBILIS® IB H120**. In some circumstances, an IB H120-strain vaccine may be adequate, but generally, field results have been better when the Ma5-strain vaccine is used.

Detailed genetic studies conducted in Brazil have demonstrated that even though H120 and Ma5 are both from the Massachusetts IB serotype, they differ due to different selective pressures during their evolution.

The **NOBILIS® IB MA5** strains’ S1 subunit of the spike gene was found to be structurally different compared to an H120 strain. The S1 subunit of the spike protein is directly involved in the stimulation of neutralizing antibodies and, thus, proteins.

The difference found in the S1 subunit of the Ma5 strains, are the results of amino acid mutation that have actually helped the strain to become more immunogenic and more effective as a vaccine.

Results when chickens vaccinated with either Ma5 or H120 were challenged 5 weeks later with a different strain.

Vaccine administered at 1 day of age	4 days after challenge with IB strain M41		
	% of birds with clinical signs (n = 10)	% of birds protected determined by viral re-isolation (n = 10)	% of birds protected determined by ciliostasis (n = 5)
H120	30%	60%	80%
Ma5	0%	90%	100%
Control	90%	0%	0%

//

*Many of the IB
virus-variant strains
that develop don't
survive long enough
to become a problem,
but some do, and
those are the ones
we have to worry
about – the surviving,
pathogenic variants.*

(Aris Malo, DVM)

//

Tried & tested

With registration in more than 70 countries and used by more than 50% of European production units, this combination has proved tried and trusted.

Efficacy

NOBILIS® IB MA5 has been available worldwide for 20 years and NOBILIS® IB 4/91 for more than a decade.

“Pathogenicity of a QX strain of infectious bronchitis virus in specific pathogen free and commercial broiler chickens and evaluation of protection induced by a vaccination programme based on the Ma5 and 4/91 serotypes.”

(Terregino, Toffan, Beato S, De Nardi, Vascellari, & Meini, 2008)

- Four groups of 12 birds each were used in the study
- All birds were vaccinated through the nasal route
- Groups 1-4 challenged at 35 days (3 weeks p.v.) via oculo-nasal route with 100 µl IBV QX-like (1997/V05) at 3.0 log¹⁰ EID₅₀ per 0.1 ml.

Table 1: Experimental design

Group	Vaccinated with NOBILIS® MA5 at day old	Vaccinated with NOBILIS® 4/91 at day 14	Challenge at 5 weeks	Collection of trachea, kidneys and oviray/oviduct at 4, 5 & 6 days pc
1: vaccinated SPF	Yes	Yes	Yes	Yes
2: unvaccinated SPF	No	No	Yes	Yes
3: vaccinated broilers	Yes	Yes	Yes	Yes
4: unvaccinated broilers	No	No	Yes	Yes
5: SPF chickens & broilers (control)	No	No	No	Yes

Table 2: Results of virological examination

Group	Trachea	Kidney	Ovary/Oviduct
1: vaccinated SPF	0/12	0/12	0/12
2: unvaccinated SPF	12/12	11/12	10/12
3: vaccinated broilers	6/12	0/12	1/12
4: unvaccinated broilers	12/12	12/12	12/12
5: SPF chickens & broilers (control)	0/6	0/6	0/6

Number of IBV positive birds/number of birds in group

- Vaccination reduced, and in many cases prevented the replication of the challenge virus in the respiratory tract
- As a consequence, lesions induced by the IBV QX-like virus in the trachea were absent.
- Birds appeared to be protected against heterologous challenge due to the presence of local immunity of the upper respiratory tract induced by vaccination which reduced the replication of challenge virus.
- This study confirms previous data (Cook *et al.*, 1999; Worthington *et al.*, 2004) showing that good protection can be achieved by vaccines containing serotypes that differ both antigenically and genetically from the challenge virus.

Conclusion:

*Under experimental conditions, the **NOBILIS® IB MA5** and **NOBILIS® IB 4/91** vaccines administered at 1 day and 14 days respectively, protect chickens from infection and disease following challenge with the IB QX-like variant.*



(MSD Animal Health, 2012)



NOBILIS® IB 4/91

Tested @ 100x the dose in drinking water

Tested @ 10x the dose with spray

Tested @ 20x the dose with eye-drop

Safe for birds in lay

NOBILIS® IB MA5

No adverse reactions at 100x the recommended dose

Safe for birds in lay

Description:

NOBILIS® IB 4/91 is a live, freeze-dried vaccine against Infectious Bronchitis serotype 4/91.

Each dose contains at least \log^{10} 3.6 EID₅₀ of the IB virus strain 4/91.

Indications:

NOBILIS® IB 4/91 is indicated for the active immunisation of chickens against disease caused by Infectious Bronchitis virus serotype 4/91 or serologically related types.

Administration:

The vaccine can be administered by spray, eye-drop or in the drinking water.

Presentation:

NOBILIS® IB 4/91 is available in vials containing 1000, 2500 or 5000 dose.

Description:

NOBILIS® IB MA5 is a live, attenuated vaccine against Infectious Bronchitis serotype Massachusetts (strain Ma5) in poultry.

Each dose of **NOBILIS® IB MA5** contains a minimum of \log^{10} 3.5 EID₅₀ per bird.

Indications:

NOBILIS® IB MA5 is indicated for the active immunisation of chickens against diseases caused by Infectious Bronchitis.

Administration:

The vaccine can be administered by spray, eye-drop or in the drinking water

Presentation:

NOBILIS® IB MA5 is available in vials containing 1000 or 2500 dose.

**References:**

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Terregino, C., Toffan, A., Beato S, M., De Nardi, R., Vascellari, M., & Meini, A. (2008). Pathogenicity of a QX strain of infectious bronchitis virus in specific pathogen free and commercial broiler chickens, and evaluation of protection induced by a vaccination programme based on the Ma5 and 4/91 serotypes. *Avian Pathology*, 487-493.

Suggested vaccine schedule

Vaccination age	Day 1	Day 14	8 Weeks	12 - 14 Weeks	16 - 18 Weeks
Layers and breeders	NOBILIS® IB MA5 *	NOBILIS® IB 4/91	NOBILIS® IB MA5	NOBILIS® IB 4/91	NOBILIS® IB MULTI **
Broilers	NOBILIS® IB MA5 *	NOBILIS® IB 4/91	n/a	n/a	n/a

* **NOBILIS® IB MA5** may be administered in combination with NCD vaccine **NOBILIS® CLONE 30 (NOBILIS® MA5 + CLONE 30)**

** In countries where **NOBILIS® IB** multi is not available, single inactivated Massachusetts type IB vaccine can be used

For more Protectotype information contact your MSD Animal Health Key Account Manager.

NOBILIS® IB 4/91 (Reg No. G4031 Act 36/1947) is a live, freeze-dried vaccine against Infectious Bronchitis serotype 4/91.

Each dose contains at least \log^{10} 3.6 EID₅₀ of the IB virus strain 4/91.

NOBILIS® IB MA5 (Reg No. G2300 Act 36/1947) is a live attenuated vaccine against Infectious Bronchitis serotype Massachusetts (strain Ma5) in poultry.

Each dose contains a minimum of \log^{10} 3.5 EID₅₀.

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