CORRELATION SCHEME BETWEEN STABLE PROBLEMS IN CATTLE AND THE PRESENCE OF TOXINS, ANTI-NUTRITIONAL FACTORS AND OTHER FACTORS.

IMPORTANT PRELIMINARY NOTES:
The considerations contained in this document are derived partly from the literature and partly from the experiences accumulated in the mutual exchange of information with the technicians of the sector, attempting a synthesis, sometimes daring, of distant numbers and evaluations. The arbitrary character of the document is therefore inevitable, the values reported must be interpreted above all as a general indication and will be subject to frequent revisions. We therefore forgive this arbitrariness, the purpose of which is only to allow the interpretation of analytical results, even by those who have not had the opportunity to create their own frame of reference over time. There are also considerations on the appropriateness of some research (various ghosts) which absolutely do not want to underestimate the importance of certain contaminations (e.g. pesticides, toxic elements, radioactivity, etc.), but simply bring them back to a broader problem of production health , without necessarily being related to animal problems.

Additional warnings:
- - It is always advisable to investigate unifeeds first for the search for ZEA, DON, FUM, NO3 and other contaminants (diagnostic function). Research on individual foods is reserved for specific cases or after the identification of any problem substance on unifeeds.
- - Above all the specific problems have been reported; these can be associated/followed by more generic symptoms (mastitis-lameness-intoxication-reduction in ingestion/production).
- - Ruminal efficiency plays a decisive role in the pathogenicity of these substances: with a rumen that does not take care of their killing, even ruminants show the symptoms of monogastrics. With this in mind, we define the levels of "risk" and "potential problem". The proposed values inevitably have an arbitrary component, trying to synthesize between documentary data (rare and contradictory) and direct and reported experiences. At this point, the priority of intervention remains to be defined: structural on the predisposing factor (reduced ruminal efficiency) or specific (elimination/attenuation of the etiological agent)?

IMPORTANT: Unless otherwise specified, the levels are intended as concentration on the complete ration, i.e. g/100g(%), mg/kg(ppm) or mcg/kg(ppb) of unifeed on dry matter.

ZEARALENONE
Silent or irregular heat, ovarian cysts, infertility and various disorders affecting the reproductive system. **It does not involve any form of intoxication or pathology concerning other systems**. The values shown are valid for the short term; exposure to the same levels of contamination in the medium to long term could have consequences equal to higher levels.
- Security levels <200 ppb
- Risk levels 200-4/500 ppb
- Potential problem/clinical manifestation levels >500 ppb

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DEOXINIVALENOL (VOMITOXIN)

- More or less drastic reduction of ingestion up to digestive disturbances (ruminal blockages/exhausts). It is an important indicator of the presence of the much richer family of TCHOTHECENES, molecules with a peripheral or haemorrhagic vasodilation action. In the most consistent contaminations, there is a potential correlation with inflammatory states of the reproductive system. In monogastrics the strong reduction in ingestion and nervousness are prevalent, for polygastrics there may also be generic problems (lameness, mastitis) especially with poor ruminal efficiency.
- Security levels <800 ppb
- Risk/potential problem levels 1000/1500 ppb
- Levels of clinical manifestations >1000/2000 ppb

FUMONISINE

Depression of the immune system; in monogastrics it predisposes to respiratory forms.

- Security levels <5/10000 ppb
- Levels of potential risk 10000-15000 ppb
- Potential problem levels >20000 ppb

AFLATOXINS

Potent liver carcinogen (cirrhosis); in monogastrics it causes necrosis of the extremities. In dairy cows, the administration is suspended before the onset of symptoms, due to the well-known consequences of milk contamination (M1), however subclinical forms of reduced ingestion, production and fertility are reported. Scarce news of clinical forms in dairy plants.

- Safe levels for milk production <0.5 ppb
- Levels of health risk for cows 1-3 ppb
- Potential problem levels >3 ppb

OCRATOXIN

Toxic for the kidney in particular, and to a lesser extent for the liver. The frequency of Aflatoxin follows (it is produced by Aspergillus Ocraceus), at the moment it represents a risk factor for pigs (meat contamination): tomorrow who knows.

NITRATES

(SEE specific ANNEX)

RANCID FATS

Refusal to eat, inhibition of ruminal activity, intestinal disorders and symptoms attributable to peripheral vasodilatation. The safety levels correspond to the absence of anomalous oxidations (N° of peroxides) or secondary rancidity, differentiating the single raw materials from the mixtures. (SEE ATTACHMENT)

- Safety levels: Less than 5 meq/kg SG (in mixes) - Less than 10 meq/kg SG (in raw materials)
- Levels of risk or potential problem 10-(15) meq/kg SG with Negative Kreiss Test
- Problem levels >20 meq/kg SG and in any case with Positive Kreiss Test.

BIOGENE AMINE

Symptoms attributable to peripheral vasodilatation, and hepatic intoxication. As secondary products of protein fermentation (putrefactions), they are related to the presence of ammonia, the maximum levels of which vary according to the type of sample (usually ensiled).

CONTAMINATION IN MOLDS

Reduction of ingestion, rumen disturbances and possible problems related to the mycotoxins produced. Contamination is assessed on individual foods (SEE ANNEX), exceptionally on unifeeds; in fact it expresses a judgment of general health, which does not necessarily imply consequences on health. Highly contaminated products can be the direct cause of a problem due to induced nutritional deterioration and, possibly, due to microbial competition at the rumen level.

ANTIFERMETATIVES (e.g. SULPHITES and FORMALDEHYDE)

Ruminal slowdowns or blockages. Typical research of chard pulps, much debated in the past, lately it does not present significant results. Not executable on feed or compounds where lignosulphite is used (interference). The anti-fermentation activity on the rumen would presumably manifest itself over 100-200 ppm of sulphites (and, perhaps, 30-40 ppm of formaldehyde) using about 2 kg of pulp head/day. Values lower than 50 ppm can be commercially accepted, the maximum frequency of results is between absent (less than 5) and 20 ppm; in reality the usual rule applies that any anti-fermentation action is in relation to the ruminal efficiency of the herd and therefore becomes marked in cases of reduced rumen activity.

PHYTOPHARMACEUTICALS

The historical case history of poisoning by pesticides is certainly richer and more articulated than our current reality, for the following reasons:

- the approximate and risky procedures of the past are now marginal;
- strong selection of permitted pesticides: by now there are very few classified as toxic, and therefore potentially able to create problems; moreover, almost all of them have very rapid biodegradation times, such as to remain only in traces a few weeks after treatment.
- In practice, only highly contaminated organochlorines/phosphorates (which can only be accidental and in the short term) are capable of giving rise to appreciable forms (nervous and motor syndromes).

HEAVY METALS and DIOXINS

Except in cases of very serious food contamination (it goes in the newspapers), they are not able to be revealed by symptoms: as well as for the presence of pesticides, aflatoxins and ochratoxins they represent above all a risk factor for health and safety of derived livestock products.

CLOSTRIDIAS

Clostridiosis is not triggered by the simple, however high and virulent, presence of clostridia: it is necessary to have predisposing intestinal conditions at the same time, such as sub-alkalosis, inflammatory states or ulcerations and various intestinal dysmetabolisms. Therefore, the search for clostridia in the unifeeds and, subsequently, in the components, is a partial and insufficient action to resolve cases of clostridiosis. The approach for research resulting from the presence of spores in milk is different: together with the verification of hygiene standards, it is important to isolate and eliminate the most contaminated foods. The reasoning relating to Botox is further different: rare but often episodic and isolated contamination, with explosive consequences on the herd, which equally responds to the predisposing factors that lower the "infectious limit", but it has more complex dynamics of action (infection/proliferation and endotoxin production). The search for infecting strains on food, obviously deferred by the duration of the incubation, is inevitably unsuccessful.

ALCOHOL IN ENSILATES

Forms attributable to peripheral vasodilatation (mastitis, zooppies, edema) and sensory disturbances.
As regards the total alcohols of corn silage, the following values are proposed:
INRA
- For dry matter <25% 49 g/kg
- For dry matter >30% 13 g/kg

SUCCI et al.
- 20 g/kg

PIGEONS
- 12-15 g/kg

Other authors propose even higher values; however, from our experience, the average of the values detected is less than 5 g/kg; in consideration of the probable losses of alcohol in the phases of sampling/delivery of the sample.
We therefore believe that values above 10-15 are already anomalous and mark the presence of alcoholic fermentations (usually confirming an "olfactory" indication), the exact quantification of which would require more stringent sampling and conservation techniques than those ordinarily implemented. Simplifying, we can say that values lower than 5 g/kg indicate normal alcoholic fermentations, while values higher than 10 could signal even more intense fermentations.
Under conditions of rigorous sampling, the data proposed by INRA are certainly correct.