

## NOR-GUTAN: what's new.

### Introduction:

In our continuous quest for developing natural solutions for animal feed, we have made some adjustments in order to improve the formula of Nor-Gutan (Cabanin). Of course, the “cornerstones” elements of the products remain unchanged: Nor-Spice AB for the prebiotic effect, cassis pomace. The main adjustments imply the antioxidant property and the addition of a new kind of tannins.

This short review explains the main improvement of the formula that have been made in order to improve Nor-Gutan better and match more with the your needs in terms of natural solutions for animal nutrition

### Nor Balm: More than an antioxidant

Nor-Gutan has an important antioxidant activity thanks to grape pomace in the old formula. In order to enhance this property, Nor Balm has replaced the grape pomace in the new developed formula. Nor Balm is Lemon Balm extract which has high antioxidant value.

### Tannins: two types for a complementary action:

In addition to chestnut tannins (hydrolysable tannins) present in the old formula, the developed formula contain Quebracho tannins (condensed tannin). In developed formula, we use high quality condensed tannins extract from the quebracho tree.

Quebracho colorado (*Schinopsis balansae* and *Schinopsis lorentzii*), commonly called quebracho is an evergreen tree that grows wild in South America.

This association of these two type of tannins is justified by the following elements:

### Gut coverage:

Where hydrolysable tannins are mostly present in anterior part of the intestine, the condensed tannin covert all the intestine and mainly in the distal part.

association of both offer a whole coverage of the gut with well-described beneficial effects of tannins.

### Complementary action:

A recent study demonstrated an antiviral effect of tannins against metapneumovirus and avian reovirus. While the action of hydrolysable tannins was only extracellular, condensed tannin had an

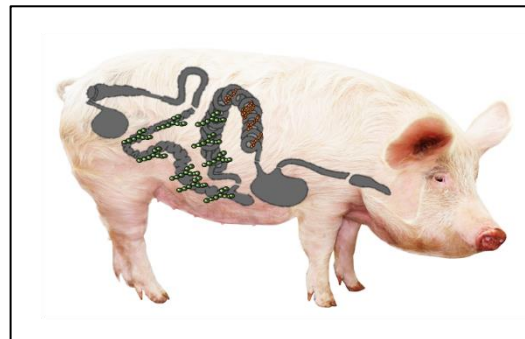


Figure 1 Better gut coverage of tannins

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extra and intra cellular action (Lupini et al. 2009). This intracellular action may be due to the small size of these tannins(M. R. Moreira 2005).

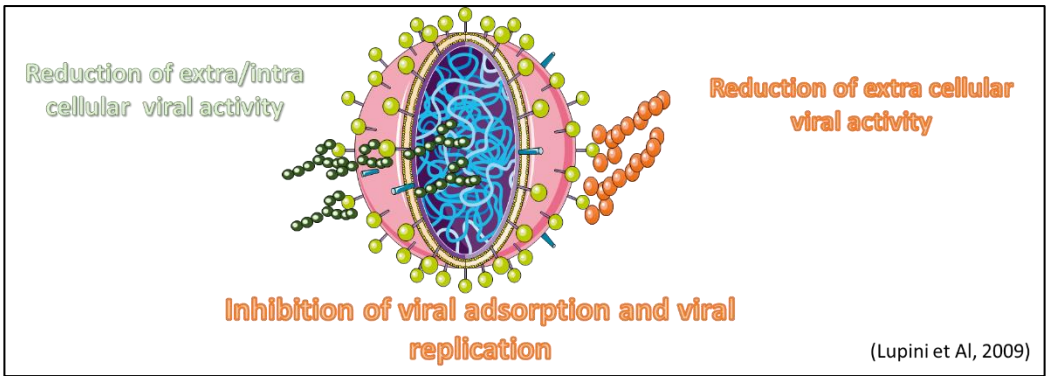
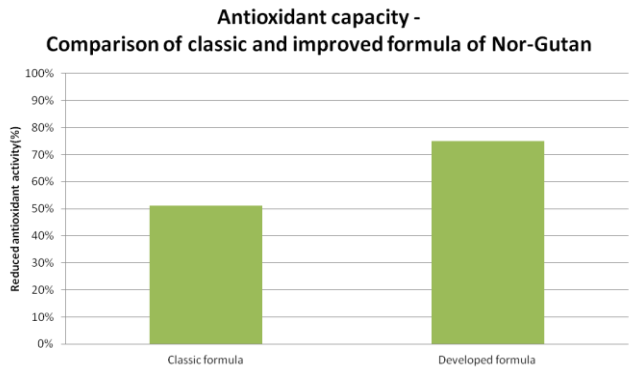


Figure 2 Complementary antiviral activity of tannins: in green the condensed tannins and in orange the hydrolysable ones

Comparative table of the two formulas:

Classic formula	Developed formula	improvement
Grape pomace	Nor Balm	<ul style="list-style-type: none"><li>• Better antioxidant capacity.</li><li>• Better final aspect of the product.</li><li>• More standardized product</li></ul>
Hydrolysable Tannins only	Hydrolysable tannins+ condensed tannins	<ul style="list-style-type: none"><li>• Better coverage of digestive tract.</li><li>• Complementary/synergetic action</li><li>• Better antioxidant capacity</li></ul>
Nor-Spice AB®	Nor-Spice AB®	N/S
Cassis pomace	Cassis pomace	N/S

**Better anti-oxidant capacity:** The improved formula of Nor-Gutan shows anti-oxidant capacity increased by 25% compared to the classic ones as shown in figure 3. Using the DPPH method we shown that formula containing both type of tannins have better antioxidant capacity than the formula containing just hydrolysable tannins.



**A more fluid and better aspect of the final product:**

As shown the figure below, and thanks to Nor Balm, the final aspect of the new developed formula is more fluid, and have a nicer aspect. This make the product easier to blend and homogenize to the other feed component.

