

# Unitán

## MGM

***“THE NEW FEED ADDITIVE BASED ON POLYPHENOLS  
FOR ANIMAL PRODUCTION”***



## TANNINS DISTRIBUTION IN NATURE

- ✘ Tannins are widely distributed in the plant kingdom, not only in Tropical plants or from SemiArid Regions (Balogun et al., 1998).
- ✘ Location of the tannins are in most valuable parts of the plant such as new leaves, flowers, fruits, which are susceptible to be eaten by herbivores. (Álvarez del Pino et al., 2001).
- ✘ High temperatures, high eliofany and poor soils comparatively increase the level of tannins in plants. (Van Soest, 1994).

- ✘ Tannins are phenolic compounds present in plants, which have specific chemical characteristics and biological activity.
- ✘ Its most known activity is that they interact with proteins binding them reversibly or irreversibly and precipitating them efficiently.
- ✘ The two main categories of tannins that impact animal nutrition are :
  - + hydrolyzable tannins.
  - + condensed tannins.

## CONDENSED TANNINS (PA)

- ✘ Condensed tannins identified more correctly as *Proanthocyanidins* (Pa).
- ✘ Most studied are Catequin y la Epicatequin.
- ✘ As an example, polymerization of both, may form Sorghum Procyanidin which is the pigment responsible for it's wide array of colour in certain varieties.

# Unitán

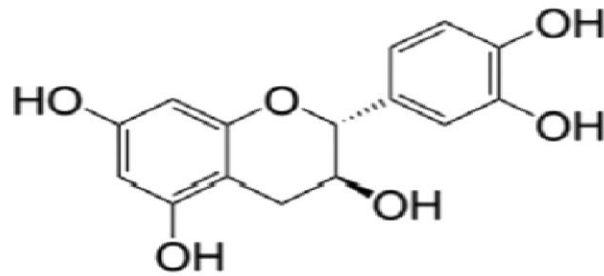
## HYDROLIZABLE TANNINS(HT)

- ✘ They are Gallic acid derives.
- ✘ The most simple are Gallotannins, which are Glucose esterified molecules.
- ✘ In nature, there are 5 Gallotannins forms, being the Alpha, the one which is in abundance.

## CHEMICAL PROPERTIES

- ✗ Ability to bind proteins is due to the high density of free phenolic groups so that multiple strong **hydrogen bonds** can be made with the protein's carboxyl group.(McLeod, 1974).
- ✗ Kumar y Singh (1984) suggest 4 union types to proteins:
  1. By H bonding (reversible and dependent on the pH)
  2. Because of Hydrophobic bondings (reversible y dependent on the pH). These are the most frequent ones.
  3. Because of Ionic links (reversible but only possible with the TH).
  4. By Covalent Unions (irreversible).

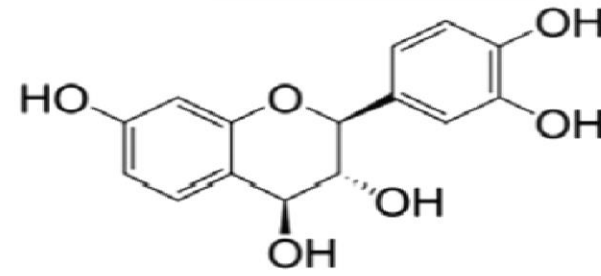
- Quebracho extract is a big polymer of dimers and trimmers (Catechin – fisetidinol bounded)
- More than 85 % of Quebracho extract it's a complex polymer.
- Dimers and trimmers can be easily exposed by pH modification.



1

catechin

Exact Mass: 290.08



2

*ent*-fisetidinol-4 $\beta$ -ol

Exact Mass: 290.08

## BIOLOGIC ACTIVITY

1. Protein precipitation Agent.
2. Increases Protein bypass in Ruminants.
3. It prevents Acidosis lowering the cereals starch fermentability rate, with high Ruminal fermentation.
4. Lower the ruminal Methano concentration.
5. Antidiarreic / Astringent
6. Antibloatting
7. Natural Origin Bactericide.
8. Natural Origin Fungistatic.
9. Natural o Biologic Antioxidant.
10. Retarder peristalsis





## MONOGASTRIC

### ✘ Primary properties:

1. Bacteriostatic
2. Reduce the peristaltic activity (retarding the movement in the gut and driving a better absorption)



### ✘ Secondary Properties:

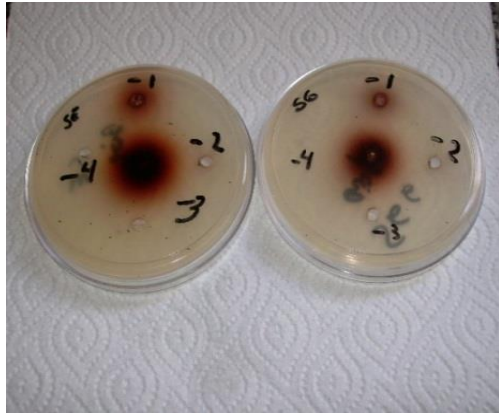
1. Antioxidant
2. Antifungic
3. Micotoxin binder



## BIOLOGIC ACTIVITY

1. Prebiotic: creat a low pH and ideal environment to favor the production of beneficial bacteria
  2. Astringent: stop diarrea and sloving peristalcia in the small intestine
  3. Inhibition: by competitve exclusion
- ✘ low pH → Lactic Bacteria
  - ✘ Inhibit Gram + and Gram - bacteria

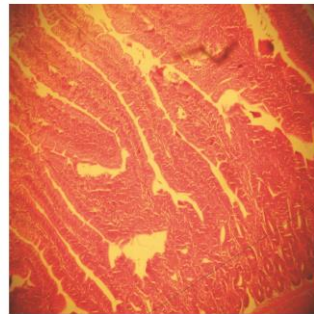




## Min Inhib Conc of Zinc Bacitracine and Poliphenolic extract

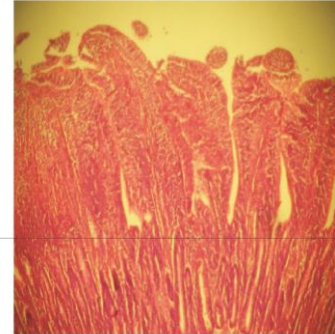
Cepas bacterianas						
Productos	Clostridium perfringens	Salmonella Enteritidis	Salmonella Gallinarum	E. coli	S. aureus	S. fecalis
Zinc Bacitrazin	330	330	330	33	0,3	330
MGM	0,5	500	500	0,5	5	5

Broilers without plant extract



Velosidad  
Cripta

Broilers with plant extract



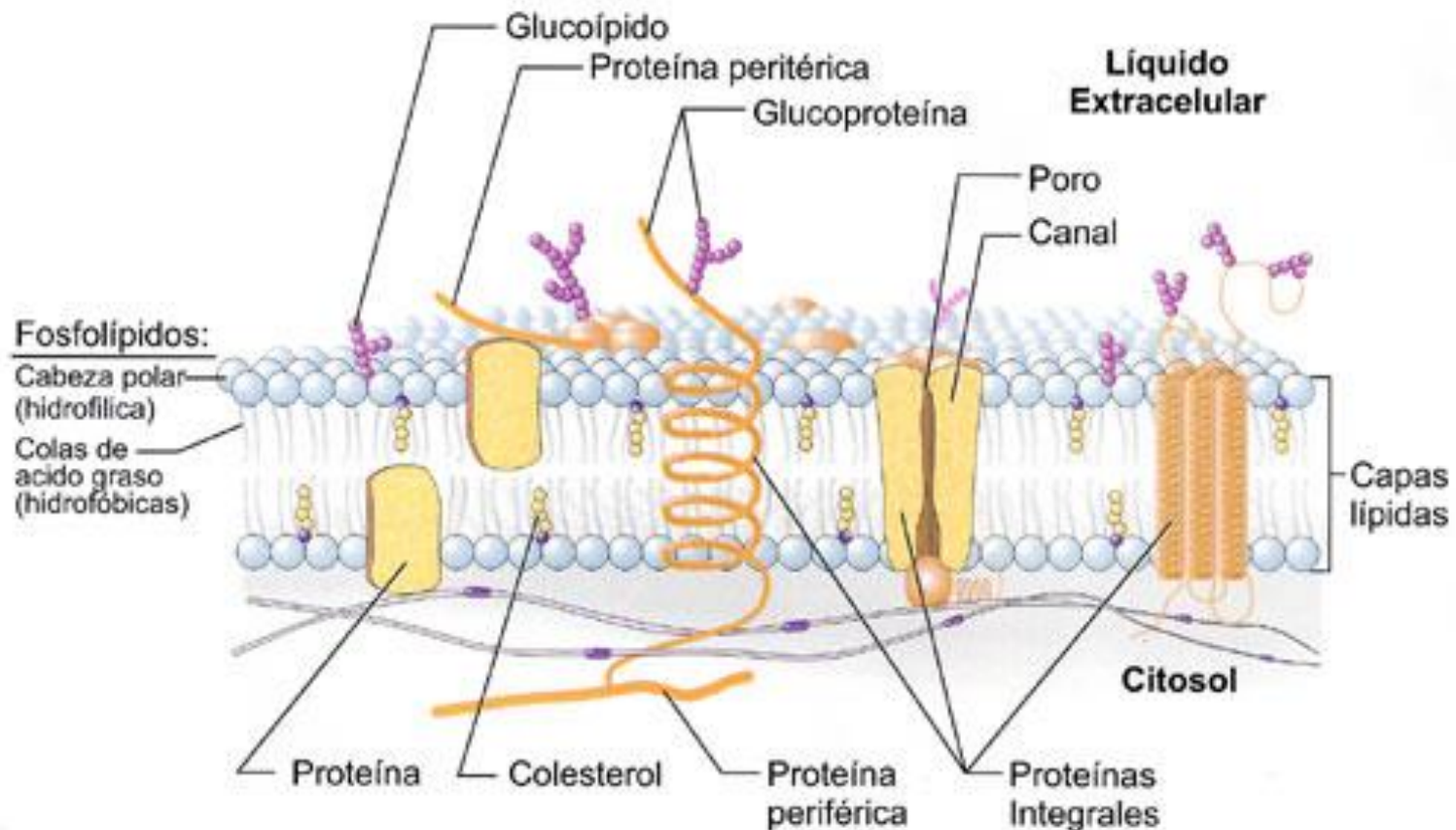
Velosidad  
Cripta

## MIC (minimum inhibitory concentration)

MGM	<i>Clostridium perfringens</i>	Salmonella Enteritidis	S. Gallinarun (field)	S. Gallinarun	<i>E. coli</i>	<i>St. aureus</i>
	pH 4.9	5 mg/ml	0,5mg/ml	5 mg/ml	0,5mg/ml	5 mg/ml
+ SBS	5 mg/ml	0,05mg/ml	0.02 mg/ml	0,005mg/ml	0.01 mg/ml	0.5 mg/ml

# ¿MGM: MODE OF ACTION?

Acting on the lipid portion of the cytoplasmic membrane of pathogens causing decrease in oxygen consumption and altered respiratory chain

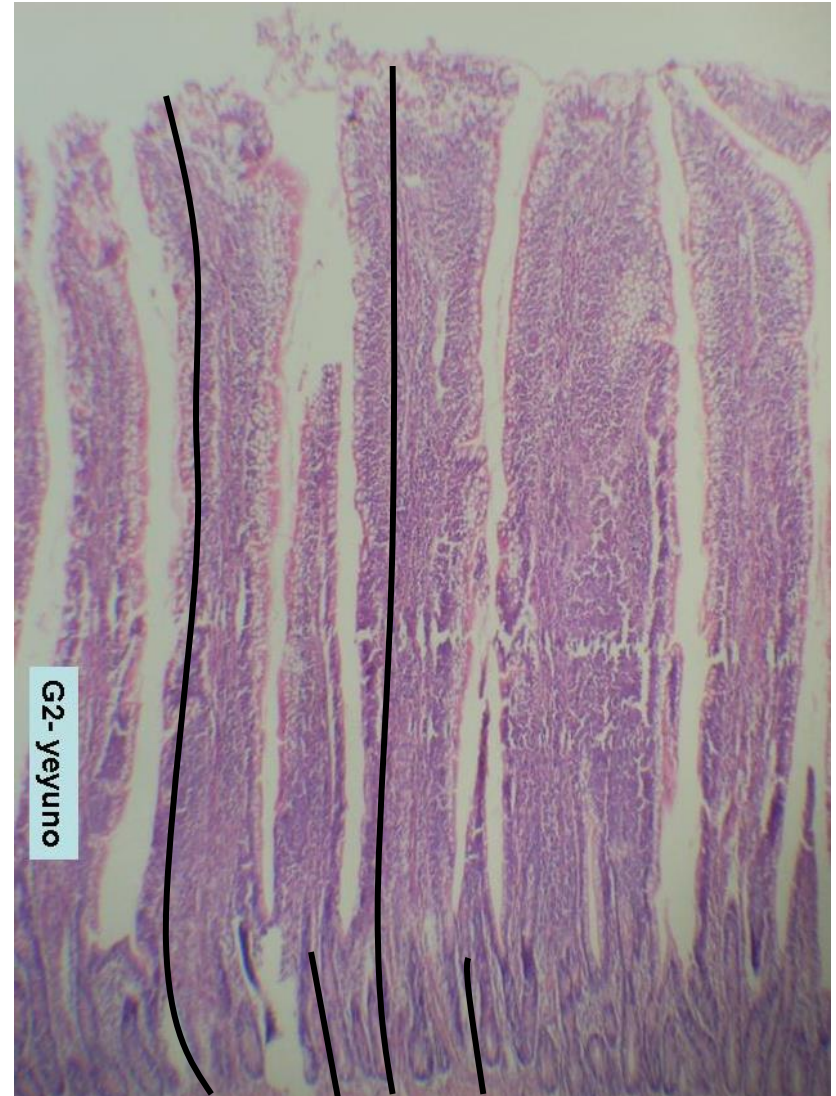


## *HOW TO EVALUATE THE MORPHOLOGICAL INTEGRITY?*

- Assess the integrity of the intestinal mucosa in a qualitative and quantitative, reliable and repeatable manner.
- The technique should provide a numeric score of the parameters analyzed

- Villa
  - Cript
  - Loss of mucosal integrity
  - Edema and Inflammation
  - Alterations in muscular-serosa
  - Presence of biological agents
- } Histomorphometry
- } Score quality

- Measuring the length of villi
- Measuring the depth of the crypts with image analysis software





- Generally injuries are classified as present or absent

For this technique we assign a value to each parameter evaluated

0: Absence of injury

1: Mild injury

2: moderate injury

3: Severe Injury

### Products:

- × CALCIUM PROPIONATE (A)
- × POTASIUM SORBATE (B)
- × VEGETAL EXTRACT (C).

### Dose:

- × PRODUCT To 1000 ppm.
- × PRODUCT B 1000 ppm.
- × PRODUCT C 1 1000 ppm.
- × PRODUCT C 2 500 ppm.
- × Control Without Product.

- × Temperature of Storage: 25 ° C (in the dark)
- × Temperature of Incubation: 28 ° C
- × Humidity content of the substrate: 16%
- × Average of culture: Agar-Extract of Malta with high osmotic concentration.
- × Specific plates 3M for fungi and leavenings.
- × Design: The initial contamination was evaluated, to the 7, 14, 30, 45 and to the 60 days.
- × Expression of the Results: In training Units of Colonies by gram of substrate. (U.F.C./g.)
- × Average of 3 repetitions by treatment.
- × The final estimation was made calculating the percentage of inhibition of each product in relation to the corresponding witness.

**Values average in UFC/g.**

<b>Product</b>	<b>0 days</b>	<b>7 days</b>	<b>14 days</b>	<b>30 days</b>	<b>45 days</b>	<b>60 days</b>
<b>A</b>	45.000	83.000	206.600	803.300	890.000	953.300
<b>B</b>	48.000	81.600	200.000	830.000	866.600	933.000
<b>C1</b>	50.000	123.300	303.000	586.600	703.300	1.400.000
<b>C2</b>	50.000	203.300	430.000	1.000.000	2.000.000	3.000.000
<b>Witness</b>	47.000	623.300	4.583.000	5.300.000	6.000.000	7.200.000

## Percentage of Inhibition

Product	0 days	7 days	14 days	30 days	45 days	60 days
<b>A</b>	0	93.4	96.4	85.5	81.8	87.3
<b>B</b>	0	94.2	96.6	85.1	86.2	87.6
<b>C1</b>	0	87.2	94.4	89.7	89.0	81.1
<b>C2</b>	0	73.3	91.6	81.9	67.2	58.7
<b>Witness</b>	0	0	0	0	0	0

## Ruminants: Trial in Milk Cows



***Control***



***MGM***

## Broilers and Layers



## CONCLUSION

---

### × Monogastric:

1. Anti-microbial effect
2. Better FC
3. Better Environment- drier Feces
4. Improved mortality
5. promotes the proliferation of lactic acid bacteria

### × Ruminants:

1. Improved FCR
2. More Milk and meat production
3. Reduce Methan and amonia production
4. Decrease urea levels in blood and milk
5. Reduction of protein fermentation

## MGM: FINAL CONCLUSION

- **Improving the environment and animal welfare and livestock performance**
- **Help to replace the use of antibiotics**
- **Improved conservation of the Feed**