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Carob bean gum and its value as a natural agent for food safety

The *effort* to reduce the number of toxic-infectious casesis a very important aspect for animal feed production in Europe since 2005. From 2007 reports have been increased to estimate the importance of toxic-infectious agents. From the report generated by the European Food Security Agency (EFSA,2007), the toxic agent caused by *Salmonella* should be considered the main toxic-infectious component, as it represents more than 39,2% of the cases.Therefore, the possibility of using natural products In animal feed which allow reducing the incidence of this zoonosisis an important element.

Today the benefit of components rich in galactomannans are known to avoid colonization in the intestines by *Salmonella.* Studies conducted in Texas (USA) show that monosaccharides like D-mannose possessa preventive effect on intestinal adherence of *Salmonella* in poultry (Oyofo *et al.,* 1988\ Also, the adherence aspect of *E. coli* to the epithelial mucus through substances like mannose is known. Therefore, D-mannose and its by-products may interfere in the adherence of *E. coli* and *Salmonella* on epithelial cells of the intestine. It should be taken into account that D-mannose synthetic is economically unviable, and therefore, the use of natural products as carob bean gum results more efficient.

Carob bean gum *(Ceratonia silicua)* is rich in polysaccharides, galactomannans among them, and specially mannose. Therefore, the use of the gum obtained from the carob seed is an ingredient with a high preventive potential for reducing the prevalence of *Salmonella* and *E. coli.*

Mannose has the capacity to aggregate *Salmonella* and *E. coli* in agar layers (analysis *in vitro).* That is why an estimation of the aggregation capacity of carob gum has been conducted, comparing it with synthetic mannose. This study performed by Ora. M!! Angels Calvo, of the "Universitat Autonorna de Barcelona" (UAB), has shown that the aggregation capacity has been greater than 50% for *Salmonella* and *E. coli,* This estimation has been conducted in three *Salmonella* strains and two *E. coli* strains.

Therefore, the response to the addition of *Solmonella* or *E. coli* strains, allows us to indicate that the product produced by ARMENGOL HERMANOS SA. has an important capacity to provided mannose to the diet and it is a preventive element for the reduction of prevalence in the case of *Salmonella* and also can be considered as a preventive product to reduce the incidence and degree of toxic-infectious agents produced by *E. coli.* These aspects are important for poultry, pig and cattle beef feed, and therefore this product, natural from the Mediterranean area, has a positive influence in this context to improve food safety.

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1 EFSA(2007). Food-Borne outbreaks in the European Union in 2007. Community Summary Report.
2 Oyofo *et af.* (1988). Prevention of *Salmonella Typhymurium* colonization of broilers with D-Manose. Poultry Science 68: 1357-

13W.

Results in Vitro Agglutination of E. Coli and Salmonella



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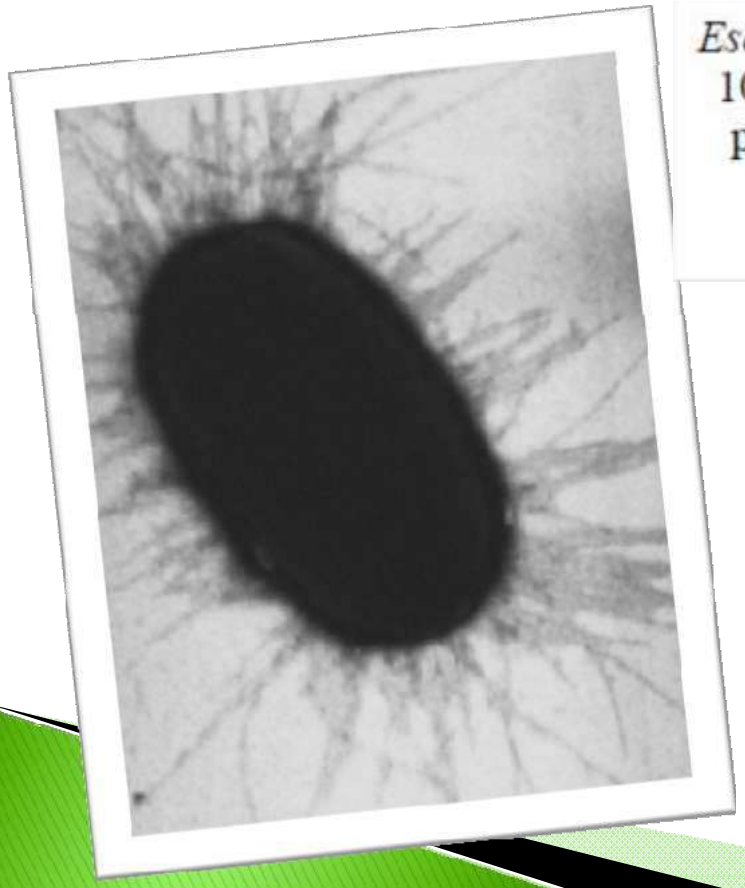
The suspensions were inoculated on slides and observed in fresh under optical microscope. A minimum of twenty fields were evaluated for each determination. It is considered that the counts of aggregations obtained with the assay carried out with Mannose 0.05M, is the maximum value of possible aggregations (100% aggregations). Compared with this value it is indicated the percentage of aggregations observed after being in contact the tested product with each microorganism.

Tables num. 1 and 2 show the degree of aggregation compared with the positive control (Mannose 0.05M, the aggregation value reached with this product is considered as 100%) for each product and concentration tested for each microorganism.

Table num. 1 shows the results for aggregation obtained for Salmonella strains when in contact with the product assayed, and Table num. 2 shows the same results regarding Escherichia coli strains.

E.Coli aglutination in vitro results

- The fimbria role.



Escherichia coli presenta unas 100-200 fimbrias que utiliza para adherirse a las células epiteliales o al tracto urogenital.



Fotografía 1.- Agregación de *Escherichia coli* por acción del producto SANICAROB al 0,4% (x1000)

armengol

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Salmonella Aglutination in Vitro

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Agglutination results on percentage (pure mannose = 100) obtained over Salmonella strains using several sources of polisaccharydes Mannans.

	SANIGUT		SANIGUT PLUS		SANICAROB		WALLS YEAST SUGAR		WALLS YEAST BRED		CACAO	
	Strain A	Strain B	Strain A	Strain B	Strain A	Strain B	Strain A	Strain B	Strain A	Strain B	Strain A	Strain B
0,40%	64	61	68	65	60	62	38	40	30	35	12	15
0,30%	65	62	64	62	60	59					7	8
0,20%	58	54	60	58	58	54	25	24	20	22	3	5
0,10%	54	56	52	54	48	45						

Strain A: Salmonella enterica var. enteritidis ATCC14901

Strain B: Salmonella enterica var. enteritidis CECT 723