



FORMULAS INFANTILES A BASE DE LECHE DE CABRA

¿ Que aportan de Novo?



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Componentes de la leche



Componente(%)	Humana	Vaca	Cabra	Oveja
Proteína	1.0	3.6	2.9	5.5
Grasa	3.8	3.7	4.5	7.4
Lactosa	7.0	4.6	4.1	4.8
Cenizas	0.2	0.7	0.8	1.0

Evolución de las fórmulas infantiles hacia la composición de la leche materna



Comités de expertos
(ESPGHAN, EFSA,...) 1977

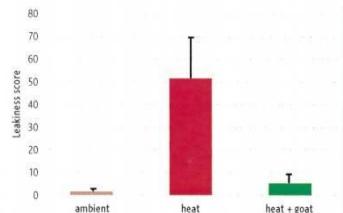


Legislación
(Directivas, Reales Decretos,...)



**REGLAMENTO DELEGADO
(UE) 2016/127 DE LA
COMISIÓN de 25 de
septiembre de 2015**

World leader in goat milk formula research

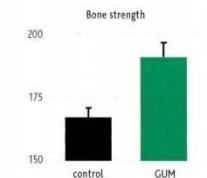
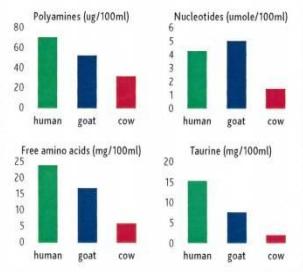


2004
Goat milk prevents leaky gut from heat stress (in animal Study).

Reduction in heat-induced gastrointestinal hyperpermeability in rats by bovine colostrum and goat milk powders (2004) Journal of Applied Physiology

2007
Bioactive profile of goat milk closer to breast milk than cow milk.

Composition of the non-protein nitrogen fraction of goat whole milk powder and goat milk-based infant and follow-on formula (2008) International Journal of Food Sciences and Nutrition



2008
Goat growing up milk improves bone strength in animal study.

Impact of goat milk powdered formulations on mineral absorption, peak bone mass and bone loss due to ovariectomy in rats (2008) Journal of the Science of Food and Agriculture



2011
Korean clinical study highlights use of goat formula as complement to breast feeding.

Association of infant feeding practices in the general population with infant growth and stool characteristics (2011) Nutrition Research and Practice



2001

First ever clinical study to demonstrate healthy weight gain of infants fed goat formula.

Randomised, double-blind comparison of growth in infants receiving goat milk formula versus cow milk infant formula (2005) Journal of Paediatrics and Child Health

2004

Nutrient uptake from formula made from whole goat milk is equivalent to whey adjusted cow milk formula.

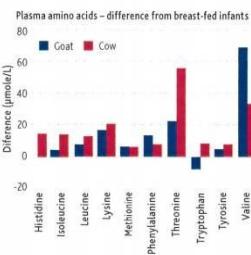
True ileal amino acid digestibility of goat and cow milk infant formulas (2006) Journal of Dairy Science

2006

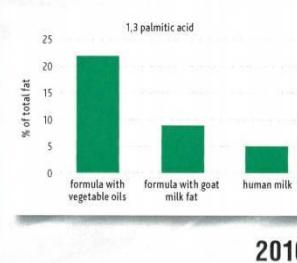
The essential amino acid content of goat milk formula is proven to be suitable for newborn infants.

Amino acid composition determined using multiple hydrolysis times for three goat milk formulations (2008) International Journal of Food Sciences and Nutrition

2008



2008



2010

Including goat milk fat in formula confers a better fat structure than vegetable oils only.

Composition and distribution of fatty acids in triglycerides from goat infant formulas with milk fat (2010) Journal of Dairy Science



LEGISLACIÓN EUROPEA

Los estudios clínicos presentados por DGC a EFSA (Autoridad Europea de Seguridad Alimentaria) convocó que la Unión Europea emitiera el 28 de agosto de 2013 la Directiva 2013/46/UE por la que se autorizaba la comercialización de fórmulas infantiles a base de leche de cabra.

En 2015, la UE mediante la publicación del Reglamento 2016/127 de la Comisión del Parlamento Europeo y del Consejo Regulador, especifica las directrices y autoriza la elaboración de **preparados para lactantes y de continuación a partir de proteínas de leche de cabra**.

Research

DGC continually updates formulations to comply with international regulations, latest research findings and nutritional trends, guided by a European-based independent Scientific Advisory Board. DGC's researchers have contributed substantial knowledge about composition and functionality of goat milk, differences between goat and cow milks, and reasons why goat milk is less allergenic than cow milk.



Dairy Goat Co-operative

2014

Second clinical trial on goat milk formula published.

Nutritional adequacy of goat milk infant formulas for term infants: a double-blind randomised controlled trial (2014) British Journal of Nutrition



For more information: www.dgc.co.nz

PROCESO FABRICACION DE LAS FORMULAS



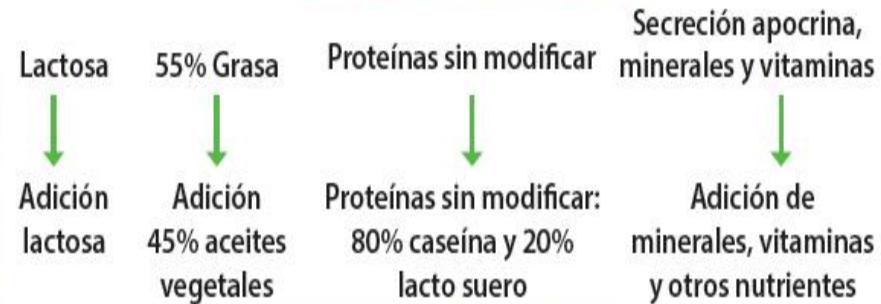
PROCESO DE EXTRACCIÓN DEL SUERO



FÓRMULAS INFANTILES A BASE DE PROTEÍNAS DE LECHE DE VACA



PROCESO MINIMIZADO





WJG

World Journal of
Gastroenterology®

Prevalence and dietetic management of mild gastrointestinal disorders in milk-fed infants

**Volume 14 Number 2
January 14, 2008**

World J Gastroenterol

2008 January 14; 14(2): 165-328

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世界胃肠病学杂志

D Infante Pina, X Badia Llach, B Ariño-Armengol, V Villegas Iglesias

-Investigadores: 285 pediatras

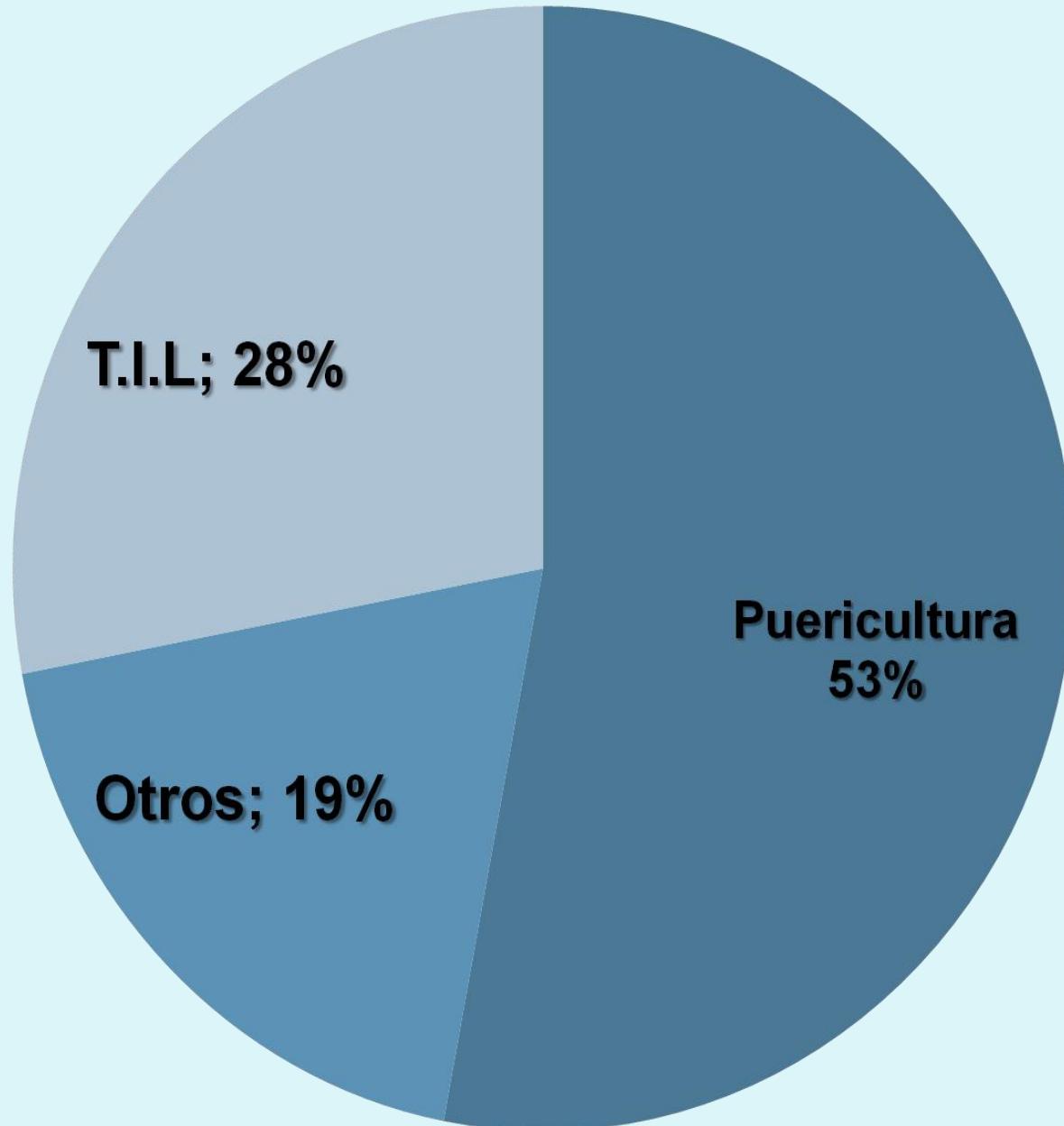
-Lactantes de < 4 meses de edad que consultaran por cualquier motivo.

-Periodo (1 semana): 4-10 Noviembre 2002.

-Total: 3487 lactantes (1-17 semanas vida)

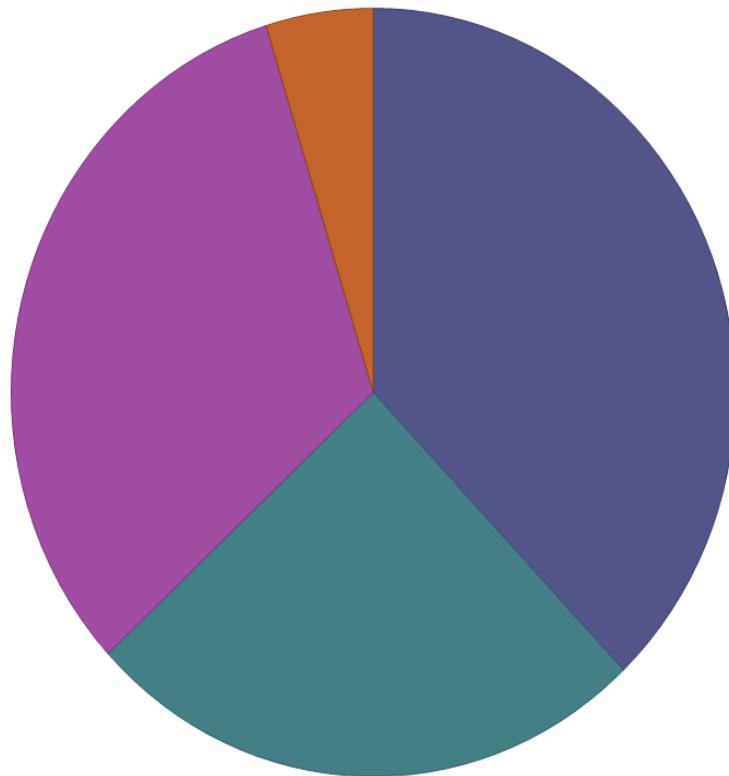
Motivo consulta

(n=3487)



Trastornos Intestinales 28 % del Estudio Transversal

**28%
Estreñimiento
(7,8 %)**



22 % Reflujo (6,1 %)

**33 % Exceso Gas
(9,2 %)**

17 % «Discomfort» (4,6 %)



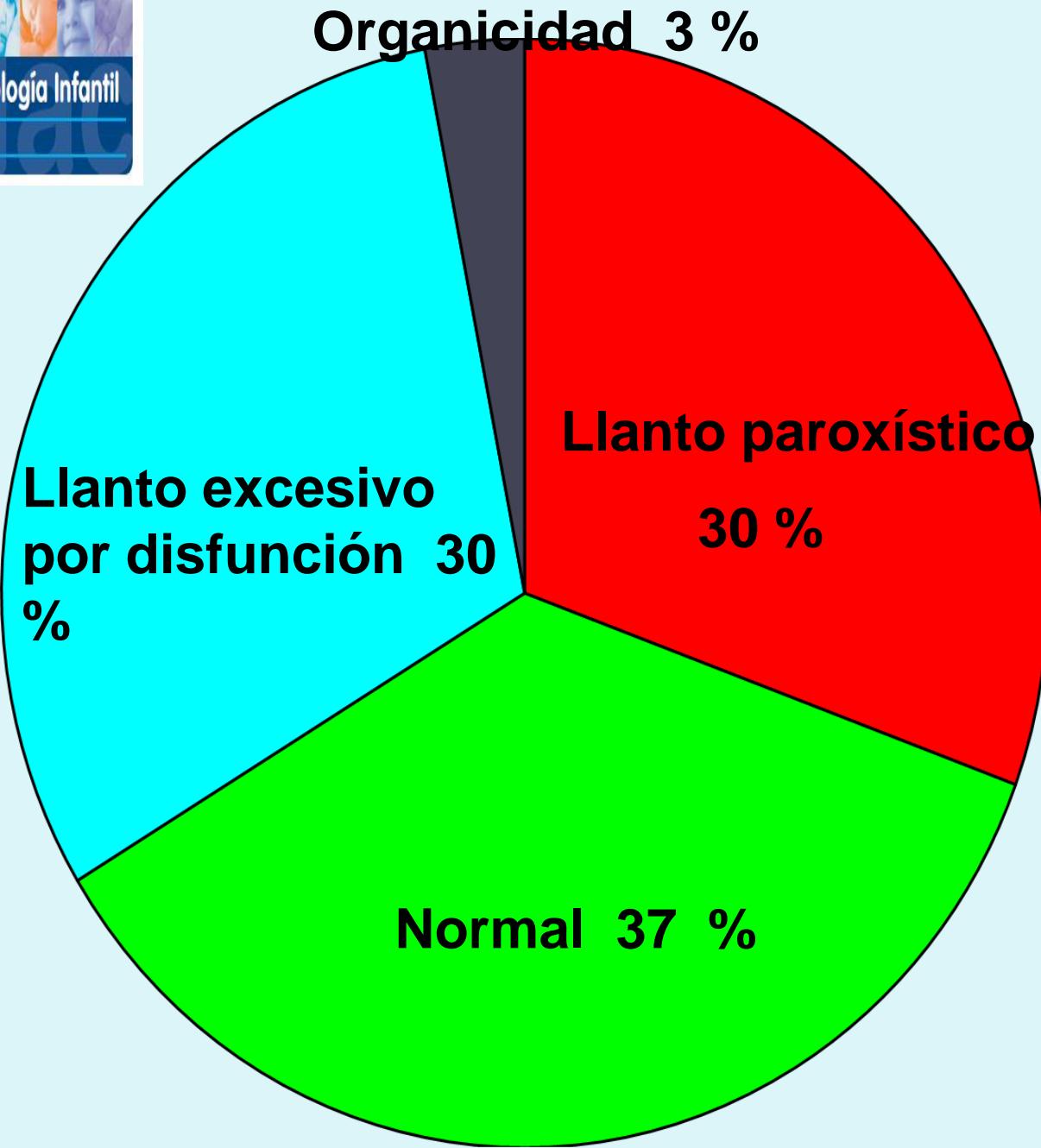
ESE PUZZLE LLAMADO CÓLICO

- **Definición de Wesel** : Llanto de más de 3 horas al día más de 3 días a la semana, más de 3 semanas.
Paroxysmal fussing in infancy : sometimes called “colic”.
Pediatrics 1954;14:421
- “Cause Obscure Lengthy Infant Crying “ **COLIC**
Acróstico de W . Carey. Cl. Pediatr 1968;7:590
« Llanto prolongado del lactante de causa desconocida»
- 17 definiciones diferentes.
Más de 120 artículos (aptos) desde 1965-2010
“ Síndrome del llanto excesivo del lactante”

"SINDROME DEL LLANTO" EN EL LACTANTE (n= 200)

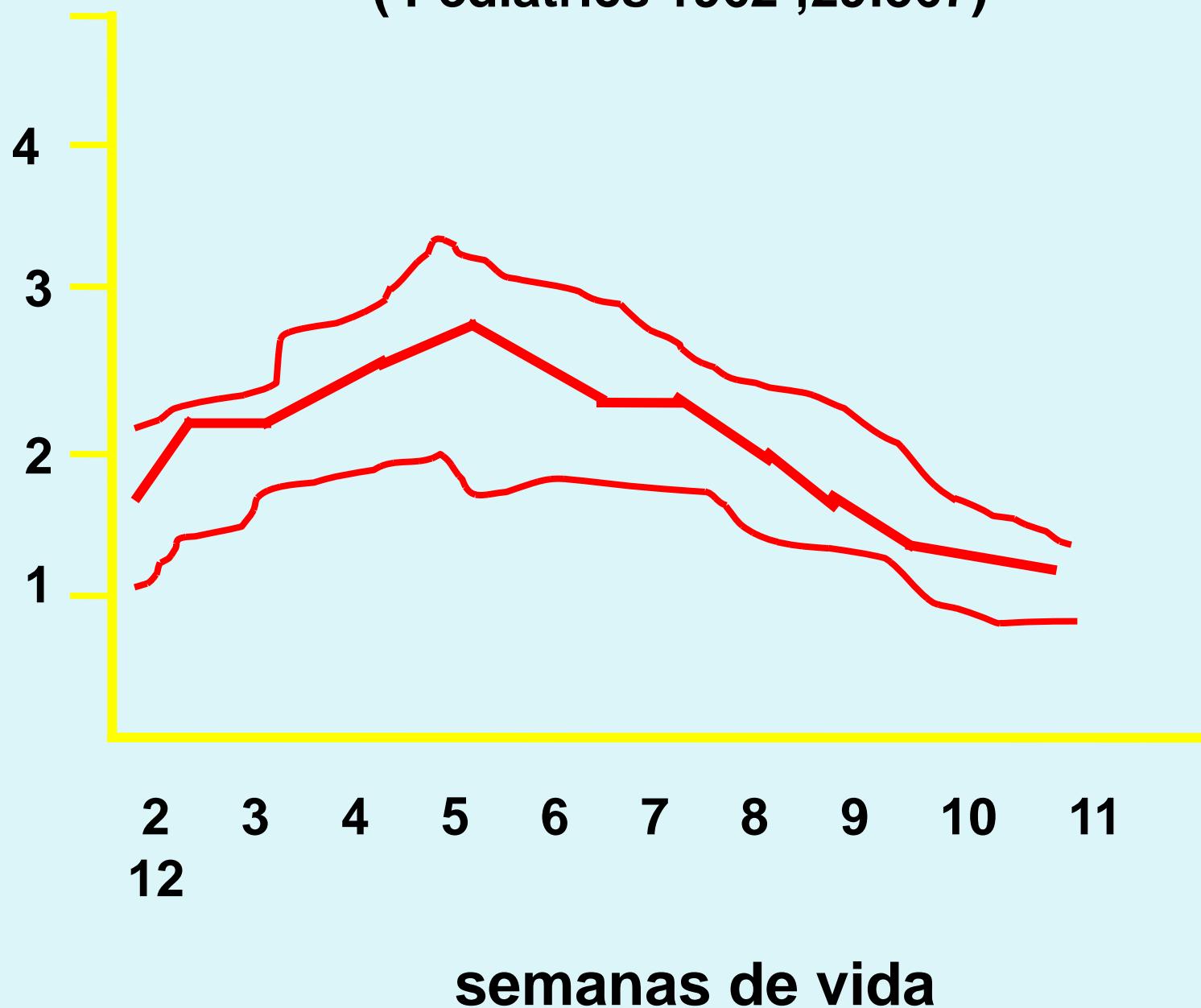


- . Reflujo 30 %
- . Estreñimiento 20 %
- . Exceso gas 30 %
- . Efectos Adversos
- PLV 20%



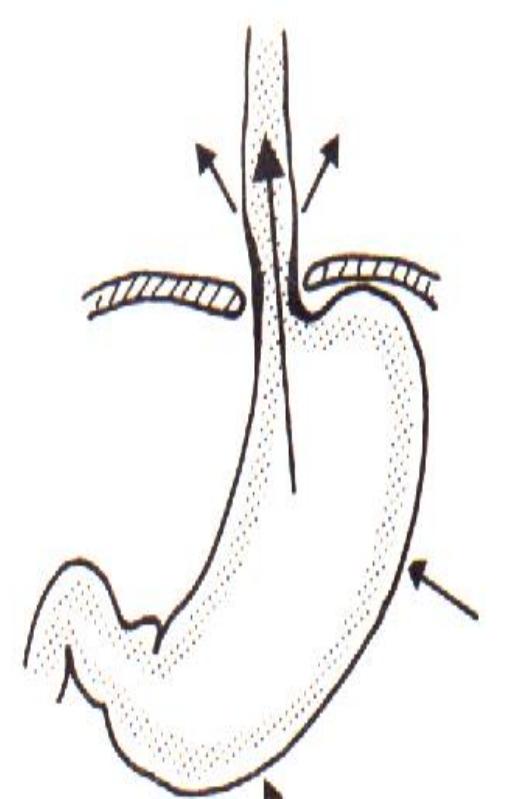
Curva de Brazelton

(Pediatrics 1962 ;29:567)



Informes Comites-Directivas

- * Eur J Pediatric 1993;152:704-11.
- * J Pediatr Gastroenterol Nutr 1994;18:143-22.
- * Eur J Pediatr 1997;156:343-57.
- Scientific Committee for Food: European Commission 1997
- * Directivas del 1995 y 1998.
- * ESPGHAN. (Committee on Nutrition).
J Pediatr Gastroenterol Nutr 2000 ; 34:496-8.



**Cientos de trabajos clínicos / exploraciones: dismución
reflujo, vaciado gástrico, ventajas e inconvenientes de los
distintos aditivos.....**

Fórmulas antirreflujo (AR)

- **Galactomanano (harina algarrobo).**
- **Amilopectina.**
- **Almidón de maíz.**
- **Arroz pregelatinizado.**
- **Menor cantidad de grasa.**
- **Aumento caseina**

.¿ Que Viscosidad debe tener una Fórmula AR ?

¿ 50 cP.....100 cP ??

- ¿ Con que espesante ?
- ¿ Que concentración?
- ¿ Influyen otros factores ?



**Enlentecimiento
vaciado gástrico**

“Limpieza esofágica”

CONCLUSIONES

Que Viscosidad debe tener una Fórmula AR ?

70cP - 100 cP

¿ Con que espesante ?: galactomananos

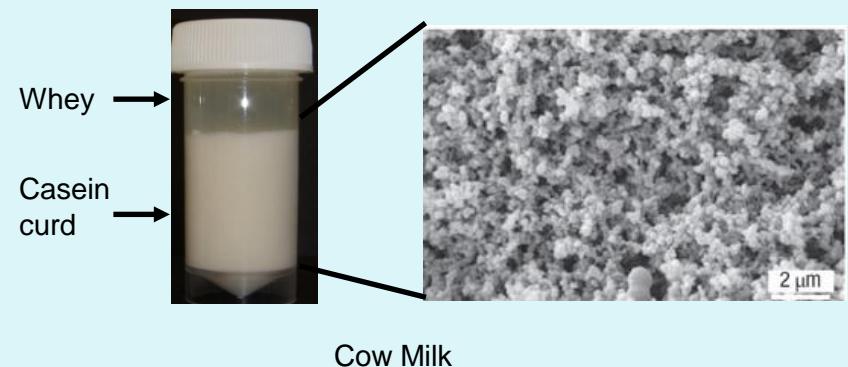
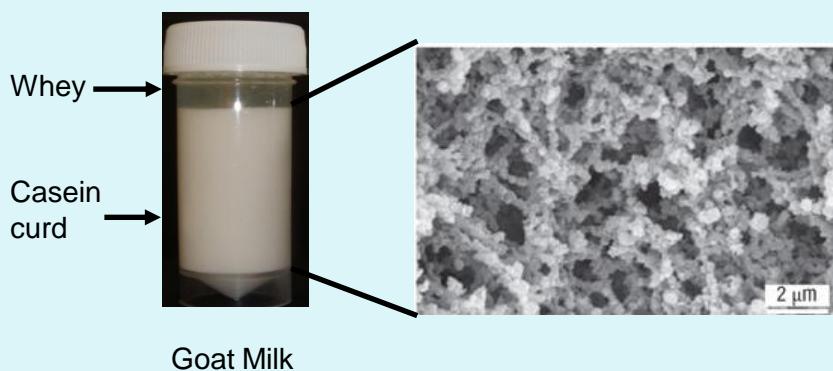
¿ Que concentración? : 3g / 100 ml

¿ Influyen otros factores ?: proporción de caseina

Goat milk and curd formation

CAPRICARE

- Niveles muy bajos de alfa s1- caseina.
- Tamaño micellas de caseina es menor L cabra versus L vaca lo que representa menor tension de la cuajada



CARACTERISTICAS DEL R.N

- Inmadurez esfínter interno anal con disminución
- Menor sensibilidad a la presión del esfínter anal
- Niveles bajos motilina: transito enlentecido.
- Déficit transitorio lipasa pancreática.
- Disminución del “pool” de ácidos biliares.
- Niveles bajos de lactasa intestinal

COMPENSACIÓN de la LMATERNA

Lipasas de la leche humana:

- Lipoprotein lipasa.
- Lipasa estimulada por las sales biliares

**Triglicéridos grasa con el palmítico en
β-posición (70%)**

Reflejo gástrico estimulado por la LM.

Digestión de los triglicéridos

Lipasa

Ca^{2+}

Ca^{2+}

Lipasa



Palmitico α

Palmitico β

Palmitico α

Palmitico α

Ca^{2+}

Palmitico α



Ca^{2+}

Palmitico

Mucosa
intestinal

→ Heces

ESTUDIO DE HECES (n=30)

Metodo Fecal Near Infrared (FENIR)

	Fórmula C_{16:0} (19 %)	Materna C_{16-:0} (66 %)		
Grasa gr%	9,12	5,75	P < 0,001	
Agua gr%	76	82	NS	

Tormo R, Infante D

Early Human Development 2001;65 (Suppl): 165-172

CONSECUENCIAS FÓRMULAS

JABONES CÁLCICOS

J.PEDIATR.GASTROENTER NUTR 1995;20:81-90

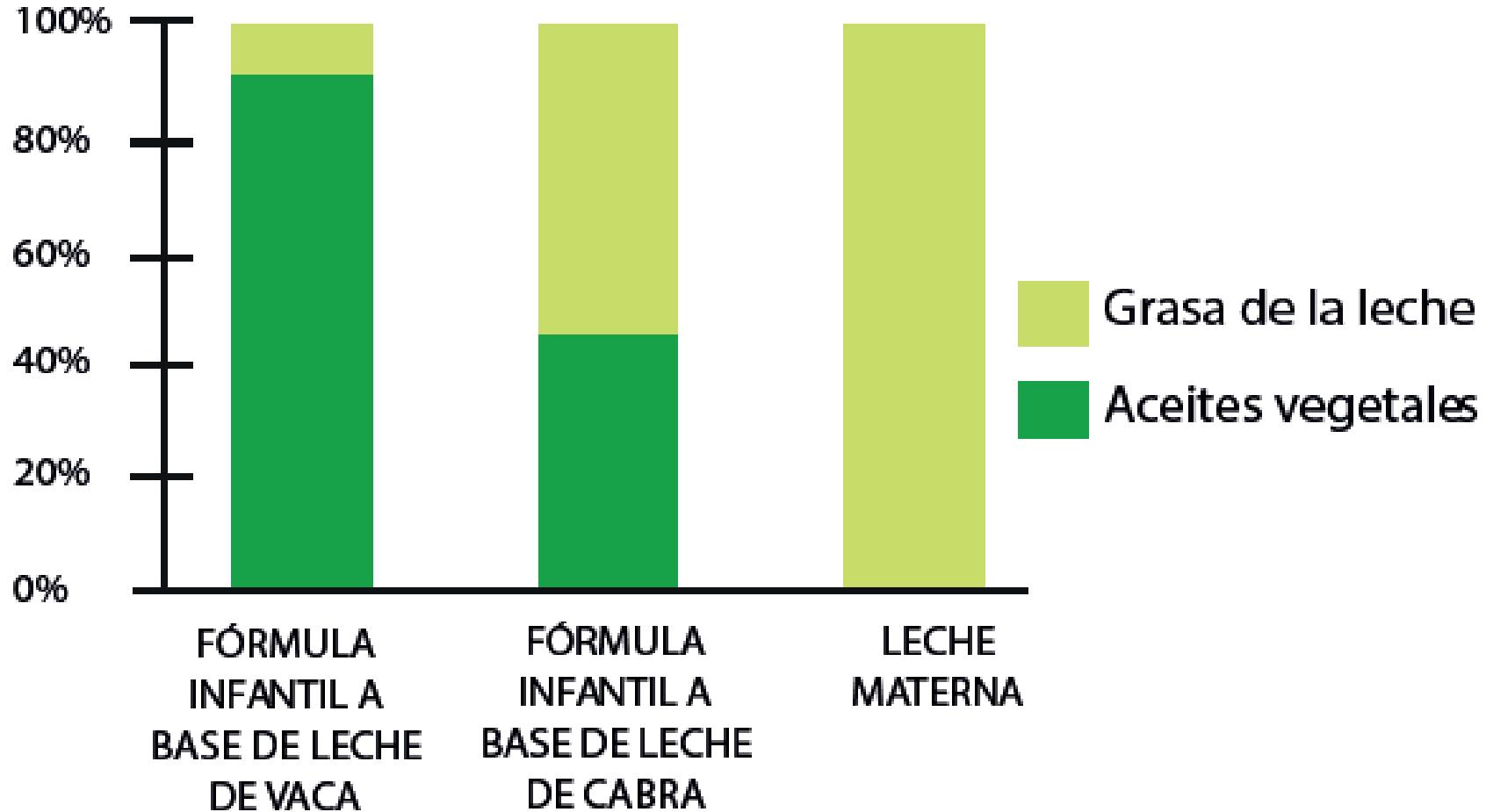
844 lactantes

> 90.000 deposiciones recogidas entre 7-15 días de vida.

Heces duras en el 17 % de los alimentados con fórmula

Comparados con 0 % en los alimentados a pecho.

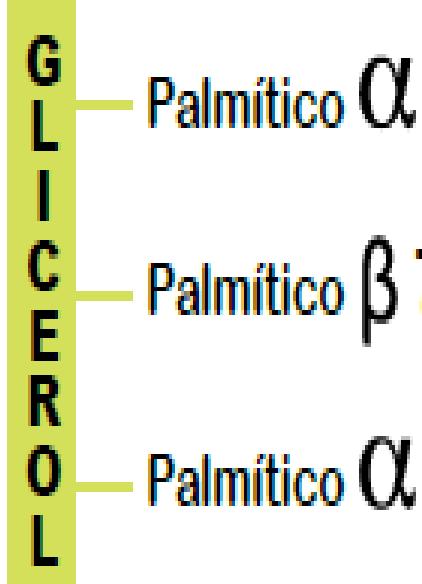
Proporción de grasa láctea y grasa vegetales en la leche materna, fórmulas a base de proteína vacuna y Capricare



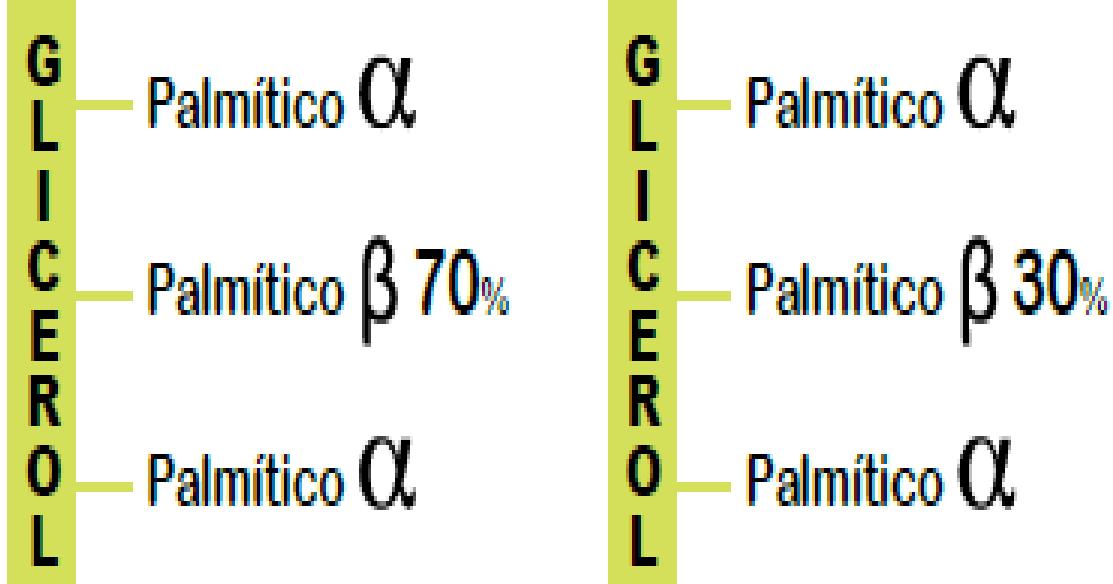
Composition and distribution of fatty acids in triglycerides from goat infant formulas with milk fat.
2010 Jul;93(7):2857-62. doi: 10.3168/jds.2009-2946.

Palmítico en posición Beta del triglicérido

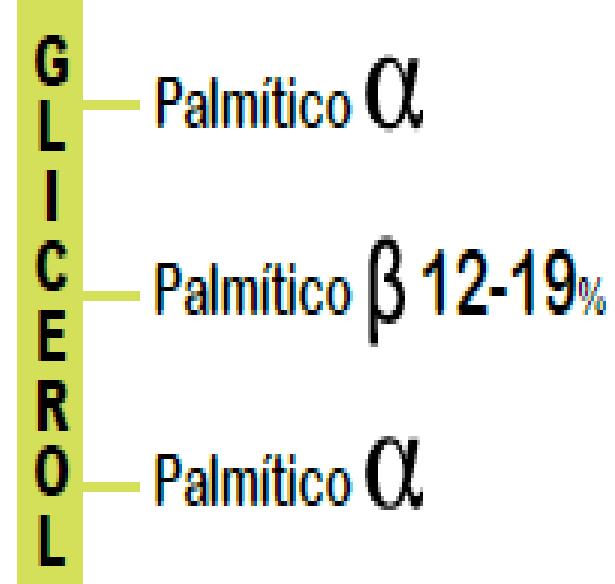
Leche materna



Capricare



Fórmula infantil a
base de leche de vaca



CALCIO EN LA LECHE

CALCIO	LM	FLV	Capricare
Orgánico	100 %	40 %	80 %
Inorgánico	-	60 %	20 %

No contiene aglutinina: gotas de grasa
más pequeñas de 25 micras

Constipated Patients Fed Goat Milk Protein Formula: A Case Series Study

Infante DD¹, Prosser CG², and Tormo R³

Formula Capricare LV

	Normal Values	Visit 1	Visit 2	p value *
Fat	7-11	8.6+1.9	6.8+2.1	<0.001
Water	80-85	78+6	80+5	>0.2
Nitrogen	<1.8	1.4+0.3	1.4+0.3	>0.2
Carbohydrate	<2	1.1+1.1	1.2+1.4	>0.2

Values are expressed as mean+SD % (wt/wt of stools)

*Wilcoxon signed rank test statistics

Table 5: Composition of stools at inclusion and follow-up

	Visit 1	Visit 2	p value *
Stool consistency	2	3	<0.05
No. Stools / day	2	2	>0.2
Crying hours 24 h	3	1	<0.001

*Wilcoxon signed rank test statistics

Table 3: Parental assessments at inclusion and follow-up

Goat Milk is Less Immunogenic than Cow Milk in a Murine Model of Atopy

Federico Lara-Villoslada, Mónica Olivares, Jesús Jiménez, Julio Boza, and Jordi Xaus

Department of Immunology and Animal Sciences, Puleva Biotech SA, Granada, Spain.

J Pediatr Gastroenterology and Nutrition 2004;39:354-360

Respuestas alérgicas inducidas por la proteína Alpha S1-Caseína de la leche de cabra en un modelo murino de atopía gastrointestinal

A. J. Hodgkinson, N. A. McDonald, L. J. Kivits, D. R. Hurford, S. Fahey, and C. Prosser .

J. Dairy Sci. 95:83-90 2012.

Using a Fortificate Formula Based on Goat's Milk in the Treatment of Atopic Dermatitis in Young Children

S. M. Denisova¹, T. B. Sentsova², M. Yu. Belitskaya¹, T. N. Korotkova², 1.1. Balabolkin², N. V. Yukhtina² and S. N. Vakhrameeva²

Denisova et al 2004

- **79 infants; 12-36 months of age**
 - Allergy to cow milk confirmed by serum IgE
 - Main symptoms - atopic dermatitis
 - Divided into two feeding groups:
 - 41 given goat formula
 - 38 given a milk free diet
 - Goat formula introduced over 10-14 days
 - In combination with other eczema therapies (skin ointment, anti-inflammatories or anti-histamines)
 - Infants divided into 3 groups based on their pre-treatment SCORAD index: mild, moderate and severe.

Denisova et al, 2004 Voprosy Detskoi Dermatolgi 1: 86-89

COLICO INDUCIDO POR LV

- *Estudios sofisticados (14 valorables)
- *No datos bioquímicos demostrables, ni clínicos, solo respuesta terapeutica.
- *Disfunción por IgG bovina ?, Apoptosis linfocitos ?, Aumento permeabilidad ?
Aumento sensibilidad neuroreceptores ?

Infante Pina D, Tormo Carnice R and Conde Zandueta M

Use of goat's milk in patients with cow's milk allergy

Anales de Pediatría 2003; 59, 138-142.

Ballabio C, Chessa S, Rignanese D, Gigliotti C, Pagnacco G, Terracciano L, Fiocchi A, Restani P and Caroli AM, 2011.

Goat milk allergenicity as a function of alphas-casein genetic polymorphism.

Journal of Dairy Science, 94, 998-1004.

Muñoz Martín T, de la Hoz Caballer B, Marañón Lizana F, González Mendiola R, Prieto Montaño P and Sánchez Cano M, 2004.

Selective allergy to sheep's and goat's milk proteins.

Allergologia et Immunopathologia, 32, 39-41.

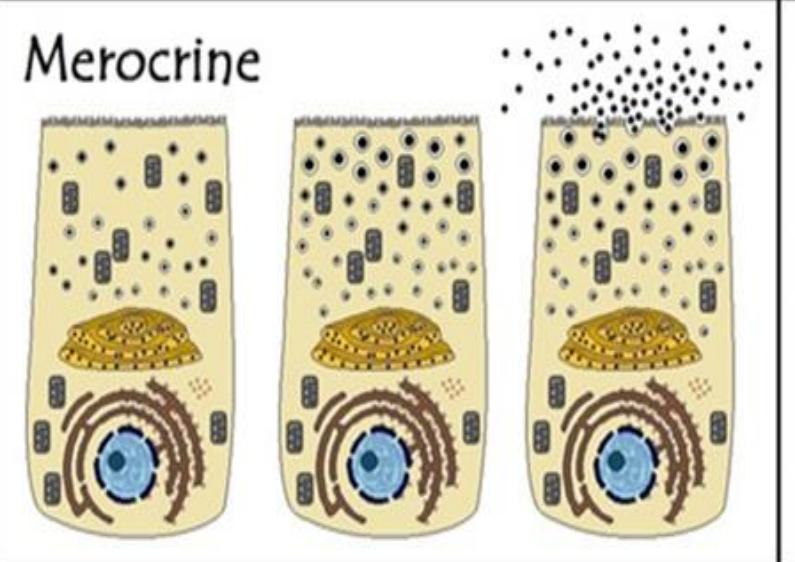
Proceso Secreción Leche



Apocrine

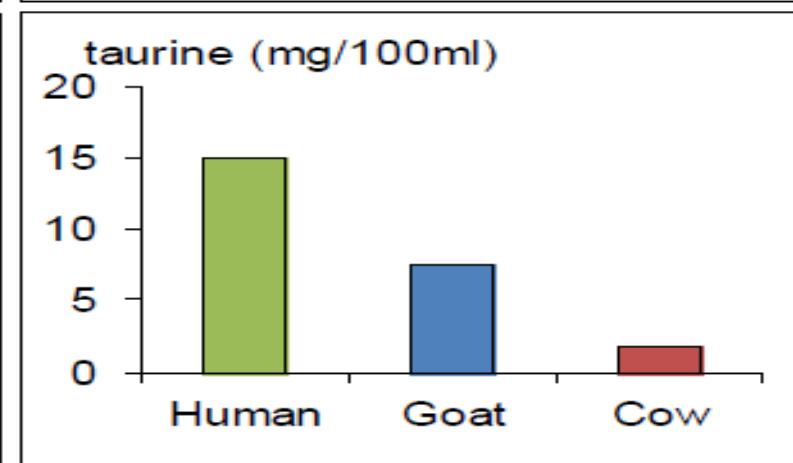
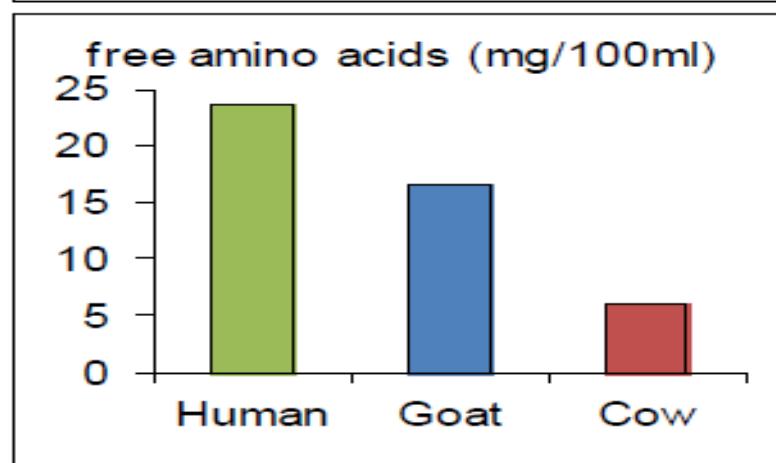
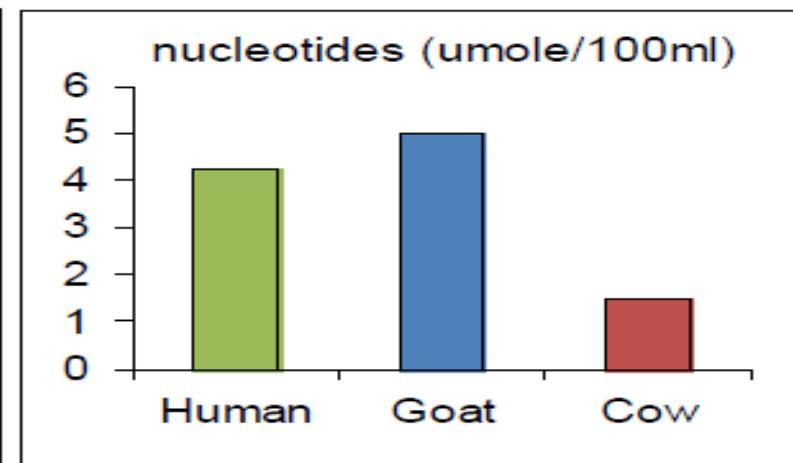
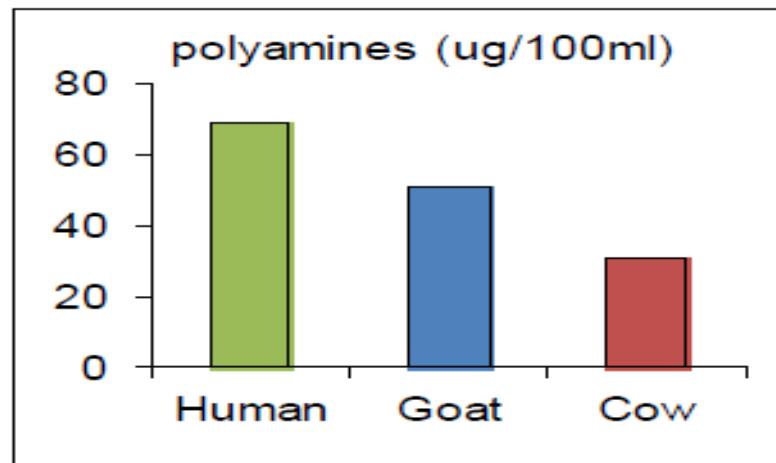


Merocrine



Bioactive components

Apocrine secretion results in higher levels of bioactives in human and goat milk



Oligosaridos en leche

Origen	Oligosacáridos (g/L)	Lactosa (g/L)
Leche caprina	0.25 - 0.30	45
Leche bovina	0.03 - 0.06	46
Leche ovina	0.02 - 0.04	48
Leche humana	0.5-0.8	68

Ferez *et al.*, (2004).

Oligosaccharide concentrations in mature goat milk from the Saanen breed from New Zealand range between 0.20 and 0.40 g/L

Accion especifica algunos Oligosacaridos

Receptores	Microorganismos
Glicoproteínas conteniendo manosa	Escherichia coli (tipo 1 Fimbriae)
Oligosacáridos fucosilados	E.coli (enterotoxina termorresistente)
Tetra y pentasacáridos fucosilados	E. coli
Sialil α (2-3) lactosa y glicoproteínas	E. coli (S-fimbriae)
Sialil (α 2-3) galactósidos y mucinas	E. coli (S-fimbriae)
Oligosacáridos neutros	Streptococcus pneumoniae
Fuc (α 1-2) Gal epítopos	Candida albicans
Gal β (1-4) GlcNAc o Gal β (1-3) GlcNAc	Pseudomona aeruginosa
Sialil-lactosa	Campylobacter pylori
Sialil-lactosa	Streptococcus sanguis
Sialil-lactosa y glicoproteínas	Campylobacter pylori
Glicoproteínas sialiladas (α 2-3)	Mycoplasma pneumoniae
Poli-N-acettillactosaminas	Mycoplasma pneumoniae
α (2-3) poly-N-acettillactosaminoglicanos	Streptococcus suis
Sialil α (2-3)lactosa	Influenza virus A
Sialil α (2-3)lactosa	Influenza virus B
9-O-Ac de NeuAc α (2-3) Rad	Influenza virus C

Microorganismos Tabla Oligosacáridos presentes en la leche humana como receptores de patógenos.

Table 2
Major oligosaccharide structures found in mature goats' milk

Structure	Elution time (min)	Concentration ^a (g L ⁻¹)
<i>Acidic oligosaccharides</i>		
6-Sialyl-lactose	19	0.05–0.07
3-Sialyl-lactose	20	0.03–0.05
Disialyl-lactose	26	0.001–0.005
<i>N</i> -glycolylneuraminyllactose	29	0.04–0.06
Sialyl-lacto- <i>N</i> -hexaose	s.n.a. ^b	Trace
Sialyl- <i>N</i> -glycolylneuraminyllactose	s.n.a.	Trace
Sialyl-hexosyl-lactose	s.n.a.	Trace
<i>N</i> -glycolylneuraminyllhexosyl-lactose	s.n.a.	Trace
Sialyl- <i>N</i> -glycolylneuraminyllhexosyl-lactose	s.n.a.	Trace
Disialyl-hexosyl-lactose	s.n.a.	Trace
Di- <i>N</i> -glycolylneuraminyllactose	s.n.a.	Trace
Sialyl-dihexosyl-lactose	s.n.a.	Trace
Di- <i>N</i> -glycolylneuraminyllhexosyl-lactose	s.n.a.	Trace
<i>Neutral oligosaccharides</i>		
3-Galactosyl-lactose	13	0.03–0.05
Lacto- <i>N</i> -hexaose	14	0.001–0.005
<i>N</i> -acetylglucosaminyl-lactose	15	0.02–0.04
<i>N</i> -acetylglucosaminyl-lacto- <i>N</i> -hexaose	s.n.a.	Trace
Di- <i>N</i> -acetylglucosaminyl-lactose	s.n.a.	Trace
<i>N</i> -acetylglucosaminyl-hexosyl-lactose	s.n.a.	Trace
<i>N</i> -acetylglucosaminyl-dihexosyl-lactose	s.n.a.	Trace

BIBLIOGRAFIA

Goats' milk as a natural source of lactose-derived oligosaccharides: isolation by membrane technology. International Dairy Journal 2006;16, 173–181.

Comparison of milk oligosaccharides between goats with and without the genetic ability to synthesize Alfa-s1-casein. Small Ruminant Research. 2013; 113: 411–420.

Oligosaccharides in goat milk: Structure, health effects and isolation. Cell. Mol. Biol. 2013;59: 25-30.

Goat milk oligosaccharides are anti-inflammatory in rats with haptene-induced colitis. J. Nutr. 2006;136: 672-676.

Oligosaccharides isolated from goat milk reduce intestinal inflammation in a rat model of dextran sodium sulfate-induced colitis. Clin. Nutr. 2006; 25: 477-488. 7

Comparison of the composition of the stool microbiotas of infants fed goat milk formula, cow milk-based formula or breast milk. Appl. Environ. Microbiol. 2013; 79:3040

RESUMEN DE POSICIONAMIENTO

Prioridad de la familia

**Estreñimiento
RGE**

**Mas natural en sus componentes naturales
apocrinos.
Oligosacaridos**

**NUNCA INDICALO EN ALERGIA/ INTOLERANCIA
PROTEINAS DE LECHE DE VACA**