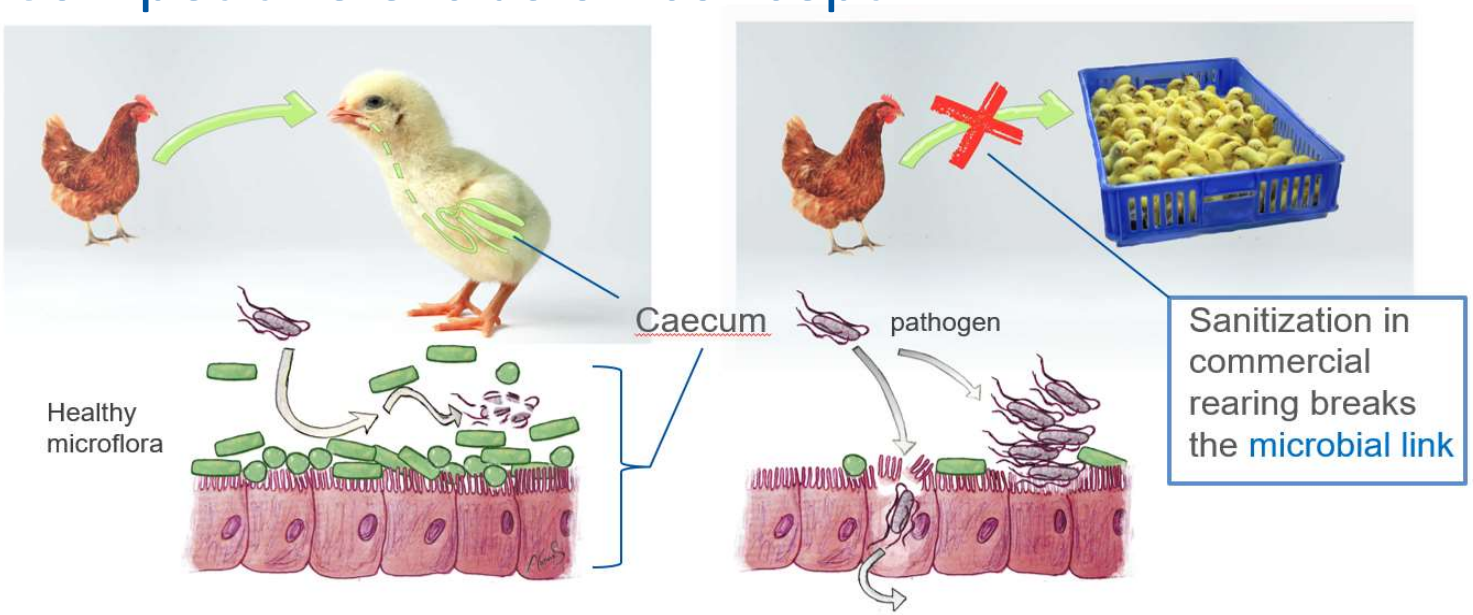
Competitive Exclusion Concept Broilact®

21.1.2025

Orion Corporation

Competitive exclusion concept



- Competitive exclusion (CE) is the natural mechanism by which the normal intestinal bacterial flora prevents the colonisation of the intestine by enteropathogens
- The mother hen plays a key role in providing healthy intestinal bacteria to newly hatched chicks

- In a hatchery, newly hatched chicks have no access to the mother's healthy intestinal bacteria
- Without a protective microflora, pathogens can easily colonise newly hatched chicks, making them reservoirs for human pathogens

History: Nurmi concept Competitive exclusion 1973

- It was known that Salmonellae can colonise the intestine of newly hatched chicks very easily, while older/adult birds have some degree of natural resistance to Salmonella colonisation.
- Finnish Professor Esko Nurmi was able to show that *Salmonella* colonisation of newly hatched chicks could be prevented by oral administration of the intestinal flora from an adult hen with a set of Salmonella challenge trials (Nurmi and Rantala, 1973).

(*Reprinted from Nature, Vol. 241, No. 5386, pp. 210–211, January 19, 1973*)

New Aspects of *Salmonella* Infection in Broiler Production

POULTRY are a considerable reservoir of salmonellae and a common source of infection in human *Salmonella* epidemics[1]. In 1971 a severe outbreak of *Salmonella infantis* infection occurred among Finnish broiler flocks, and 277 human cases[2] were diagnosed as caused by the same serotype. The broiler industry suffered serious losses through confiscation of broiler meat and elimination of infected birds.

As broiler production is carried out under abnormally hygienic conditions we suspected that the prevalence of *Salmonella* infection in broilers as compared to layer hens was caused by a hampered development of the intestinal flora, which normally participates in defence against pathogenic bacteria.

History: Competitive exclusion adopted to control Salmonella

- The competitive exclusion concept was adopted to control *Salmonella* in some poultry facilities in Finland as early as 1976 (Hirn et al., 1992) and in Sweden from 1981 as part of the official Swedish national salmonella control program (Wierup et al., 1992).

- In 1987, the first competitive exclusion product (Broilact®) entered the market. The product has most likely played a significant role in controlling *Salmonella* in both Finland and Sweden during the late '80s and the '90s.

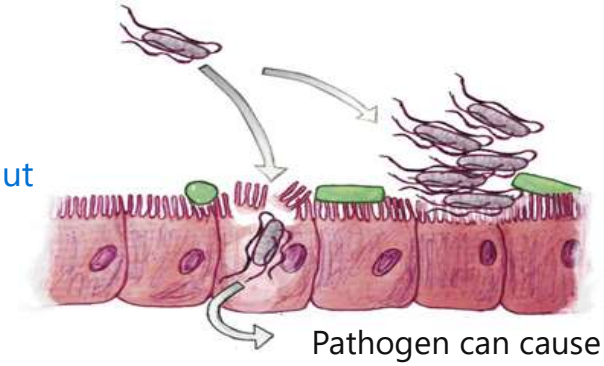
5.12.3. Salmonella in animals

Salmonella infections do not usually show clinical signs in the animals. To protect themselves against Salmonella infections, the majority of broiler farms in Finland are using voluntary CE (competitive exclusion) treatment. The treatment aims to prevent the attachment of the Salmonella bacteria to the intestines of chicks and to increase their resistance. In Finland, the method has been applied successfully to combat Salmonella in poultry since the 1970s.

EVIRA & Finnish National Institute For Health and Welfare 2012: **Zoonoses in Finland in 2000-2010**

The right bacterial flora in poultry is important for human health and wellbeing

Unhealthy gut



Pathogen can cause diseases
Increases stress and mortality

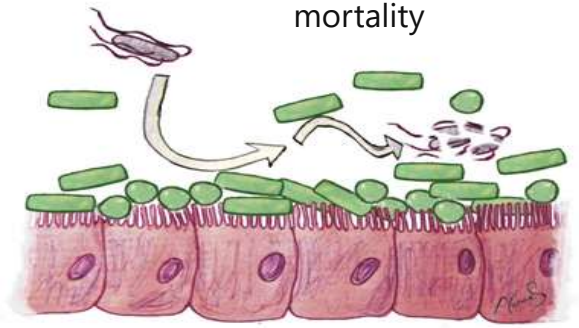
Host becomes a reservoir for pathogens and antibiotic-resistant strains

Antibiotics used to deal with poultry health problems

More antibiotic resistance

Threat to human health

Healthy gut



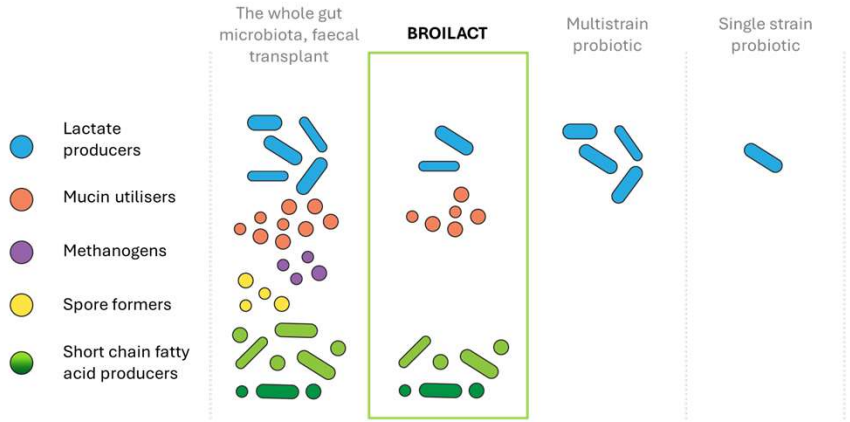
A healthy gut microflora naturally excludes pathogens

Antibiotics are seldom needed, antibiotic free production possible

Broilact®

Composition

- Broilact® is a refined mixture of gut microbiota that has been cultured directly from a healthy adult hen and it contains dozens of bacterial strains



Production

- The mixed bacterial culture is fermented and freeze-dried
- The manufacturing process has been standardized
- Each batch needs to comply to set specifications and is tested to be free from pathogens

Broilact®

Main uses

- Establishment and development of a natural microflora in the intestine of newly hatched chicks → natural defence (competitive exclusion) against salmonella
- Administered once by spraying to one day old chicks in the hatchery

Efficacy

- Standardized salmonella challenge test has been used to develop and follow the efficacy of the product
- Several peer reviewed publications demonstrate the benefits of Broilact® e.g.:
  - Efficacy against *Salmonella* in broiler chicks in laboratory trials (Schneitz, 1992; Cameron and Carter, 1992) and field studies (Palmu and Camelin, 1997; Bolder et al., 1995)
  - Efficacy against *Salmonella* in turkeys (Schneitz and Nuotio, 1992) and pheasants (Schneitz and Renney, 2003)

Regulatory status in EU

- Broilact® is not registered in EU as a feed additive as it has not been categorised

Finnish poultry industry view for competitive exclusion (CE) products / Broilact®

- Broilact® has been widely used in Finland for over 35 years, and it has been shown to be safe and effective product in poultry farms
  - *The practical experience of the use of the competitive exclusion product Broilact® over close to four decades in Finnish broiler production has not shown any negative impact on antibiotic resistance, zoonosis or disease situation. (ref: Eija Kaukonen DVM, PhD, Specialist in Production Animal Medicine)*
  - Due to the good Salmonella situation in Finnish broiler production, domestic broiler meat is not considered to be an important source of human salmonellosis cases in Finland
- Positive effects associated with competitive exclusion / Broilact® use in the industry:
  - **Early Application**: CE products, such as Broilact®, are administered to chicks shortly after hatching. This helps to establish a healthy gut microbiota early on.
  - **Effectiveness:** Multiple studies have shown that CE can significantly reduce Salmonella colonization in poultry, leading to lower infection rates and improved overall health
  - **Long-Term Benefits:** Finland's long-term experience with CE has contributed to maintaining low Salmonella prevalence in poultry, supporting the overall success of the national control program

Broilact® global industry reach

- Competitive exclusion and Broilact® is currently gaining importance in several international markets as a solution for reducing or eliminating the use of antibiotics in poultry production
- Broilact® is specifically targeted for industrial poultry production, and is used today by the industry in grandparent, parent and production broilers
- Broilact® main markets globally are in:
  - Europe
  - Latin America
  - Middle-East