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# On the Historical Background of Bovine Colostrum

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Bovine colostrum, also known as "first milk" or the "first food", is produced by healthy mammary glands until the first 72-h *post-partum*, after which acquires the typical physicochemical, microbiological, nutritional and rheological characteristics of milk. The colostrum is composed by unique bioactive compounds, which are divided into two main classes: immunological and growth factors.

The use of colostrum to treat illnesses and to contribute to the well-being dates from thousands of years ago. In India, the physicians of *Ayurvedic* prescribed colostrum throughout thousands of years and nowadays colostrum stills very often the first medicine used by many families. In addition, the Indian spirituals leaders Rishis already registered the benefits of colostrum for humans since the time cows were domesticated [1,2]. Furthermore, in Scandinavia a dessert made of colostrum and honey was confectioned during hundreds of years to celebrate the birth of healthful newborn calves [2].

In 1799, *Hufeland* [3] found out – based on rational analysis for the first time – a straight relationship between the fast and healthful growth of calves and the bovine colostrum consumption. Since then much research has been dedicated to colostrum, although this period was followed by stagnation of the research efforts as a direct consequence of the advents of sulfhydryl drugs and antibiotics such as the penicillin. At the end of XVIII and beginning of XIX century, scientists undertook more attention to the colostrum through comprehensive studies of this complex matrix and establishing its benefits towards the survival, growth and development of newborns. In such a period, scientists recognized the high levels of antibodies present in colostrum formulation, when compared with the remaining milks [4]. In 1920, *Spolverini* claimed the use of colostrum in children feeding as a means to protect them against infectious illnesses [1,5].

In 1950, *Albert Sabin* - the "father" of poliomyelitis (also called polio or infantile paralysis) vaccine for some discovered that colostrum contained antibodies against the poliomyelitis and recommended its use in children susceptible to contract this illness; moreover, in 1955 emerged a therapy for rheumatic arthritis based on "immune milk" or colostrum [1,5]. In 1963, *Campbell and Peterson* developed a pioneering program where cows were immunized with a mixture of pathogenic organisms, prior to the calf born, and the colostrum collected from these animals was assigned for immune colostrum or hyper-immunized colostrum [1,6].

The prophylactic and therapeutically use of immune milk presented satisfactory success in the prevention and treatment of bacterial infections produced by *Escherichia coli* strains, in gastroenteritis treatments in children originated by rotavirus, in the treatment of cryptoccidiosis (or cryptococcal disease, a disease caused by one of two species of fungi belonging to the genus of *Cryptococcus*) and diarrhoea in patients with acquired immune deficiency syndrome (AIDS) and other immunological illnesses, and in the prevention of dental caries, among many other examples. In all these cases, colostrum was collected from cows previously hyper-immunized with specific pathogens [1,5,7,8]. Clinical studies undertaken by *David Tyrell*, in 1980, revealed that a high percentage of antibodies and immunoglobulins (Ig) in the composition of colostrum were not absorbed by the organism but remains instead in the intestinal tract, where the immune factors have a key role to keep a healthy intestinal microflora [2].

Lately, in 1992, *Kummer* was the first researcher demonstrating that colostrum of immunized cows did not prevent gastrointestinal illnesses in children, whereas, in 1998, *McCConnel* and its co-workers demonstrated the possibility to produce colostrum of non-hyper-immunized cows with higher levels of antibodies than of hyper-immunized ones [1,5].

Thanks to the biotechnological advances obtained in the last decades, it has been demonstrated that the immunological and growth factors present in colostrum composition are transferable along all the food chain between mammal species and are not species-specific. This important finding regarding the possibility to use bovine colostrum by other species (including the human-beings) resulted largely in its reintroduction in the commercial market as food supplements, natural additives and nutraceuticals and other convenient, nutritious, stable, natural and healthy products. Hence, a major opportunity to expand the renewed market niche of colostrum emerged rapidly. It is likely that this path of growth and expansion will remain based on the diversity of innovative solutions and biotechnological findings that emerges around colostrum and similar natural products, in addition to the increasing demand by the new consumers for more natural and healthy foods and their awareness concerning the relationship between food, lifestyle and health [9,10,11].

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