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International Dairy Meet

A next generation delivery system of bioactive nutrients to dairy cattle for the production and optimization of new, value added, medicinal, milk products

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This project takes aim at developing a novel and natural nutrient delivery system that incorporates an active ingredient (holy basil, HB) into molecular gels. These gels, or emulsions, are fed to dairy cows alongside their regular diets, and are efficiently transferred to the mammary gland, while resisting degradation during digestion. Gel creation is preformed via emulsification of a stable wax polymer and a sodium alginate (NaAlg) solution, followed by a two-tier gelation process initiated by calcium salts. The wax complex makes up 25% of the gel and is comprised of rice bran wax (2% w/v) and canola oil. It was selected based on its stability (<10% degradation) during 48 hr artificial rumen incubation. The NaAlg solution (75% of the gel) is added to the wax solution to be homogenized and emulsified, creating a low viscosity emulsification. A 9:1 solution (CaCO3:CaCl2) is then added to our emulsification at the same time as the HB. The calcium salts induce encapsulation of the HB through immediate and long-term gelation. The insoluble calcium (CaCl2) activates instantaneously, causing rapid gelation, while the insoluble calcium (CaCO3)—activated by a drop in pH—is triggered once the gel reaches the cow's acidic digestive system. The CaCO3 activation creates sustained gelation; this helps ensure the encapsulated HB survives rumination while on its way to the mammary gland for deposition. This target-specific delivery system will enhance the functional food properties of milk and can be applied to attain marketable, medicinal milk products, unique to the industry in their therapeutic qualities.

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Development of new functional dairy products from goats' milk: Prospects and challenges

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The goat market in Brazil is under development, and has shown in recent years, high growth, especially in the Northeast and Southeast. Currently, Brazil produces an average of 35 million liters of goat milk a year, only 26 million of these are industrialized. The importance of goat milk as a functional food is due to its high digestibility, hypoallergenicity and nutritional value, as well as its therapeutic and dietary characteristics, which is recognized in the nutrition of children and the elderly. However, this type of product has not achieved sufficient production volumes, both for lack of raw material, as the lack of efficient structure of industrialization and marketing, besides the lack of diversity of products made with goat milk. For these reasons, the development of new dairy products from goat's milk, as fermented milks and milk drinks, is a way to benefit the agro-industrial complex of goat dairy sector. Another problem is that when compared to other dairy matrices, such as bovine and ovine, it is difficult to make goat milk yogurt with an appropriate flavor and consistency, which is mainly due to the difference in casein composition and content. Micelle structures of goat milk differ from cow milk in average diameter, hydration, and mineralization. Therefore, it is necessary to use certain technological strategies. One alternative is the addition of inulin or another type of fiber, such as that present in fruit pulp.

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