

MODULAR EQUIPMENT FOR IN VITRO DIGESTION

DESCRIPTION OF THE TECHNOLOGY

The modular equipment for in vitro digestion is an experimental equipment related to nutrition and health. This equipment is able to recreate accurately the mechanical and physical-chemical conditions present in the human digestive system. This invention allows to perform bioaccessibility and bioavailability studies of ingredients and active principles, microencapsulated or not, with results closer to reality than the traditional static experiments or with animal testing, since it can recreate the peristaltic movements, the dynamic pH variations, enzyme segregation, etc. in a similar way to the human digestive tract.

The equipment is composed by four units well differentiated: stomach reactor, small intestine reactor, membrane absorption system and colonic reactor. In addition to that, it has auxiliary elements such as hydraulic circuits to create the mechanical movements, pH control loops to automatically adjust the medium through the dosage of acid or base, a thermostatic bath to adjust the water to the temperature of the human body and a programmed controller allowing complete computerization and adjustment of all variables of the digestive process.

MARKET APPLICATION SECTORS

-) Food
-) Feed (monogastric animals)
-) Pharma
-) Nutricosmetics

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The nutritional quality of food, as well as the efficacy of complements and pharmaceutical products, depends largely on the absorption availability. Currently, the studies of bioavailability of nutrients are frequently addressed through animal testing, since the clinical trials with humans are complicated due to the high cost and time required, tedious preparation and follow-up, possibility of ethical issues, and results that are difficult to compare due to the significant differences among the participant individuals. The studies with animals are simpler, however, they do not provide sufficient representativity due to the important differences existing in the digestion and absorption in humans and animals. On the other hand, traditional in vitro studies do not allow to reproduce the continuous physical-chemical changes, either the simulation of the movements of the human digestive system. The modular equipment for in vitro digestion provides a solution to the abovementioned issues:

-) It simulates accurately the complex and changing conditions, mechanical and physical-chemical, occurring during the digestive phase of foods.
-) It avoids the problems associated to in vivo studies.
-) It allows the adjustment of the variables of the digestive process in order to reproduce different digestive states of the individual (age of the individual).

CURRENT STATE OF DEVELOPMENT

TRL9: system proven in operational environment. The equipment is working and it is used in studies of bioaccessibility and bioavailability of nutrients, functional ingredients or active principles, with or without previous microencapsulation.

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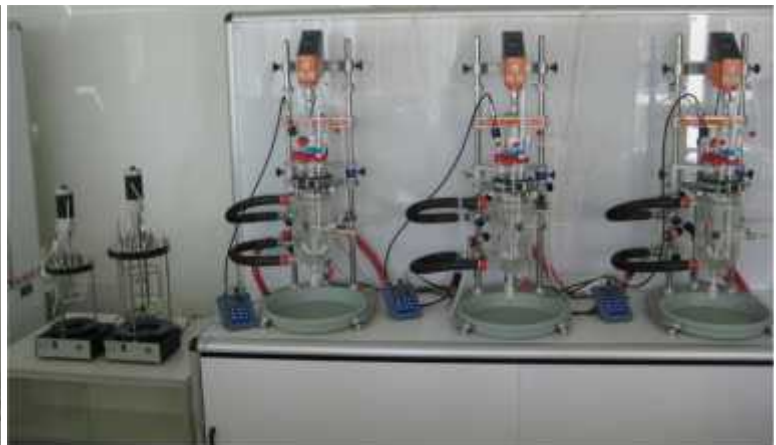
INTELLECTUAL PROPERTY RIGHTS

Patent No. ES2361983B1: “Equipo modular de digestión in vitro”. Concession date 19/04/2012.

COLABORATION SOUGHT

Companies interested in using the equipment for their studies of bioaccessibility and bioavailability of ingredients, nutrients or active principles, as a screening before clinical trials, in the framework of the development of new products.

RELATED IMAGES



CONTACT DATA

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