

# Num. 8-2017 | Abstract English Version

## **REDUCTION OF THE ENVIRONMENTAL IMPACT OF MILK INDUSTRY ORGANIC WASTE BY MEANS OF VALORIZATION OF WHEY**

Thirty one percent of milk production in Ecuador is used to make cheese (Villegas, 2013).

Of the raw milk used for cheese, between 80-90% is whey, a residual product of the milk industry which has various nutritional characteristics, retaining an



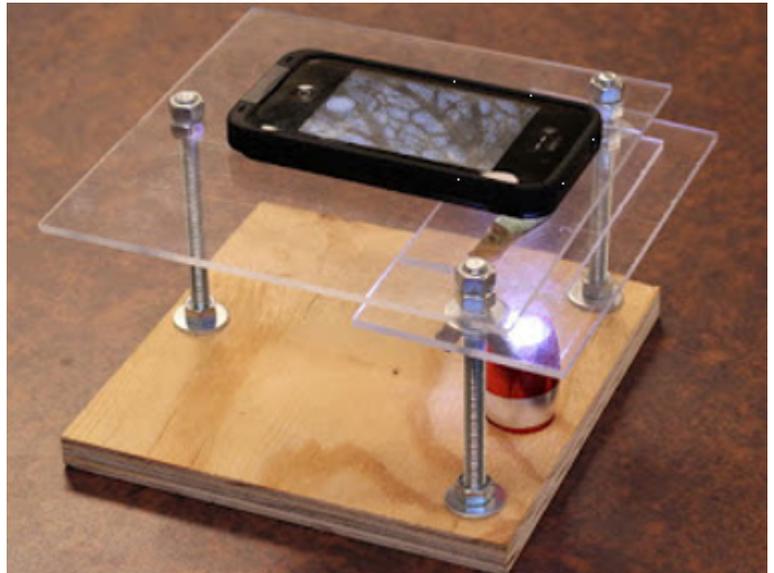
estimated 50-55% of all the nutrients of raw milk. In addition, whey has a high organic load, reaching almost 35 kg of biochemical oxygen demand (BOD) per 100 liters of milk (Valencia y Ramírez, 2009). Therefore, this waste product requires pre-treatment prior to discharge to natural water bodies, thus generating high costs for the milk industry. Because of its chemical composition, whey can be used as a raw material for production of useful substances for the industry in general, such is the case for prebiotics (for example lactic acid, galacto-oligosaccharides (GOS)) and functional food products that have reported benefits for human and animal health. This work aims to determine the value of whey as a prime material in the production of lactic acid, GOS and functional fermented beverages by using kefir granules.

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### **QUÁNTIKA: A POCKET PHYSICS LABORATORY**

The Quntica enterprise is described, whose objective is to

improve the quality of education in developing countries, by means of technical tools based on mobile units to teach physics. Android applications are used to collect and process data from sensors which are found in intelligent cell phones and tablets for physics lab experiments, including the design of experiences that can be done both inside and outside traditional laboratories.



This enterprise originated as a winner of competitions and scientific talent organized by MCPEC and SENESCYT, as a result of which it received start-up support and was the subject of market, feasibility, social impact, innovation, and sustainability studies.

The advantage that students can do experiments with their own phones, allows them to confront their knowledge themselves, with the results of their measurements and to learn physics through observation of their daily environment, while allowing implementation of low-cost laboratories, in educational centers with large numbers of student or low budgets. The device itself facilitates communication between students, facilitating the exchange of files and images, and other information.

The preliminary results show that the use of mobile devices increases student interest in physics, facilitates conceptual comprehension, increases independent work, and favors the exchange of results.

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## **“EDUPRODUCTIVE” UNITS: THE AGROINDUSTRIAL ENGINEERING DEPARTMENT MODERNIZES**

Technology is developing faster than ever, releasing a series of innovations and advances that have surprised the world.

The use of the internet, a basic tool for application of technology, has made service to humanity possible in a thousand ways, reducing investment costs and time and guaranteeing the effective use of any product offered by the market. To speak



of technology is to refer to development, transformation, and globalization. Applying technology in production systems guarantees semi-elaborate products that are pathogen-free, offering consumers products that guarantee care and protection of health, and integrated development; these must be products that are appropriate for consumption, with an added value that is easy as well as economical to access. This is what the “eduproductive” units of the department of agro industrial engineering of the Universidad Técnica del Norte are developing. ¿Who doesn't want to have a safe place where one can obtain their basic food products such as cheese, yogurt, “biscochos”, jams, and “dulce de leche”, with no preservatives which threaten people's health?

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