Title: **Development and design of a plant for carbonated beverages manufacture**

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The carbonated beverage industry has been innovating the design of new beverages, new flavours and the search for new markets such as functional beverages. Today, carbonated beverages are available almost everywhere; not only in shops and supermarkets, but also in cinemas, sports centres, etc. Carbonated beverages are in a market that is widely accepted by consumers.

The objective of this work is to develop carbonated beverages with functional characteristics and to design the production plant for these beverages.

In order to achieve this objective, a search was carried out for information on the carbonated beverages that exist in the current market. Functional carbonated beverages practically only exist the energizers, it is what is closer to the conception of my product, therefore, there is the possibility of a local market for carbonated beverages with other functional characteristics. After an investigation, it was found the existence of concentrated juices with functional properties (detox, antioxidant and relaxant). The conclusion was reached that carbonated beverages should be made from these types of concentrates, since people choose healthy beverages. The production of carbonated beverages has to take into account the different quality factors and ingredients required for these beverages.

When designing the carbonated beverage plant, the different stages of the process have to be taken into account: water treatment by reverse osmosis, preparation of a sucrose solution, mixing of ingredients and carbonation.

Once these processes have been defined, using the Aspen Batch Developer tool, a program that allows different scales to be carried out: laboratory recipe, pilot plant and generic plant. In this case, a generic plant was used directly, in which the necessary equipment was selected for each stage of the different processes. The equipment needed by this plant are: reactors, osmosis membrane, storage tanks and auxiliary equipment (pumps). Aspen also helps to determine the timing of operations. Some of these times are due to defects, the times that are considered reasonable are maintained and the others have been decided how long it would take.

The production capacity of this plant will depend on the way of working it operates. You can operate in shifts: 1 shift (8 hours), 2 shifts (16 hours) or 3 shifts (24 hours) and 5 days or 7 days a week. Whenever the plant is stopped for more than 8 hours, an equipment cleaning must be programmed.

Keywords: Carbonated beverages, product development, plant design, scheduling