PRODUCTION OF CRAFT BEERS USING TRADITIONAL MEXICAN INGREDIENTS

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Introduction. Craft beers have been in the market for several years as a response to the consumers demand for a wider variety of products. They are either home- made or produced in micro or nano breweries. In Mexico, as in other places, the use of local traditional ingredients is one of the trending forces in the development of these beverages. Even if these beers represent a small segment of the market, the annual production reaches 1.8 million liters (1). At the Chemistry Faculty, UNAM, a didactic pilot plant has been installed and multidisciplinary research projects are being developed. In the present one, the incorporation of local pseudocereals and ingredients is pursued. The purpose of these additions is the generation of a diversity of texture and flavors, the use of local raw materials and the modification of the nutritional value of the final product.

The present work is divided in two sections. In the first one, the impact of the addition of *Amaranthus hypocondriacus* as an adjunct on the ethanol content of the final product is analyzed, based on its known composition (2), while in the second one, the addition of Mexican honey as a flavoring agent is evaluated.

Methods. The development of the product requires the setting of the operation conditions, such as temperature, extraction time, saccharification, filtration and brewing times, based on the traditional beer making process (3)The raw materials must comply with sanitary regulations and be organoleptically acceptable.

Results.

Table 1. Effect of different levels of amaranth addition on ethanol yield. The level of Fe is indicated.

% Amaranth	ppm Fe	% ethanol
5	11.0	4.84
10	15.8	4.27
15	17.9	6.73
20	16.3	6.68
25	66.0	5.67
30	42.7	6.86
35	49.0	4.88
40	32.7	4.95

The amount of Fe in the final product is remarked as the amounts of this mineral were higher than in traditional beers. The addition of honey was performed on a base beer prepared with malt (100%), that had reached a level of ethanol of 3.55% de etanol (v/v) at the end of the first fermentation. The different levels of honey shown on Table 2 were added and a second fermentation was ran, for 96 h.

Table 2. Effect of different levels of honey addition on ethanol yield after a second fermentation

% Honey	% ethanol (v/v)
1	6.45
2.5	8.00
5	8.98
7.5	6.79

Conclusions. The addition of amaranth as an adjunct or of honey as a flavoring ingredient yields in higher levels of ethanol in the final product. Other nutritional parameters, like the level of Fe, were improved. There is no direct relationship between the amount of adjunct or of flavoring agent and that of ethanol produced. The properties of the final products were attractive for the consumers.

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