ABSTRACT

Citric acid production by Cane juice and Molasses.

Everton W. D. Younger

Citric acid is a most important food additive to
the food industry in the Caribbean and indeed the world.
It can be produced by isolating it from fruits which
contain it naturally, or, more commonly, by fermentation
of molasses, and to a lesser extent sugar cane juice, by
strains of Aspergillus niger.

The fermentation is usually carried out by the
surface fermentation method or the submerged
fermentation method. In this project the submerged
method was used, along with various additives, in an
attempt to produce citric acid using Aspergillus niger
NRRL 1996 and Aspergillus niger NRRL 2354. This method
involved the growth of the micro-organism throughout the
body of the substrate, the aeration being provided by
small air pumps in this experiment. Batches of 250 mLs
were used in an attempt to ascertain the appropriate
conditions and then 3 litre batches were fermented using
Aspergillus niger NRRL 2354 which was reputed to be a
better citric acid producer than the NRRL 1996 strain.

Attempts were made to extract citric acid crystals
from the 3 litre batches with fair degrees of success.
The yields however, were quite low. Results obtained
indicate that citric acid can definitely be produced and
extracted from Trinidadian varieties of molasses and
cane juice. Best yields from cane juice were obtained
when vegetable oil, and methanol were added. The yield
ranged from 16.47 to 16.73% in the case of vegetable
(soya bean) oil and 18.33 to 18.67% in the case of
methanol. Molasses solutions gave best yields when
treated with 30 ppm potassium ferrocyanide. This yield
ranged from 8.47 to 8.80%.

Infrared spectroscopy showed that the citric acid
extracted was of an acceptable purity after
recrystallization.