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ORIGINAL ARTICLE **OPEN ACCESS**

To Study the Effect of Enzyme Concentration (%) on Yield (%) and Physico–Chemical Composition of Apple Juice

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ABSTRACT
An investigation was carried out to study the effect of enzyme concentration on yield of apple juice. In addition physico–chemical composition of apple juice was also studied. On comparison of characteristics of apple juice obtained by hydraulic press and enzyme treatment, yield increased from 40.6% to 86%, while pomace decreased from 59.2% to 15%. Pectin was obtained 0.86% in hydraulic press while nil in enzyme treatment juice. Effect of enzyme concentration on yield and physico – chemical composition of apple juice shows that on increasing enzyme dose from control to 0.1 pomace, yield decreased from 40% to 14%, pectin decreased from 1.55% to 0.58%, and filtered juice yield increased from 28.8% to 82.0%. Juice clarity was turbid in control sample while very good in 0.1 enzyme dose.
Keywords: Apple Juice, Enzyme process

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INTRODUCTION

Fruits and vegetables are among the most important foods of mankind as they are not only nutritive but also indispensable for the maintenance of human health. Almost all types of fruits and vegetables are produced in India due to its wide range of agro climatic conditions. The daily per capita consumption of fruits and vegetables in India is about 85g, which appears to be too low in comparison with the minimum requirement by the Expert Committee of National Institute of Nutrition.

Juice from fruits and vegetables is usually extracted using screw or hydraulic press. Use of different treatments can further increase the juice yield. The enzymatic treatment is one of the methods, which facilitates juice extraction, thereby resulting in high juice yield. The enzymatic treatment is one of the methods, which facilitates juice extraction, thereby resulting in high juice yield without losing nutrients into pomace (1).

The processing of fruits and vegetables should be oriented towards developing such a technology that should not only be feasible but should also suffice to produce economic quality products. The most common and convenient modes in which fruits are processed and preserved are juices/pulps (2).

Apple (*Malus Pumilia* or *Malus Sylvestris*) is a common fruit grown extensively over the temperate regions of Northern India. A few verities are cultivated in India in over 1200 hectares (3), of them Red Delicious is good for table purpose with of excellent quality. One of the most desirable ways of utilizing is the production of juice from the raw material. In the conventional process of manufacturing apple juice, the fruits are milled, macerated and the juice is pressed out through an inverted ram hydraulic press. This extraction of juice from the fruits does not give a clear juice. Normally, extracted raw juice is treated with enzyme for clarification. Apple contains considerable amount of pectin which is a valuable byproduct of fruit juice industry. Studies were carried out to develop an enzymatic process by which clear juice could be obtained and at the same time maximum quantity of pectin could be recovered. Red delicious variety was evaluated for its suitability for juice preparation.

Considering these facts the present investigation was carried out to study-

1) The effect of enzyme concentration (%) on yield (%) and physico –cChemical composition of apple juice:
2) The physico-chemical properties of apple juice

Materials and Methods:

Red delicious variety of apple is purchased from the local market. The fruits were washed in running tap water and pulped. The pulp was heated to 65° C for 10 minutes and cooled immediately to room temperature. Potassium Meta bi sulphite was added to the pulp (75 – 100 ppm SO2). Pectin was estimated by (4) as Calcium Pectate. Acidity was determined as Malic Acid by AOAC (5). Total soluble solids were recorded as °Brix and the pH determined by digital pH meter. Reducing sugars and moisture content by AOAC procedure. Pectinolytic enzyme concentrate (PEC) was used for juice treatment.

Fruits
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Washing
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Pulping
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Extraction
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Juice
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Filtration
|
Pasteurization
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Bottling and capping

Table : 1: Physico – Chemical Characteristics of Apple Juice:

°Brix	15
Total Sugar %	10.75
Pectin %	00.33
Acidity %	00.175
pH	4.1

	Hydraulic Press	Enzyme
% Pomace	59.2	15
% Yield	40.6	86
°Brix	15	15.4
Acidity	0.175	0.22
% Pectin	0.68	nil

Table 2: Effect of Enzyme Concentration (%) on Yield (%) and Physico – Chemical Composition of Apple Juice:

Enzyme Dose	Pomace % Yield	Pectin in Pomace	Filtered Juice Yield %	Acidity%	° Brix	pH	Clarity
Control	40	1.55	28.8	0.175	15.0	4.2	Turbid
0.02	22	0.80	72.5	0.225	15.1	4.1	Moderate
0.04	17	0.75	78.5	0.250	15.1	3.9	Good
0.06	15	0.71	79.0	0.268	15.2	3.9	Good
0.08	14	0.65	81.5	0.290	15.3	3.9	Very Good
0.10	14	0.58	82.0	0.312	15.4	3.8	Very Good

RESULTS AND DISCUSSION

On comparison of characteristics of apple juice obtained by hydraulic press and enzyme treatment, yield increased from 40.6% to 86%, while pomace decreased from 59.2% to 15%. Pectin was obtained 0.86% in hydraulic press while nil in enzyme treatment juice.

Effect of enzyme concentration on yield and physico – chemical composition of apple juice shows that on increasing enzyme dose from control to 0.1 pomace, yield decreased from 40% to 14%, pectin decreased

from 1.55% to 0.58%, and filtered juice yield increased from 28.8% to 82.0%. Juice clarity was turbid in control sample while very good in 0.1 enzyme dose.

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