European Journal of Educational and Development Psychology

Vol.4, No.2, pp.25-32, April 2016

Published by European Centre for Research Training and Development UK (www.eajournals.org)

ROSE APPLE FRUIT: IT PROSPECTS FOR JUICE AND WINE PRODUCTION

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ABSTRACT: *The following nutritional values of rose apple juice were determined such as moisture content, protein content, crude fibre, fat content, ash content, total soluble solid, titrable Acidity, vitamin C and pH. The juice has a moisture content of 95.50% which indicated that the fruit is very juicy makes it suitable for juice and production. The ash content of rose apple is 0.144% which indicates the presence of mineral component in the Rose apple which is essential for body use. The protein content of rose apple is 0.132% which indicate that the rose apple contain some level of protein in it. The fibre content is given to be 0.002% which indicates that the rose apple contains low fibre level. The fat content of the rose apple is 0.66% which indicates that the rose apple contains high level of fat. The total soluble solid of rose apple is 4.10% which is low compared to that of pineapple that is 13.3%. The Vitamin C content in rose apple is given to be 19.986mg/100g; it shows that rose apple has appreciable level of vitamin C. The pH value of rose apple is given to be 4.46 which showed that it contains some level of acid. The titretable acidity (TA) of rose apple is determined to be 0.315g/100ml. From these results, it shows that rose apple is a good source of all nutritional components and has potentials as a good raw material for both fruit juice and wine production.*

KEYWORDS: Rose Apple, Prospects, Juice, Wine, Fruit.

INTRODUCTION

Nigeria abounds with native and introduced fruits. Nigeria fruits like most tropical fruits develop their flavor when ripe and do not keep well under refrigeration. Therefore their economic potentials have never been exploited. During their season of production, a considerable percentage of the fruits are not harvested due to lack of demand and inadequate storage facilities, therefore leading to wastage. The surplus could be used for fruit wine and juice production. Many of these fruits, however, could be processed by fermentation and conversion into high valued wine and fruit juice.

Most of the common fruits being utilized for wine and juice making are cashew, pineapple, mango, orange, etc. According to Sanchez, (2009), the qualities required by fruits as a suitable raw materials in wine and juice production are medium ripe, free from soil, bruises and microbial infection. Rose apple is a kind of a fruit that can serve as a raw material in wine and fruit juice production.

The term "rose apple" (in French, *pomme rose, pommier rose*; in Spanish, *poma rosa, pomarrosa, manzana rosa,* or *manzanita de rosa*) is so widely employed that the species has few alternate names apart from those in the many local dialects of Africa, India, Malaya, southeastern Asia, the East Indies and Oceania. It is sometimes called *jambosier* by French-speaking people, plum rose or malabar plum in the English-speaking West Indies,

pommeroos or *appelroos* in Surinam, and *jambeiro* or *jambo amarelo* in Brazil; *jaman* in India, and *yambo* in the Philippines. The rose apple is native to East India and Malaysia.

Rose apple fruit is not a kind of rose; the rose apple does not at all resemble an ordinary apple it is not an apple either, but comes from the rose apple tree (that is recognized with lots of titles, with respect to the nation you're in). Rose apple fruits can also be known as the wax jambu, water apple and also bell fruit. Rose apple fruits usually are bell- or pear-shaped. Unripe rose apples have a bright green color. If ripe, the skin is rose-pink and waxy. The fruit is crispy, has a wooly texture and tastes like an apple. Rose apple fruits are extremely sensitive fruits. They bruise effortlessly, and deterioration sets in immediate, so there is need for it to be process into juice and refrigerated, hence, maintain its quality. Much like an apple however, the skin of the rose apple fruit is consumed together with its crispy flesh. (MakG , 2013)

The Rose Apple tree is an average size tree that is one of the plant families Myrtaceae. The lanceolate foliage is 12.5-20 cm. long having a short petiole or even stalk. The tree is readily identified by its very good looking flowers that are about 7.5-10 cm. in diameter. The flowers are situated on short terminal racemose inflorescences and they're organized in pairs. The delicious, tasty and also somewhat mushy fruits are bell-shaped, mild green, white, pink, or even red in color and also consist of 1 or 2 grey seeds. The fruits are simply palatable with a moderate sweet taste.

Rose apples as a potential raw material for juice and wine production

Commercial production of juice and wine is possible from any of these locally available fruits. The fact that some of the shrubs and trees have found their way into agroforestry systems will make the fruit readily available for juice and wine production,(Ngwira 1996). There is great potential in Nigeria for commercial production of country wine. So far, the wine has advertised itself.

Rose apple fruit can be process into these two major products namely: rose apple juice and rose apple wine. Winemaking can be divided into four basic phases. The first phase consists of finding a source of high quality fruit and which is in an optimum condition. The second phase consists of fermenting the grapes into wine. Winemakers manage the fermentation by controlling several different fermentation parameters such as temperature, skin contact time, pressing technique, etc.

During the third phase, the new wine is clarified and stabilized. Winemakers clarify wine by fining, racking and filtration. Wine is stabilized by removing excessive protein and potassium hydrogen tartrate (potassium bi-tartrate). These materials must be removed to prevent them from precipitating out of the wine later. In the fourth phase of winemaking, the winemaker ages the wine. Most high quality wines are aged in bulk and then for an additional time in the bottle. Winemakers have an active role throughout the lengthy bulk aging process. Wines are smelled, tasted and measured every few weeks, and any needed adjustments are made promptly. (Eisenman, 1998)

The liquid to flesh ratio of the wax apple is comparable to a watermelon. It's remarkably refreshing and juicy which makes it an ideal fruit in the production of juice and wine. Rose apples are low in calories and rich in antioxidants. In India, the fruit is regarded as a tonic for the brain and liver. The rose apple is utilized as food and also as medication.

The main objective of this paper is to make known the economic importance of the rose apple fruits as a potential raw material for juice and wine production.

Processing of Rose Apple Fruit

The African continent has many indigenous shrubs and trees, fruit-bearing varieties among them. A number of these fruit shrubs and trees, mostly the exotic ones, have been domesticated, and some are grown under agroforestry farming systems. The fruits produced by many of the indigenous shrubs and trees are edible. They grow and ripen within a very short period of the year, which leads to an overabundance of the fruit at that time, when the supply usually exceeds the demand. This situation is aggravated by the lack of storage facilities for fresh fruit or of fruit-processing facilities. In addition, some of the fruits, although edible, are not very palatable, contributing to their underutilization.

Producing wine from these indigenous fruits is one way to utilize the excess fruit or to improve its palatability. Wine has been made from the fruit of palms (Herzog et al. 1995), sour cherry (Vondracek et al. 1981), *Rosa roxburghii* (Liu-Jiunian 1982), cashew apple (Rao 1985) and bamboo (Mgheni 1983), among many indigenous others. The most common commercial wine is traditionally made from grapes.

According to Adeniyi, et.al (2010) conversion of fruits into juice was originally developed as a method for making use of supplies surplus to the fresh fruits market, but while it still fulfills this function. Juice production is now firmly established in its own right. A fresh juice may be defined as the liquid expressed by pressure or mechanical means from the edible portion of the fruit. This fruit juice can then be converted to wine through the process of fermentation. However, fermentation in juice was due to the oxidation of organic compound present in the juice by bacteria and fungi. Fig. 1 shows the flowchart for processing fruits into juice while fig.2 shows the flowchart for processing of fruit into fruit wine.

Processing of Rose Apple fruit into Juice

In the processing of the fruit into juice, the freshly harvested rose apples were rinsed in clean water, cut into pieces for blending. The rose apple juice was extracted from the blended rose apple fruits using sieve, the flow chart is shown in fig 3. Additives can be added to the juice and then packaged for storage.

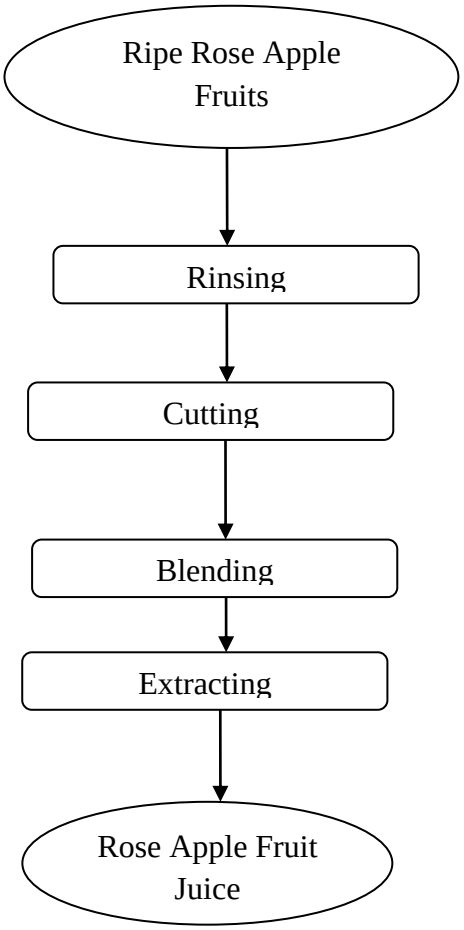

Fig 3: flow chart for the Processing of Rose Apple Fruits into juice

Table 1: Proximate Composition of Rose Apple Juice

Sample	Moisture Content %	Protein Content %	Ash Content %	Fibre Content %	Fat Content %	Total soluble solid %	pH	Titretable Acidity g/100ml	Vitamin C. mg/100g
Rose Apple	95.90	0.132	0.144	0.002	0.66	4.10	4.46	0.315	19.986

Nutritional Value of Rose Apple Juice

The proximate analysis was carried out on the rose apple juice using the A.O.A.C 2000 method. The nutritional values that were determined are moisture content, protein content, crude fibre, fat content, ash content, total soluble solid, titrable Acidity, vitamin c, pH.

The result of the proximate analysis obtained is shown in table 1. The juice has a moisture content of 95.50%mc (wb) which indicated that the fruit is very juicy, this is because of its high moisture content which compare favourably with that of watermelon of 94.6%. Moisture content of a food sample is the total water component of the food sample. It is used to determine the quality of food sample (Inuwa et al, 2011).

The Ash content of a biological material is the organic residue that remains after organic matter has been burnt. The ash content of rose apple is 0.144% which indicates the presence of mineral component in the Rose apple just like other fruits such as pineapple that has ash content of 0.018% Hemalatha and Anbuselvi (2013), while that of water melon has 0.5% ash content Inuwa, et al (2011). The protein content of rose apple is 0.132% which indicate that the rose apple contain some level of protein in it as Orange has 0.08% and mango has 0.17% Tasnim, et.al (2010). The fibre content is given to be 0.002% which indicates that the rose apple contains low fibre level compared to water melon 0.3% Inuwa, et al (2011) . The fat content of the rose apple is 0.66% which indicates that the rose apple contains high level of fat compared to water melon that has 0.15% Inuwa, et al (2011) and pineapple that has 0.4% Asare-Bediako et al (2007). The total soluble solid of rose apple is 4.10% which is low compared to that of pineapple that is 13.3% according to Hemalatha and Anbuselvi (2013). The Vitamin C content in rose apple is given to be 19.986mg/100g , it shows that rose apple has appreciable level of vitamin C compared to lemon has 53 milligrams of vitamin C per 100 grams and lime has 29 milligrams which are considered to have high level of vitamin C (Appleby , 20013). The titretable acidity (TA) of rose apple is determined to be 0.315g/100ml which is comparable with that of apple juice that falls between 0.36-0.80g/100ml. This shows that malic acid is predominant in the rose apple juice. The pH value of rose apple is given to be 4.46 which showed that it contains some level of acid though lower than that of pineapple which is 3.7(Asare-Bediako et al, 2007). According to McCarthy, (2013), pH 3.56 and above precipitates Potassium hydrogen tartrate (KHT) causing Titretable Acidity (TA) to decrease and pH to rise. It was shown that the pH of juice can be very different at similar levels of TA depending on the amounts and proportions of tartaric acid, potassium bitartrate, di-potassium tartrate & malic acid Present.

Malic acid is weaker than tartaric acid, so wines unusually high in malic acid can have a high TA and a high pH value. Malic acid is prevalent in many types of fruit. This acid is responsible for the tart taste of green apples. Malic acid is one of the biologically fragile wine acids, and it is easily metabolized by several different types of wine bacteria (Eisenman, 1998). The tart taste of dry table wine is produced by the total quantity and the kinds of acids present. Tartaric and malic are the major wine acids. Tartaric acid is responsible for much of the tart taste of wine, and it contributes to both the biological stability and the longevity of wine. Malic acid is prevalent in many types of fruit. This acid is responsible for the tart taste of green apples.

Malic acid is one of the biologically fragile wine acids, and it is easily metabolized by several different types of wine bacteria (Eisenman, 1998).

The malic acid is high in rose apple juice which is not biologically stable and can cause formation of Malolactic fermentation after the wine has been bottled for this reason rose apple juice might not be suitable for home make wine production except for large scale production of wine where a sterile filter must be used to remove all bacteria from the wine before bottling or small quantity of fumaric acid can be added to make the wine stable.

CONCLUSION AND RECOMMENDATION

Rose apple has a lot of potentials which has been observed in the nutritional qualities; from the results obtained it shows that it is a good source of all nutritional components. Also it can be used as a good raw material for both fruit juice and wine production on a commercial purpose. The wine that will be made from rose apple would be for industrial purpose because of high presence of malic acid that requires a sterile filter to remove all bacteria from the wine before bottling or small quantity of fumaric acid can be added to make the wine biologically stable.

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APPENDIX

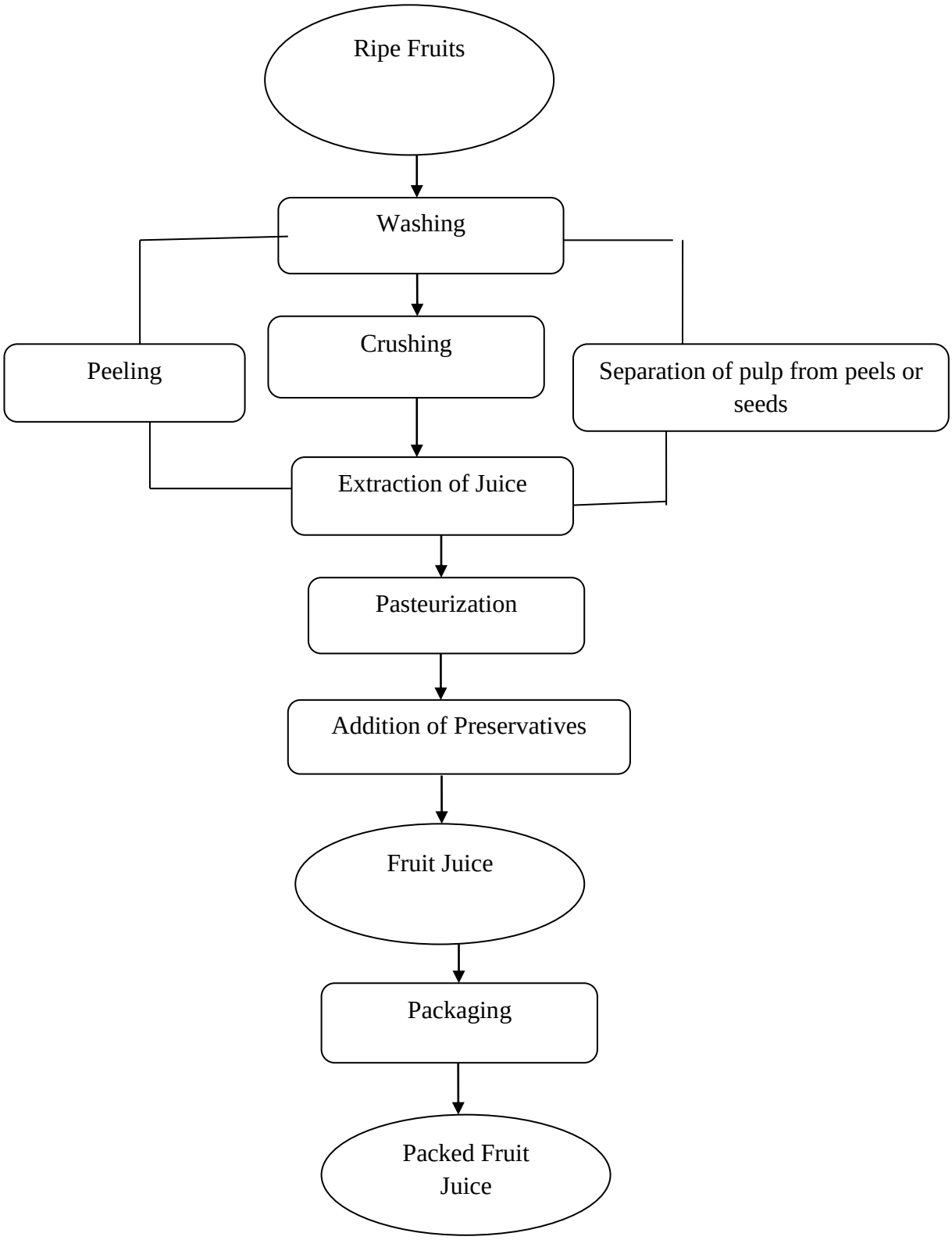

Figure 1: General Flowchart for Processing Fruits into Juice

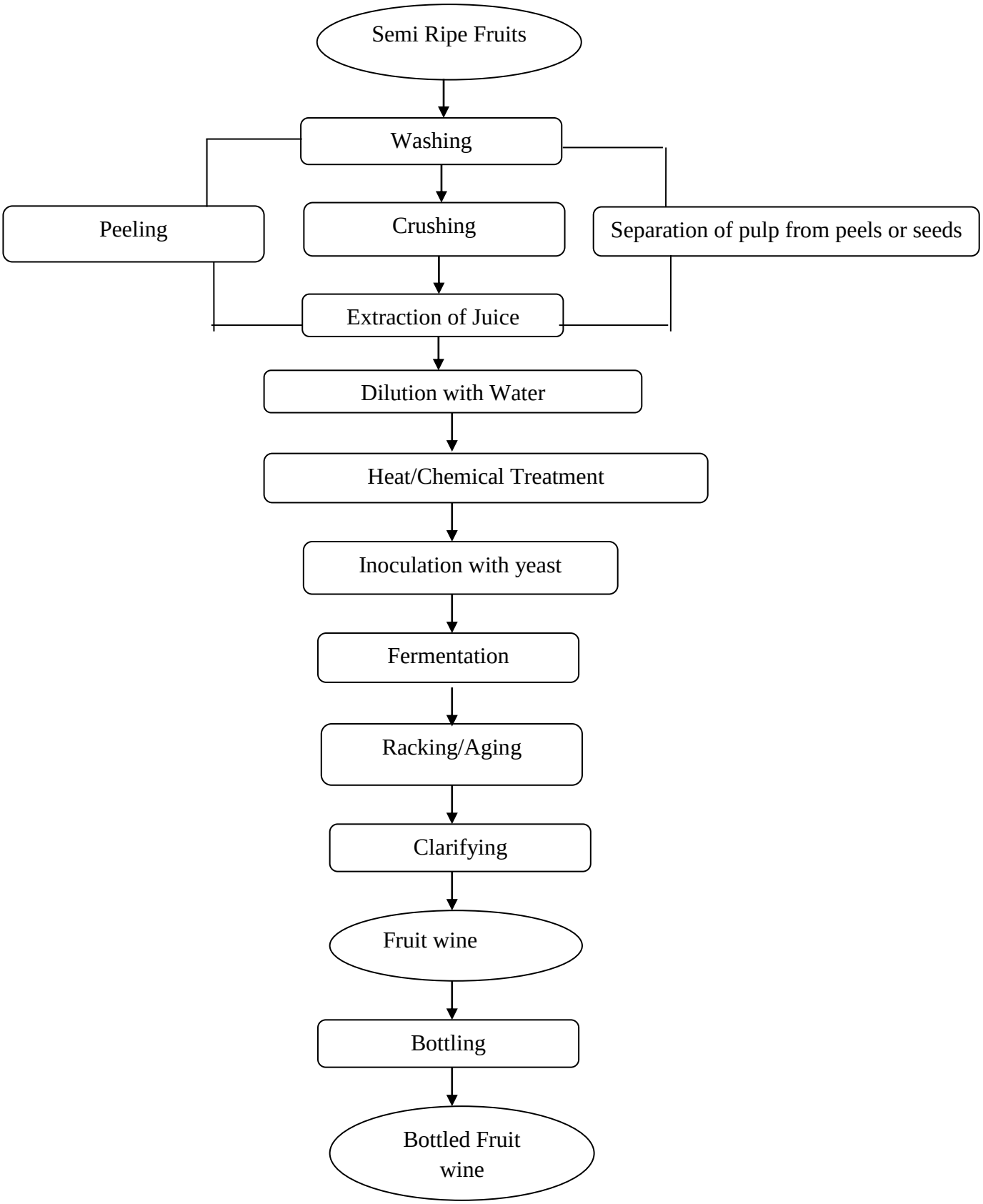

Figure 2: General Flowchart for Processing Fruits into Wine.