

Sweet potato is a major food staple cultivated mostly in China and various parts of the world. The world sweet potatoes cultivation range from 1.0 million tons per annum in the United States to 81.7 million tons in China.

Sweet potatoes have high nutritive value which is one essential reason for its high consumption. The nutritional values show that the energy content of sweet potato is about 39.70g per 100g (3.5oz) of sweet potato. Other nutrient values vary from 21.29mg vitamins and 631.51mg trace metals per 100g (3.5oz).⁶

Comparing sweet potatoes with other major staple foods, sweet potatoes have a higher sugar content of 4.18g per 100g of raw potatoes⁶ and thus, very suitable for alcoholic fermentation.

It has been reported that some industrial sweet potatoes breeding lines developed could produce ethanol yields of 4500-6500 L/hectare compared to 2800-3800L/hectare for corn.^{2,5}

Sweet potato is widely grown as a food crop. It contains average about 22% starch and 5-6% sugar for a total of 27-28% fermentable material. A ton should yield up to 182kg of alcohol⁵.

Sweet potatoes contain saccharine (sugar) materials in which the carbohydrate (the actual substance from which the alcohol is made) is present in

the form of simple, directly fermentable six and twelve carbon sugar molecules such as glucose, fructose and maltose⁵.

Table 2: USDA Comparison of sugar content of sweet potatoes with other major staple foods (per 100g).

Staple	Sugar (per 100g)
Maize/Corn	0.64g
Rice (white)	0.12g
Rice (brown)	0.85g
Wheat	0.41g
Potato	0.78g
Cassava	1.70g
Soybean (Green)	0.00g
Sweet potato	4.18g
Sorghum	0.00g
Yam	0.50g

Starch is made up of long chains of glucose molecules coiled together. The starch must be broken down into sugars that are only one or two molecules long for the yeast to feed on.

In addition, sweet potatoes have a short shelf-life of three to five weeks after harvest and just about 50% is actually utilized for human consumption, the other 50% usually decompose due to its short shelf life. Thus, in order to prevent its spoilage and massive waste, its use in the production of alcohol is of great value.⁷

Alcoholic fermentation is a biological process in which sugars such as glucose, fructose and sucrose are converted by cellular energy and thereby produce ethanol and carbon dioxide as metabolic waste product. Because yeasts perform this conversion in the absence of oxygen, ethanol fermentation is classified as anaerobic.



The aim of this research project is to produce ethanol from two locally available varieties of sweet potatoes within Nigeria (Carolina Ruby and O'Henry) while varying the fermentation parameters such as temperature, time and mass ratio of yeast to potato. The ethanol produced from each experiment was then titrated to calculate the amount of ethanol produced (in percentage) in order to discover the most efficient temperature, time and mass ratio of yeast to potato for the fermentation process within our country.