

## Origin of some chemical compounds of a sugarcane wine of *Saccharum officinarum* Linn from Centreville, Gabon

Abogo Mebale Aimé-Jhustelin,<sup>1</sup> Ondo Ndong Roger,<sup>1</sup> Ondo Azi Alain Serge,<sup>2</sup>  
Ekome Nguema Marc,<sup>1</sup> Suebang François Constant,<sup>1</sup> Ondo Jean Aubin,<sup>1</sup>  
Eba François.<sup>1</sup>

<sup>1</sup>Laboratoire Pluridisciplinaire des Sciences (LAPLUS), Ecole Normale Supérieure, B.P. 17009 Libreville, Gabon.

<sup>2</sup>Institut National d'Agronomie et de Biotechnologies (INSAB), Université des Sciences et Techniques de Masuku (USTM). B.P. 905 Franceville, Gabon.

---

**Abstract:** The origin of some chemical compounds of sugarcane wine of *Saccharum officinarum* Linn were studied. The phytochemical analyses showed that **alkaloids** and **tannins** come from **sugarcane juice** and **barks of *Garcinia* sp.** The origin of **reductor compounds** is the **sugarcane juice**. **Flavonoids** and **saponins** come from **stem barks of the plant**. The pH of the wine increases when the quantity of barks increases.

**Keywords:** Phytochemical compounds, sugarcane wine, *Garcinia* sp, *Saccharum officinarum* Linn.

---

### I. Introduction

The sugarcane wine is a traditional alcoholic drink produced from fermentation of sugarcane juice of *Saccharum officinarum* in the presence of barks of *Garcinia* sp [1]. Since many years, the commercialization of this wine increase and lead to the improvement of the living conditions of many families [2]. The recent studies showed that the sugarcane wine content alkaloids, polyphenols, tannins, reductor compounds and flavonoids [3]. A lot of these compounds are benefit of the health of human being. Alkaloids and flavonoids have antioxidant and antidiabetic properties [4-6]. The origin of some chemical constituents of sugarcane wine is not establish. This paper show with certainty different origins of alkaloids, flavonoids, saponins, tannins and reductor compounds contained in the sugarcane wine and the evolution of pH when quantity of bark increase.

### II. Materials And Methods

#### Sugarcane juice

Mature *Saccharum officinarum* Linn was collected in village Centreville (north of Gabon) in January 2014. The juice was extracted using a manually sugarcane press. 750 mL of the juice is left for two weeks at room temperature in the presence of the air.

#### Sugarcane wine preparation

To be fermented to become sugarcane wine, the juice (750 mL) was put in the plastic container and stem barks of *Garcinia* sp was added (50 g). The mixture is left for two weeks at room temperature in the presence of the air.

#### Stem barks extract

50 g of stem barks of *Garcinia* sp and 750 mL of distilled water was added to the plastic container. The mixture is left for two weeks at room temperature in the presence of the air.

#### Phytochemical analysis

Chemical constituents were determined using the methods described by Harborne, Hegnauer and Wagner [7-9].

Tests of **flavonoids** were realised using the aqueous solutions of NaOH at 10% and FeCl<sub>3</sub> at 2%. **Alkaloids** were characterized by the marketing Dragendorf reagent. **Tannins** were analysed by aqueous solution of lead acetate at 10%. Test of **reductor compounds** was done with the marketing Fehling reagent. Test of **saponins** was realised by observation of persistent foam (up to 1cm) during 15 min. after shaking the extract in a test tube.

#### pH

The pH of sugarcane wine was measured after 7 days (pH<sub>1</sub>), 14 days (pH<sub>2</sub>) and 21 days (pH<sub>3</sub>), using the pH-meter Lutron pH-201. The pH<sub>0</sub> of the freshly sugarcane juice was 4.45.

### III. Results And Discussion

Phytochemical analyses of sample of sugarcane wine showed the presence of alkaloids, tannins, reductor compounds, saponins and flavonoids (Table 1). Results were qualitatively expressed as negative (-) or positive (+).

Alkaloids, flavonoids, tannins and saponins are present in the stem bark extract. However, reductor compounds were not found. The sugarcane juice contents alkaloids, tannins and reductor compounds but saponins and flavonoids were not found.

The results of the Table 1 show that alkaloids and tannins come from barks and sugarcane juice. Barks of *Garcinia* sp are the only origin of flavonoids and saponins. Reductor compounds come from sugarcane juice.

The effects of sugarcane wine may be due to the presence of alcohol and alkaloids. Indeed, some alkaloids, such as cocaine, have euphoric properties [10]. Tannins are often combined with alkaloids. It is perhaps for this reason that both are found in cane juice and barks extract. Flavonoids are water soluble phenolic compounds. They diffuse easily by soaking in the juice. The disappearance of saponins over time shows that these compounds are not very stable. The anti-diabetic effect of the sugarcane wine could be limited [11]. The presence of tannins gives the wine the ability to precipitate heavy metals [12]. But, some of them, can be dangerous for the human health.

Table 2 shows that the pH increases when the amount of barks increases. Indeed, after seven days the pH is 3.46 for juice without barks, 3.7 when the juice contains 50 grams of barks and 4.08 when there is 100 g of barks in the wine. This trend was observed at 14 days and 21 days (Figure 1). The pH increase may be explained by the presence of more alkaloids which are basic compounds [13].

In sugarcane juice without barks, pH gradually decreases from 4.45 to 3.02 after 21 days (Figure 2). This decrease can be attributed to the progressive formation of the acetic acid.

In the presence of barks, the pH tends to decrease after 14 days and to increase after 21 days. The alcoholic fermentation may be the cause of the decrease in pH. But it rises after 21 days because of the presence of a larger amount of alkali compounds [13].

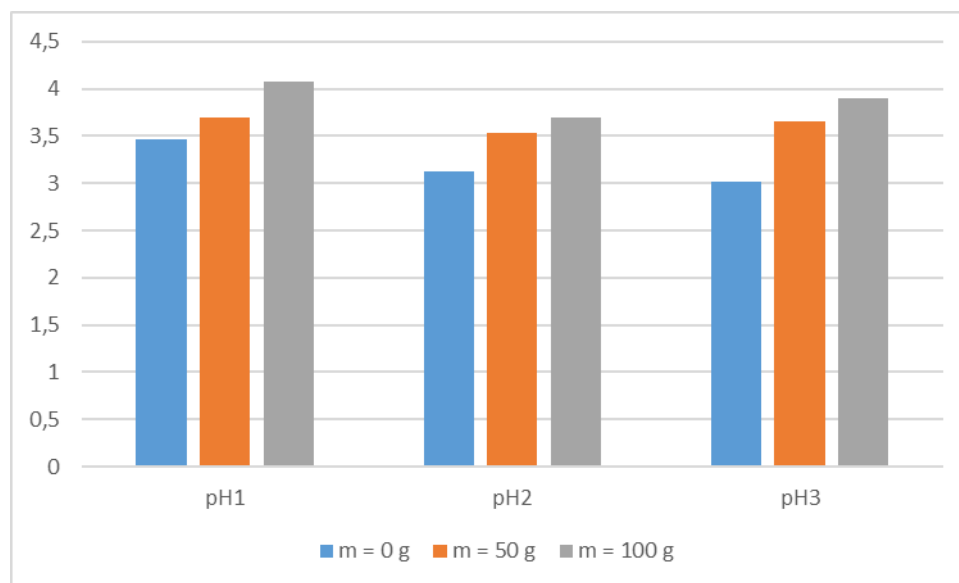
### IV. Figures And Tables

**Table 1.** Results of phytochemical screening

Chemical constituents	Stem bark extract	Sugarcane juice	Sugarcane wine
Flavonoids	+	-	+
Alkaloids	+	+	+
Tannins	+	+	+
Reductor compounds	-	+	+
Saponins	+	-	+

**Table 2.** pH of sugarcane wine

Weight of bark (g)	pH <sub>0</sub>	pH <sub>1</sub>	pH <sub>2</sub>	pH <sub>3</sub>
0	4.45	3.46	3.13	3.02
50	4.45	3.70	3.53	3.66
100	4.45	4.08	3.70	3.90



**Figure 1.** Evolution of the pH of the sugarcane wine.

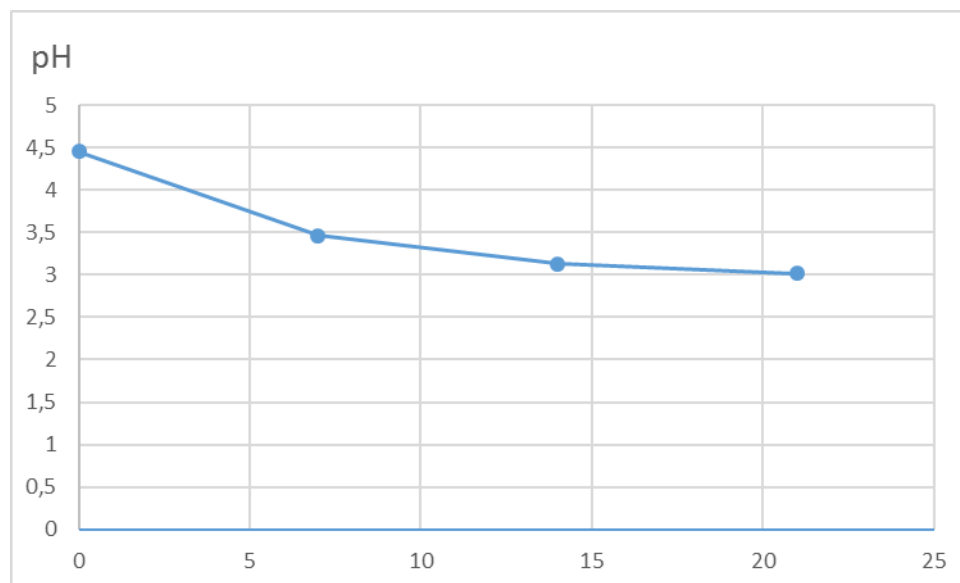


Figure 2. Evolution of the pH of the sugarcane juice.

## V. Conclusion

In this paper, we reported the more important results obtained for the studies of phytochemical analyses and alcohol level of sugarcane wine of *Saccharum officinarum* Linn. The origin of some chemical compounds of sugarcane wine was determined. Alkaloids and tannins come from sugarcane juice and barks of *Garcinia* sp. The origin of reductor compounds is the sugarcane juice. Flavonoids and saponins come from stem barks of the plant. The pH study showed that bars of barks contain basic compounds which diffuse in the wine.

## References

- [1] A. Raponda-Walker and R. Sillans. Les plantes utiles du Gabon. Fondation Raponda-Walker. Edition Sépia. 1995; 197-198.
- [2] N. Luzietoso, P.C. Bom Khonde, J.J.M. Bazabana. Utilisation, transmission et amélioration d'un savoir-faire traditionnel: le cas du vin de canne à sucre. Notes CA. 2000 ; 24, 1-4.
- [3] A.J. Abogo Mebale, F.C. Suébang, A.S. Ondo Azi, J.N. Yemelong, J.A. Ondo, E. Nsi Emvo, F. Eba. Chemical composition of a standard sugarcane wine of *Saccharum officinarum* Linn from Woleu-Ntem, Gabon. Journal of Agriculture and Sustainability. Vol.3 (2); 216-222.
- [4] B.H. Havsteen. The biochemistry and medical significance of the flavonoids. Pharmacol. Therapeutics. 2002; 96, 67-202.
- [5] A.P. Bidié, B.B. N'guessan, A.F. Yapo, J.D. N'guessan and A.J. Djaman. Activités antioxydantes de dix plantes médicinales de la pharmacopée ivoirienne. Sciences & Nature. 2013. Vol 8(1-2); 1-12.
- [6] A. Meddour, M. Yahia, N. Benkiki and A. Ayachi. Etude de l'activité antioxydante et antibactérienne des extraits d'ensemble des parties des la fleur du *Capparis spinosa* L. Lebanese Science Journal. 2011. Vol 14 (1); 49-60.
- [7] J.B. Harborne. Phytochemical Methods ; A guide to modern techniques of plant analysis 2<sup>nd</sup> Edition, London New York. 1973.
- [8] R. Hegnauer. Chemotaxonomie der Pflanzen, Birkhäuser Verlag, Basel, Stuttgart, 6. 1973; 761.
- [9] H. Wagner. Drogen analyse, Dünnschicht chromatographische Analyse von Arzneidrogen. Springer Verlag Berlin Heidelberg New York. 1983; 522.
- [10] T. Aniszewki. Alkaloids- Secrets of life. Alkaloid Chemistry, Biological Significance, Applications and Ecological Role. Elsevier first Edition 2007.
- [11] O. Nacoulma-Ouédraogo. Plantes médicinales et pratiques médicinales traditionnelles au Burkina Faso : cas du Plateau central. Thèse de Doctorat ès Sciences Naturelles, Université de Ouagadougou (Burkina Faso). 1996.
- [12] E.S.I. Atefeibu. Contribution à l'étude des tanins et l'activité antibactérienne de *Acacia nilotica* var *adansonii*. Thèse de doctorat en pharmacie. Université Cheikh Anta Diop de Dakar (Sénégal ) 2002.
- [13] J. Bruneton. Pharmacognosie, phytochimie, Plantes médicinales. Paris 4<sup>ème</sup> édition Lavoisier. 2007.