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Influence of the Spice Level In A Honey-Based Craft Drink During Production

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Summary
Preparing honey drinks requires three major ingredients: water, honey and ferment. But they are often enhanced with bark, spices etc. to provide added value. This present study therefore consists of determining the impact of the spice level on these drinks during their production. To do this, 3 spices were selected, namely ginger, black pepper and chili pepper. These spices were used in the preparation of several drink samples based on honey at different rates (1%, 3%, 5%). Physicochemical, microbiological and sensory parameters were subsequently evaluated. The results showed that the rate of spices exerted an influence on these different parameters. The pH was between 4.16 ±0.017 and 4.4 ±0.01; the titratable acidity between 3.33 ±0.51 g/l and 5.16 ±0.51 g/l, the alcohol levels between 15.28 ±0.89% and 18.81 ±5.06% and the total sugars between 496.2 ±16.52 g/l and 543.6 ±7.38 g/l. Indeed, the higher the rate of spices increases, the higher the pH, the alcohol level increases while the sugars totals and yeast loads decrease significantly. The drink containing 5% chili has summer the most appreciated of all THE drinks tested by the panels with a pH of 4.4±0.01, a titratable acidity of 5.16±0.51 g/l, an alcohol content of 16.94±1.44%, a yeast load of 2570 CFU/g and a sugar content of 527.87±7.38 g/l.

keywords: honey, influence, spices, craft drink, ginger,pepper, chili

Introduction

Mead, a grape-free wine made from honey and water, is considered one of the first drinks fermented in the world. This beverage alcoholic East obtained by their fermentation of honey and water **[1].** It was at one point one of the drinks THE more consumed in a large part of Europe, of America, of Asia and Africa. Mead, with African roots, was adopted in India and China, as well as in Europe where production became widespread **[2, 3].** However, Various factors have caused its decline. The main factor being the price, largely in reason of their rarefaction of Honey dew at lack of evolution of technologies beekeeping For TO DO to correspond the offer with their growth demographic **[2]**. Furthermore, their preparation of mead was during a long time the batch of a class of insiders. As a result, it was unable to compete with wine in terms of price **[4].**

However, many variations can be found, container of the herbs, of the spices or of the fruits **[1, 5].** Most of the flavors unique to this beverage depend on kind of honey. For each additional ingredient, molecules of aroma additional can be developed **[1, 6].** Despite there long tradition of making mead, scientific knowledge in this area is limited in Africa and particularly in Ivory Coast. Consequently, systematic information and knowledge are needed to be able to define the parameters necessary to understand and control the quality of mead, develop suitable formulations and optimize fermentation conditions as examined by **[7].** It is in this context that this present study was initiated to study the impact of rate of spices on of the drinks has base of Honey during their production.

Materials and methods

Material biological

The biological material used includes honey, commercial yeast (*Saccharomyces cerevicae*), pepper (*Piper nigrum*), chili (Capsicum sp.) and ginger (*Zingiber officinale*) selected from the Korhogo market.

Methods

Spice processing

Before use, the spices were washed several times with distilled water to remove impurities. Once washed, the pepper and chili were dried at 70°C for one hour. The ginger was cut into strips and dried at 50°C for 24 hours. The spices were then ground. The resulting spice powders were stored at 4°C for further processing.

Preparation of the honey-based beverage

For the preparation of the drink, the honey used was selected randomly on the market. For preparation of 600 ml, 360 ml of water and 240 ml of honey were required. Several preparations were obtained after adding the spices. Thus, the spices, pepper, chili, ginger, were added at different rates (1%, 3%, 5%). The whole was then sterilized at 115°C for 15 min. Commercial yeast (*Saccharomyces cerevicae*) was added at a rate of 1% after cooling of the samples. The samples have summer arranged have room temperature for fermentation to 24 hours.

Evaluation of physicochemical parameters

Determination of the pH

The pH of the samples East determined directly has helped with a pH-meter. The calibration of the device is ensured using two buffer solutions at pH 7 and it is done systematically before pH measurements. These measures are carried out by diving the electrode into 20 ml of samples. They read east repeated three times.

Determination of acidity titratable

Titratable acidity is obtained by the method described by **Amoa-Awua *et al.* [8].** It is determined by dosing 10 ml of sample with a solution hydroxide of sodium 0.1 N After addition at prior of 2 has 3 drops of phenophthalein has 1 %. There END of the dosage is marked by a pale pink coloring.

The results obtained constitute the average of three tests. The acidity rate expressed as a percentage East determined according to the formula next:

$$\text{Acidité titrable} = \frac{V_{NaOH} \times N_{NaOH} \times 0{,}09 \times 100}{Ve}$$

V_{NaOH} : Volume of their solution hydroxide of sodium (ml)

N_{NaOH} : Normality of their solution hydroxide of sodium (meq-g/l)

Ve : Volume of socket trial (ml)

0.09 : milliequivalent gram acid lactic.

Dosage of the sugars totals

Total sugars were measured using the method proposed by **[9]**. In a test tube containing 1 ml of sample, 1 ml of phenol and 5 ml of sulfuric acid (in a dry jet) are added. The whole is brought to a boiling water bath for 5 min. After removal, the tubes are put to darkness for 30 minute and the optical density is read at the wavelength of 490 nm at spectrophotometer (spectrophotometer 7305, jenway®, France). The amount of total sugars is determined by reference to a calibration curve previously established using a solution of glucose has 1 mg /mL. The test is done in triplicate.

Determination of rate of alcohol

The alcohol content is determined using an alcohol meter (densimeter graduated in alcoholic degrees) **[10; 11].**

Analyses microbiological

The yeast count was carried out according to Standard NF ISO 6611:2004
The culture medium used for the enumeration of yeasts and molds is Sabouraud Chloramphenicol Agar (Fluka, Bochemica 89579, Sigma-Aldrich Chemie GmbH, India).

Expression of the results

After growth and counting of colonies in a dilution dish, the number of colony forming units per milliliter (cfu/ml) is obtained according to the following formula:

$$N\ (ufc/ml) = \frac{\sum C}{V(n1+0{,}1n2)d}$$

N = number of colony forming units per milliliter (cfu/ml)

Σ c = the sum of colonies on all plates considered

d = dilution rate considered

v = volume of inoculum inoculated

n1 = number of boxes retained at the first dilution

n2 = number of boxes retained at the second dilution

Protocol analysis sensory general

For the general sensory analysis, panelists were selected based on responses to a questionnaire that asked for standard demographic details (age and gender), interest, measured consumption, capacity to consume alcohol, and experience with sensory analysis. Thus, a panel of 30 randomly recruited individuals was organized.
The first sensory criterion was a descriptive analysis of taste and smell. Samples were presented blindly to the tasters and designated by random codes. The panelists were asked to approach each sample, swirl the covered glass, remove the lid, and evaluate the smell. They then evaluated the basic taste and mouthfeel, and each taster was required to award a score between 0 and 5 for the descriptive test.
Following the other sensory analyses, the tasters gave their overall assessment of the honey samples. The technique consisted of taking a little honey with a spoon, putting it in the mouth while salivating for a few seconds and then saying whether the product was extremely unpleasant, very unpleasant, quite unpleasant, unpleasant, neither pleasant nor unpleasant, pleasant, quite pleasant, very pleasant, extremely pleasant.
For the general assessment, each entity chosen by the tasters corresponded to a score varying from 0 to 8 in ascending order of assessment.

Statistical processing of data

One-way variable analysis (ANOVA) and Duncan's test were performed with STATISTICA 99th edition software to understand the variables measured on the different honey-based drinks. Differences are considered significant for values of $P < 0.05$ ($P < 5\%$). This software also allowed calculating the means and standard deviations of the analyzed parameters. Calculations and figures were performed using EXCEL.

Results

Physicochemical analysis

The ANOVA test revealed that the honey-based beverage samples with spices differed significantly ($p < 0.05$) from the control honey-based beverage (without spices). The mean values are shown in (**Table 1**). After 24 hours of fermentation, the control beverage (without spices) had a pH of 4.1 ± 0.002; a titratable acidity of 3.33 ± 0.51; an alcohol content of 16.93 ± 0.41 and total sugars of 527.87 ± 7.38. However, the addition of spices to honey-based beverages influenced their physicochemical parameters.
The pH of the drinks containing spices is higher compared to that of the control honey drink (4.1±0.002). These values vary respectively between 4.16 and 4.4. Among the spice-based drinks containing 1%, 3% and 5% ginger had the highest pH down by report to other drinks has base of spices container 1 %, 3 %, 5 % of pepper Thus that those containing 1%, 3%, 5% of chilies which have the highest pH compared to the other drinks. The drink containing 5% chili pepper obtained the highest pH (4.4±0.01) of all drinks analyzed.

The titratable acidity of honey-based drinks containing spices increases with the added spice content compared to that of the control drink (3.33±0.51). It varies between 3.33±0.51 and 5.16±0.51 depending on the content and type of spices. Drinks containing 1%, 3% and 5% ginger do not show significant differences in their respective titratable acidities: 3.33±0.51; 3.33±0.51; 3.66±0.98 compared to that of the control drink (3.33±0.51a). While drinks containing 1%, 3%, 5% pepper with respective values of 3.66±0.51; 4.66±0.51; 4.66±0.51 and drinks containing 1%, 3%, 5% chili with respective values of 3.66±0.51; 4.66±0.51; 5.16±0.51, their titratable acidities are significantly higher compared to the titratable acidity of the control drink. The highest value at the level of titratable acidity was obtained with the drink containing 5% chili (5.16±0.51).
After 24 hours of fermentation, the alcohol content values in honey-based drinks containing spices increased compared to the control drink depending on the spice content. However, drinks containing 1% and 3% ginger, 1% pepper, 1%, 3% and 5% chili had alcohol content lower than or equal to that of the control drink (16.93±0.41%). The highest alcohol content was observed with drinks containing 5% ginger, 3% and 5% pepper with respective alcohol content of 17.59±0.51%, 17.30±2.93% and 18.81±5.06% compared to that of the control drink (16.93±0.41%). The drink containing 5% pepper recorded the highest alcohol content (18.81±5.06%) compared to all other honey-based drinks considered.
During fermentation, sugars are converted into alcohol up to a threshold. The lower the total sugar level, the higher the alcohol level. Thus, proportionally to the alcohol level, the total sugars of all honey-based drinks containing spices decrease compared to the control drink (without spices) except for drinks containing 1% ginger, 1% pepper, 1% and 3% chili and ginger and 5% chili with respective total sugars of: 543.55±14.78 g/L, 527.88±22.17 g/L, 543.6±14.84 g/L, 533.1±14.78 g/L and 527.87±7.38 g/L greater than or equal to that of the control drink (527.87±7.38 g/L). The drinks containing 3% and 5% pepper and ginger contain respectively: 522.65±29.56 g/L, 496.52±66.52 g/L and 517.42±22.16 g/L of total sugars compared to that of the control drink (527.87±7.38 g/L). The drink with the lowest total sugars is the one containing 5% pepper with a value of: 496.52±66.52 g/L.

Table 1 : Results of the physicochemical parameters of Honey And samples of drinks has base of Honey

Code	Ph	**AT (g/L)**	**TA (%)**	**ST (g/L)**
MB	4.18±0.018 ^{a}	$^{0.51}$ ab	6.18±0.01 ^{a}	825.8±14.79 ^{d}
TE	4.1±0.002 ^{a}	3.33±0.51 ^{a}	16.93±0.41 ^{bc}	527.87±7.38 ^{a}
Gi 1	4.16±0.017 ^{a}	3.33±0.51 ^{a}	15.92±0 ^{b}	543.55±14.78 ^{b}
Gi 3	4.16±0.014 ^{a}	3.33±0.51 ^{a}	16.94±1.44 ^{bc}	527.87±7.38 ^{a}
Gi 5	4.17±0.014 ^{a}	$^{0.98}$ ab	17.59±0.51 ^{c}	517.42±22.16 ^{a}
Poi 1	4.2±0.022 ^{b}	$^{0.51}$ ab	16.93±2.4 ^{bc}	527.88±22.17 ^{a}
Poi 3	4.32±0.008 ^{c}	4.66±0.51 ^{bc}	17.30±2.93 ^{c}	522.65±29.56 ^{a}
Poi 5	4.34±0.012 ^{c}	4.66±0.51 ^{bc}	18.81±5.06 ^{d}	496.52±16.52 ^{c}
Pim 1	4.26±0.03 ^{b}	$^{0.51}$ ab	15.28±0.89 ^{b}	543.6±14.84 ^{b}
Pim 3	4.32±0.01 ^{c}	4.66±0.51 ^{bc}	16.59±1.93 ^{bc}	$^{14.78}$ ab
Pim 5	4.4±0.01 ^{d}	5.16±0.51 ^{c}	16.94±1.44 ^{bc}	527.87±7.38 ^{a}

Gi : Honey-based drink with ginger; **Poi** : Honey-based drink with pepper; **Pim** : Honey-based drink with chili; **TA** : Alcohol Level; **ST** : Sugar totals ; **MB** : raw honey ; **TE**: Honey-based drink without spices

has, b, c,…,f : Coefficient of significance difference ($p<0.05$) ;

Microbiological analysis

Generally, the addition of spices in honey-based drinks influences yeast activity (**Table 2**). The microbial load of drinks without spices (control) is significantly different from drinks to which spices have been added. When the spice content is increased, the microbial load of yeasts decreases. Samples containing 1% ginger, 1% pepper and 1% chili present the highest yeast loads with respective values of 19,055 ± 0.13 cfu/g; 63,096 ± 0.21 cfu/g; 15,136 ± 0.16 cfu/g. However, drinks containing 3% ginger, 3% pepper, 3% chili have significantly low yeast loads with respective values of 10,000 ± 0.49 b cfu/g; 11,482 ± 0.21 cfu/g; 6,607 ±0.86 cfu/g as well as those containing 5% ginger, 5% pepper and 5% chili with respective loads of: 7,244 ±0.3 cfu/g; 7,943 ±0.48 cfu/g and 2,570 ±0.36 cfu/g compared to the control drink (15,136 ±0.03 cfu/g).

Table 2: Influence of the amount of spice on their charge of the yeasts After 24h of fermentation

Code	Microbial load (CFU/g)
TE	15 136 ± 0.03 ^{d}
Gi 1	19,055 ± 0.13 ^{e}
Gi 3	10,000 ± 0.49 ^{c}
Gi 5	7,244 ± 0.3 ^{bc}
Poi 1	63,096 ±1.25 ^{f}
Poi 3	11,482 ± 0.21 ^{cd}
Poi 5	7,943 ± 0.48 ^{c}
Pim 1	15 136 ± 0.16 ^{d}
Pim 3	6,607 ± 0.86 ^{b}
Pim 5	2,570 ± 0.36 ^{a}

Sensory analysis

Sensory analysis of different honey-based drinks containing chili, pepper and ginger by a consumer panel of 30 people allowed them to be classified according to their taste, smell and general appreciation (**Figure 1 and 2**).

Overall, the panelists positively appreciated the taste and smell of the honey-based drinks containing spices.

Thus, regardless of the overall appreciation, taste, and smell, chili-based drinks received the highest scores.

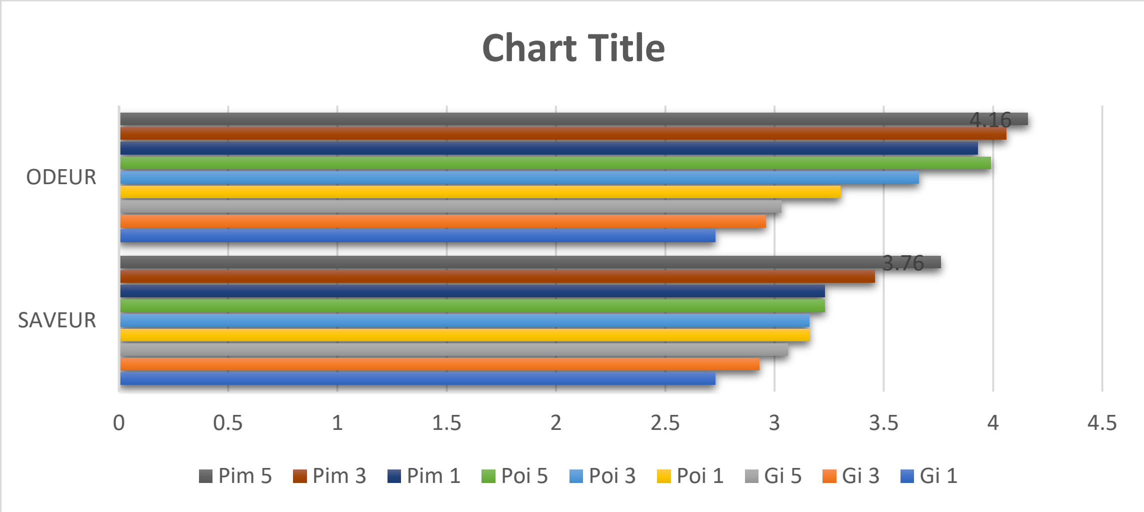

Figure 1 : Odors and flavors of drinks after 24 hours of fermentation

Next came pepper-based drinks, followed by ginger-based drinks. It was also observed that the more spices the drink contained, the more consumers appreciated it. However, the drink supplemented with 5% chili was the most accepted by the panelists.

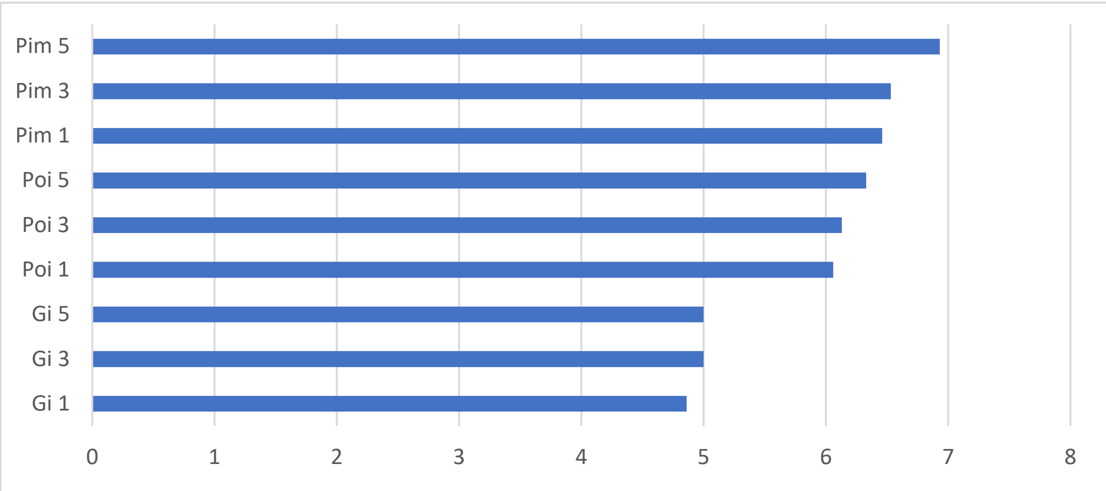

Figure 2 : General appreciation of drinks after 24 hours of fermentation

Discussion

The study on the impact of spice level on honey-based drinks during their production revealed that the spice level influences the physicochemical parameters, microbiological parameters as well as the sensory properties.

The pH of raw honey is 4.18±0.018. The pH value of the honey obtained in this study is within the standard pH limit of honeys (pH: 3.5 to 4.5) according to the Codex Alimentarius **[12].** After adding spices and fermentation, the pH of the drinks increases from 4.16 to 4.4. However, the variation in pH depends on the spice and its quantity used. The higher the spice content, the respective pH of the drinks increases compared to that of the control drink (4.1±0.002). Just like the pH, increasing the amount of spice to 3% and 5%, promotes the increase in the titratable acidity of the drinks. The spice content would influence the production of total acid. An influence of the amount of spice used on the alcohol content produced during fermentation is also observed. At 1% ginger (15.92±0%) and 1 to 3% chili (15.28±0.89%; 16.59±1.93%), the alcohol content obtained after fermentation is lower than that of the control drink (16.93%). This could be explained by the fact that at these concentrations, ginger and chili compounds would be insufficient quantity to stimulate the fermentation process. Indeed, the alcohol produced is proportional to the sugar content used by yeasts. However, at 5% ginger (17.59%), 3% and 5% pepper (17.30% and 18.81%), the alcohol content is significantly higher than the alcohol content of the control drink (16.93%). The high level of spice (ginger (gingerol) and pepper (peperine)) stimulate alcoholic fermentation. However, according to the work **[13],** with increasing the amount of gingerol added, the number of viable yeasts decreases and the alcohol content of the broth during a 30-day fermentation. However, the high alcohol content in 24 hours of fermentation could be explained by the fact that a high concentration of ginger (gingerol) and pepper would promote the production of glycerol. Indeed, glycerol is one of the main by-products of alcoholic fermentation by yeasts. It plays an important role in maintaining the NAD+ /NADH balance and in triggering alcoholic fermentation **[14].**

These results are a contribution to those **[5]** in their study on the artisanal production of "kuri", an alcoholic drink made from diluted honey containing chili pepper or sometimes other spices was added to the drinks of Adamaoua (Cameroon). These researchers obtained after 24 hours of fermentation an alcohol content of approximately 15.4±0.6%.

To produce our beverages, yeast was added to the various prepared musts to promote fermentation. Indeed, sweet honey-based bever drinks age must generally have sugar concentrations three times higher and nitrogen concentrations 100 times lower than grape musts **[15].** Therefore, with a must composed only of water and honey, fermentation would likely have a long lag phase, a slow fermentation rate, and low sugar conversion. Therefore, honey-based beverage manufacturers often add an additional source in the form of diammonium phosphate (DAP) to prevent slow or blocked fermentation. Commercial yeast sachets combine DAP with other additional compounds for yeast vitality such as yeast hulls and extracts, mineral salts, amino acids, and vitamins **[16].** Thus, the addition of yeasts promoted fermentation and the production of various beverages. However, in the presence of spices, an influence on the activity of these yeasts is observed. Samples containing 1% ginger, 1% pepper and 1% chili pepper have the highest yeast loads compared to the control drink. However, drinks containing 3% and 5% ginger, pepper and chili pepper have the lowest yeast loads of all drinks compared to the control drink. Indeed, spices have an inhibitory effect on the growth and metabolism of yeasts. As the number of spices increases, the microbial load of yeasts decreases. This inhibitory effect of spices on yeast activity also depends on the type of spices. This inhibition could be explained by the presence of active compounds contained in ginger (gingerol), chili pepper (capsaicin) and pepper (peperine). To this end, several studies have already demonstrated the inhibitory activity of these spices **[17; 18; 19].**

The drinks containing the spices were subjected to sensory tests carried out by a consumer panel of 30 people. The panelists analyzed the drinks and gave ratings that were generally satisfactory in terms of flavor, smell and general appreciation. According to the panelists' ratings, the chili-based drinks were the most appreciated, followed by the pepper-based drinks and then the ginger-based drinks. However, the drink with the highest score was the drink containing 5% chili, which was the best in terms of aroma, taste and general appreciation. This drink had the highest pH of all the honey-based drinks containing spices (4.4±0.01), the highest titratable acidity (5.16±0.51c), an alcohol content of 16.94±1.44% and total sugars of 527.87±7.38.

Conclusion

The results of this study reveal that the spice content influences parameters during the production of honey-based beverages. Thus, when the spice content is increased, the pH, titratable acidity, and alcohol content increase. Higher levels also affect fermentation by inhibiting yeast growth but could activate their metabolic activities. Among the beverages obtained, the one containing 5% chili pepper was the best in terms of aroma, taste, and overall appreciation. This beverage has the highest pH of all the beverages (4.4±0.01), the highest titratable acidity (5.16±0.51 g/l), an alcohol content of 16.94±1.44%, and a total sugar concentration of 527.87±7.38 g/l.

Bibliographic references

1. **Giulia C, Luca Debias, Mary S, Eva Ueberegge, Egon Z, Henry J, Peter R and Lorenza C, (2020).** Volatile profile of mead fermenting blossom honey and honeydew honey without *Ribes nigrum* . Molecules, 25:1818-15

2. **Gayre GR, (1948)** . Was sail! in Mazers of Mead. 1st edition Phillimore & Co. Ltd, London Ge W.
3. **Ben B, (2009)**. Le marché mondial de l'hydromel : débouchés pour les exportateurs canadiens d'hydromel Comparaison avec le succès remporté par le vin de glace canadien à l'étranger. Agriculture et Agroalimentaire, Canada.
4. **John D, Thomas M, Michael T, Dick D and Michel F, (2008)** . Mead step by step. Bees & Co, 126: 21-25.
5. **Djoulde DR, Bakari D, Bayoi J and Etoa F, (2014)** . Artisanal production of “kuri” an honey made alcoholic beverage from Adamaoua Cameroon. Global Journal of Scientific Research, 2(3): 65-70.
6. **Li R and Sun Y, (2019)** . Effects of honey variety and non-Saccharomyces cerevisiae on mead volatile flavor. Journal of the American Society of Brewing Chemists, 77 (1): 40-53.
7. **Iglesias A, Pascoal A, Choupina AB, Carvalho CA, Feás X and Estevinho LM, (2014)** . Developments in the fermentation process and quality improvement strategies for mead production. Molecules, 19:12577-12590.
8. **Amoa-Awua WKA, Appoh FE and Jakobson M, (1996).** Lactic acid fermentation of cassava dough into agbelima. International Journal of Food Microbiology, 31: 87-98.
9. **Dubois M, Gilles KA, Hamilton JK, Rebers PA and Smith F. (1956)** . Colorimetric method for determination of sugars and related substances. Anal. Chem, 28: 350-356
10. **Brandam C (2001).** Optimisation des conditions opératoires d'un procédé de brassage : étude expérimentale et modélisation. Thèse de doctorat en Génie des procédés et de l'environnement, Institut national polytechnique, Toulouse.
11. **Simard, JF, (2005).** Comment faire de la bonne bière chez soi, 4ème Ed. Trecarre, Belgique.
12. **Codex Alimentarius (2001)** . Codex Standard for Honey (Codex Stan 12-1981 (Rev. 2-2001)).
13. **Zhixin Li, Chen Ying, Chuan He and Min Wei (2020)** . Effects of Gingerols on Yeast Growth and Metabolism of the Fermentation Process. Journal of Physics: Conference Series, 1637: 1-7.
14. **Filippousi R, Antoniou D, Tryfinopoulou P, Nisiotou AA, Nychas GJ, Koutinas AA, Papanikolaou S, (2019)** . Isolation, identification and screening of yeasts towards their ability to assimilate biodiesel-derived crude glycerol: microbial production of polyols, endopolysaccharides and lipid. J Appl Microbiol, 127(4): 1080-1100.
15. **Ramalhosa, Pereira, Dias T, Estevinho** , **(2011)** . Mead Production: Tradition versus Modernity. Advances in Food and Nutrition Research, 63: 101-118.
16. **Schramm K.** , **(2003)** . The Compleat Meadmaker: Home Production of Honey Wine from Your First Batch to Award-Winning Fruit and Herb Variations. Brewers Publications, USA.
17. **Suvarna Y., Rahaman SK Abdul** . **(2019)** . Pharmaco-therapeutic properties of black pepper: A systematic review. Asian Journal of Research in Chemistry and Pharmaceutical Sciences. 7(1), 293-304.
18. **Akroum S, (2021).** Activité antimicrobienne des extraits de *Rosmarinus officinalis* et *Zingiber officinale* sur les espèces du genre Candida et sur *Streptococcus pneumonia*. Annales Pharmaceutiques Française, 79(1) : 62-69.
19. **Koffi AC, Koffi AR, Kossonou YK, Koffi-Nevry R, (2021)**. Activité antimicrobienne et composition phytochimique d’extraits de piment ‟Capsicum sp.” Revue RAMReS – Série Pharm. Méd. Trad. Afr., 20(2) : 29-38.