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STUDY THE EVOLUTION OF THE SCOVILLE INDEX OF FIVE VARIETIES OF CHILI PEPPERS IN FIVE SAUCES COMMONLY CONSUMED IN THE CITY OF MAN

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ABSTRACT
In Ivory Coast, where chili is an almost essential ingredient in traditional sauces, the perception of the spicy flavor is a key organoleptic element. The Scoville index is a scale that allows you to determine the heat of a pepper. However, the perception of the spicy flavor of chili peppers can vary depending on food matrices. The objective of this work was to study the evolution of the Scoville index of five varieties of peppers in five sauces commonly consumed in the city of Man. For this study, a panel of 25 people previously trained in the Scoville test was formed. This panel had to classify the different sauces on the simplified Scoville scale after incorporating the five varieties of peppers. The highest index was that of the pair *"sauce claire/ Capscicum annuum yellow "* with a degree of 7 corresponding to 20,000 Scoville units. The lowest index was that of the pair *" sauce arrachide/ Capsicum fructescens sweet "* and *"sauce graine/ Capsicum fructescens sweet".* This study established that the strength of chili pepper is less perceptible in sauces with high-fat content.

KEYWORDS: Chili pepper, Sauces, Scoville scale, Man.

INTRODUCTION

Chilli pepper comes from the Latin pigmentum meaning coloring substance. Because of its generally spicy taste, chilli pepper is well appreciated in human food. It is a vegetable very rich in vitamin C. Depending on the variety, chilli pepper is more or less hot.[1]

Chilli pepper is adapted to tropical and subtropical conditions because it tolerates heat well. In Ivory Coast chilli pepper is grown all year round and is present in all food markets. In the city of Man in particular, where chilli pepper is an almost essential ingredient in traditional sauces, the perception of the spicy flavor is a key element on the organoleptic level.[2]

The Scoville index is a scale that determines the strength of a chilli pepper. Wilbur Lincoln Scoville, an American pharmacist, is at the origin of this scale that bears his name. In 1912, he developed an organoleptic test to measure the concentration of capsaicin, the compound responsible for the burning sensation in chilli peppers. Initially, the test consisted of diluting a solution of chili extract in sugar water until the burning sensation was no longer perceptible by a panel of testers. The degree of dilution required then corresponded to the value in Scoville units (SHU).[3]

However, the perception of the spicy flavor of chili can vary depending on the food matrices. Since Ivorian sauces have variable compositions, it seemed appropriate to conduct this study, the main objective of which was to study the evolution of the Scoville index of five varieties of chili peppers in five sauces commonly consumed in the city of Man. For this study, a panel of 25 people previously trained in the Scoville test was formed. This panel had to classify the different sauces on the simplified Scoville scale after incorporating the five varieties of chili peppers.

MATERIAL AND METHODS

Biological Material and Food Matrix

The five varieties of peppers used in this study are:
Yellow Capsicum annum; West Indian Capsicum annum; Sudanese Capsicum annum; Attié Capsicum annum; Sweet Capsicum annum.

The Scoville scores of these five varieties of peppers were determined in five food matrices including:

- Seed sauce;
- Peanut sauce;
- Kple sauce;
- Clear sauce;
- Eau Céleste®

METHODS

- **Preparation of crude extracts of peppers**

Five hundred (500g) grams of each variety of pepper were crushed and then added to 0.5 l of distilled water. After centrifugation at 3000 rpm, the mixture obtained was filtered. The crude extract thus obtained was incorporated into the different food matrices for the determination of the Scoville score.

- **Panel composition**

For this study, a panel of 25 people previously trained in the Scoville test was formed. This panel had to classify on the simplified Scoville scale (Table I), the different food matrices after incorporation of the raw extracts of five varieties of peppers.

Table I: Simplified Scoville scale.

Degree	Rating	Scoville Units
0	neutral	0 – 100
1	mild	100 – 500
2	warm	500 – 1 000
3	spicy	1 000 – 1 500
4	hot	1 500 – 2 500
5	strong	2 500 – 5 000
6	fiery	5 000 – 15 000
7	burning	15 000 – 30 000
8	torrid	30 000 – 50 000
9	volcanic	50 000 – 100 000
10	explosive	100,000 and above

RESULTS AND DISCUSSION

The Scoville scores of the food matrices after incorporation of the crude extracts of five varieties of peppers are presented in Figures 1; 2; 3; 4 and 5. Considering the varieties of pepper, it appears that the highest scores are obtained with Capsicum annum yellow (Fig 1) with scores ranging from 3 (sharp) to 7 (burning). These results corroborate those of several authors[2]; [3]; [4] who have shown that Capsicum annum yellow was a variety of pepper very rich in capsaicin. In addition, it should be noted that the Scoville scores are generally proportional to the capsaicin content.[3]

Considering the food matrices, it appears that the lowest scores are obtained with the seed sauce (fig 1; 2; 3; 4 and 5) with scores ranging from 1 (mild) to 3 (sharp). These results could be explained by the high fat content of seed sauce.[1] Indeed, several authors[3]; [5] have shown that the effect of capsaicin was masked by substances rich in fat. This also explains the fact that the clear sauce and the low-fat kplé sauce[5], have the highest Scoville scores with scores ranging from 3 (sharp) to 7 (burning).

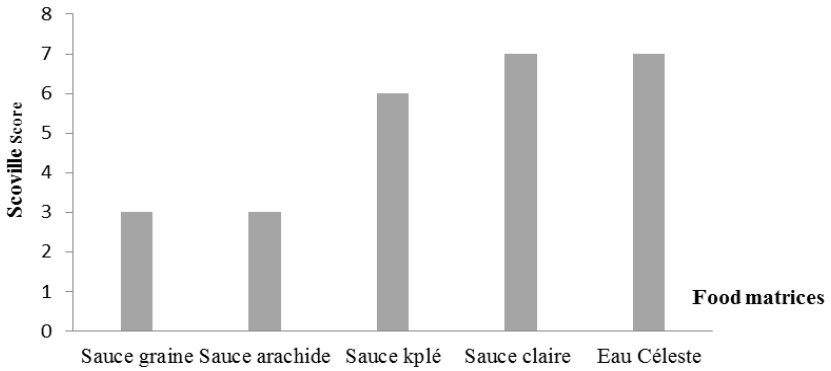

Figure 1: Scoville scores with Capsicum annum jaune.

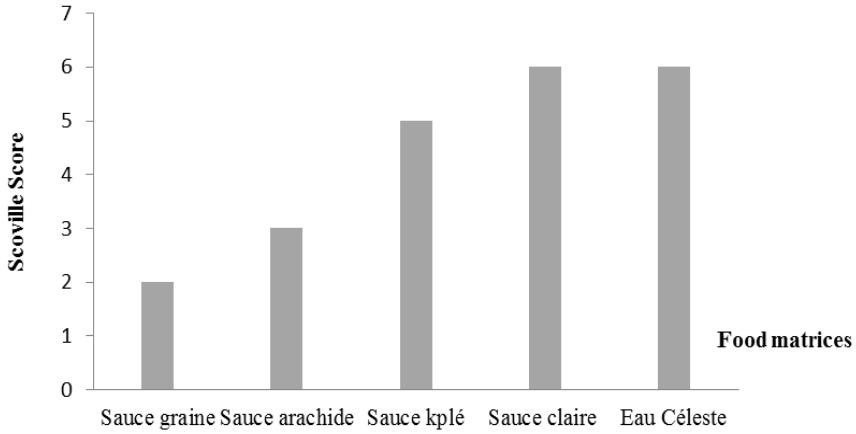

Figure 2: *Scoville scores with Capsicum annum antillais.*

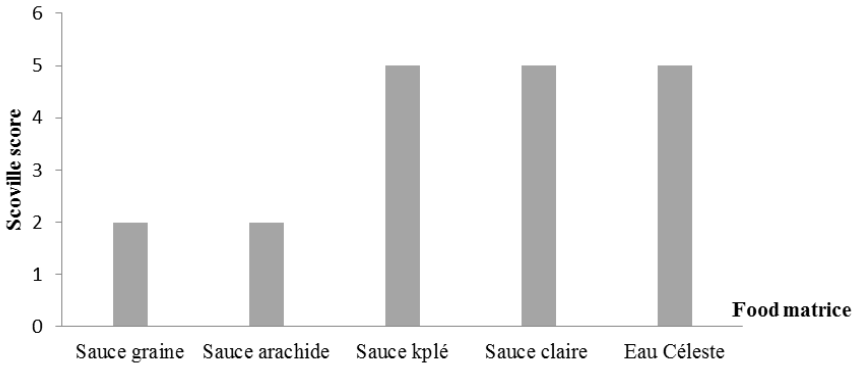

Figure 3: ***Scoville scores with Capsicum annum soudannais.***

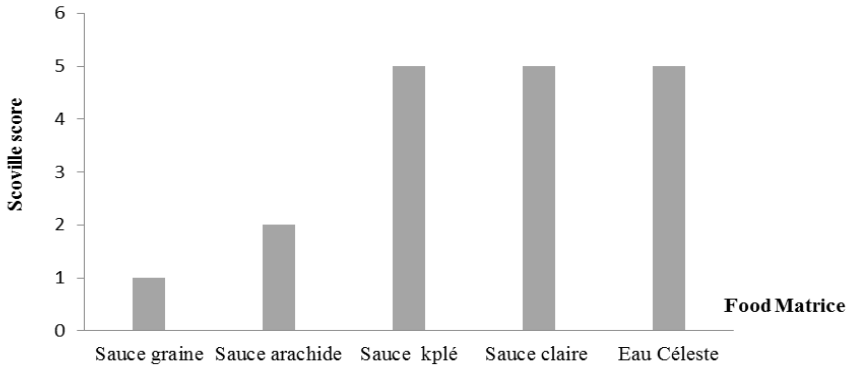

Figure 4: ***Scoville scores with Capsicum annum attié.***

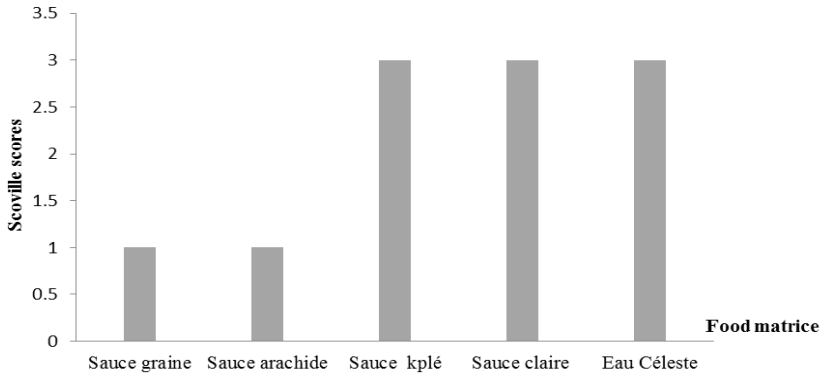

Figure 5: ***Scoville scores with Capsicum annum doux.***

CONCLUSION

This study showed that the highest scores are obtained with yellow Capsicum annum, a variety of pepper very rich in capsaicin. Considering the food matrices, it appears that the lowest indices were those of the pairs "peanut sauce/sweet Capsicum fructescens" and "seed sauce/sweet Capsicum fructescens". This study thus confirms that the strength of the pepper is less perceptible in matrices rich in fat.

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