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Effect of ratio oil to potato on amount of oil uptake and quality of potato French fries

Abstract

In deep fat fried products health should be addressed to meet consumer demand .the soft and moist interior together with crispy crust are desirable characteristics of most fried food. In this study the effect of ratio oil to potato on amount of oil uptake of potato strips at two size were investigated. Results showed that ratio oil to potato 20:1 lead to increase in potato loss of strips during frying among other ratios (33% oil uptake %). Oil to potato 10:1 had the lowest amount of fat content (24% oil uptake %). By this study, the highest and lowest loss weight percent were 44% and 34% which related to ratio 20 and 10 respectively. Significant differences in texture of several ratio were observed. Ratio 20 was the most texture of fried potato, but from view of oil uptake %, ratio of 10 was the best for two sizes of French fries potato.

Keywords: ratio of oil in potato, oil uptake, French fries

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Introduction

In the french fry process, raw potato are washed and cut into strips after this potato strips are fried in hot oil (180°C), cooled in ambient air and finally frozen and packaged on the other hand, air dehydration leads to a lower initial moisture content which also reduces the oil absorption. One way to achieve that is by controlling of frying temperture, ratio oil to potato etc. The main goal of deep fat frying is to maintain the food flavor inside a tenderized and crispy crust. Quality attributes in fried products includes dry matter, oil content, color and texture. Oil content is one of the important quality attributes in fried products.[1] Today consumers are looking for food products with lower oil content, therefore it is important to find the ways that can reduce the oil content of fried products. During the frying process, the physical, chemical and sensory characteristics of the food are modified. Texture, color and oil content are the main characteristics or quality parameters of French fries. Good quality French fries must have a crispy of about 1-2mm where most of the oil is located and a wet, soft center, like a cooked potato.[2] French fries color is the result of maillard reaction that depends on the superficial content of reducing sugar and temperture and frying period. Another way to achieve that is by controlling ratio oil to potato, because higher ratio leads to higher absorbed oil.[3,4] Oil content has been a main concern for food processors from an economic point of view and for consumers from a healthy one. During the process of French fries manufacture, processors have some ways to control the oil picked up by the potato pieces, as explained below. Today, due to consumer health concerns, there is a strong incentive to reduce the oil content of fried foods.[5,6] Some fried products may contain fat up to 50% of the total weight. Some of these lipids were not in the food before frying. Lipid content of French fries increases from 2% to 14%. The objective of the present work was to apply ratio oil to potato for reduce oil uptake in French fries potato.[7]

Materials and methods

Sample preparation

Potato were purchased from Greece market, after peeling, they were converted with two shapes were deep fried at 180°C for 10minute.

Experiments

Changes of weight of potato, temperture of oil with time of frying were plotted, thickness of crust and thermal conductivity coefficient (K) were measured. These experiments were done for ratios oil to potato 20, 10 separately.

a. Sunflower oil was supplied from local market of Greece.

b. Strip of potato were prepared with two dimension 3cm (diameter) and thickness of 1cm, other size were 1cm of length at 0.5cm of diameter at 0.5cm of thickness

Statistical analysis

All these experiments were replicated 3 times and the average values were reported. Significant differences of means were compared using Duncan test at 5% significant level using suitable software program.

Results and discussion

We found for two sizes of French fries potato that there was significant difference ($p<0.05$) among two ratio oil to potato in items of % loss water (Figure 1). The highest % loss water was ratio 20 and the lowest was ratio 10, our results revealed that percent of oil at ratio 20 and 10 were 33% and 24% respectively. As it can be seen in Figure 1, loss weight of potato at time 10minute was 42% and 34% for ratio 20 and 10 respectively. This different were significant

($p<0.05$). Temperture of oil were after 10 minute of frying 187°C and 178°C for ratio 20:1 and 10:1 respectively and this different was significant($p<0.05$)[7] (Figure 2). Considering thermal conductivity coefficient analysis were observed difference significant between ratios 20 and 10 ($p<0.05$). That valves were 620 and 550 wat/c sec for ratios 20 and 10 respectively (Figure 3). Results showed thickness of crust were significant for ratios that values were 3 and 1,2mm for ratio 20 and10 respectively[8] (Figure 4). At last, oil uptake % were 33 and 24 for ratio 20 and 10 respectively thus ratio 10 was suitable for frying of potato ($p<0.05$) (Figure 5).

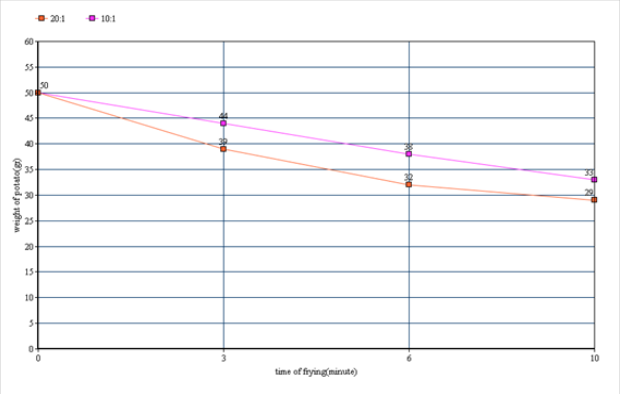

Figure 1 Some properties of French fries potato.

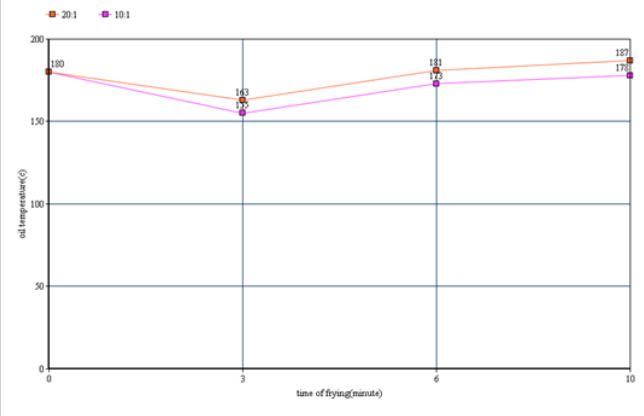

Figure 2 Some properties of French fries potato.

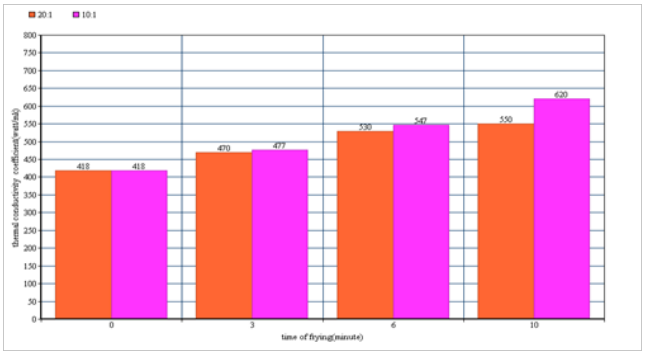

Figure 3 Some properties of French fries potato.

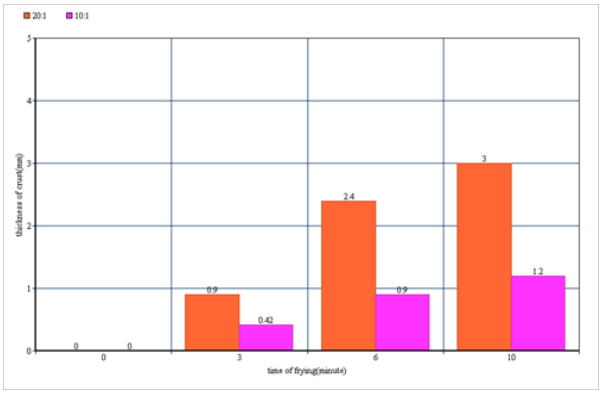

Figure 4 Some properties of French fries potato.

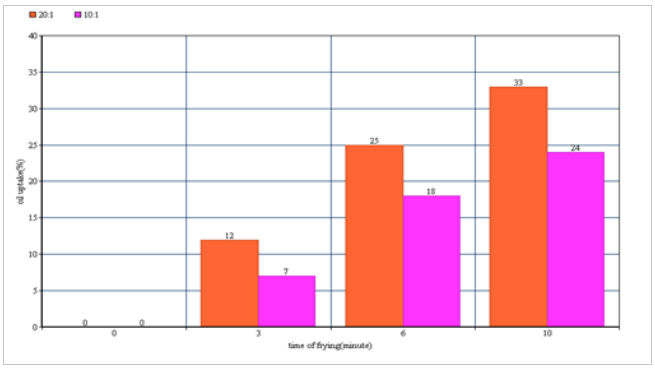

Figure 5 Some properties of French fries potato.

Conclusion

Our results showed that oil uptake were at ratio 10 less than ratio 20, thickness of crust were significant difference between ratios 20 and 10 ($p<0.05$). By considering, the best results of oil uptake were ratio oil to potato 10.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

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