Physicochemical characteristics of Noodles using Chicken Breast added with *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*

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Abstract-Effect of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten* in combination with chicken breast and wheat gluten on functional properties and physicochemical characteristics during processing of cooked noodles were investigated. These studies were carried out to investigate functional properties of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten* by the antioxidant ability. Antioxidant activities were evaluated by electron donating, xanthine oxidase inhibition rate and contents of total polyphenols. Overall, the antioxidant activities of hot water extracts showed a little higher than those of ethanol extracts. And also, the antioxidant abilities at the concentration of 1,000ppm in hot water extracts showed a higher than those of ethanol extracts by the determination of total polyphenol content and DPPH, in which showed 150.25 mg% in extracts of *Rubus coreanum Miquel* and showed 69.36%in extracts of *Opuntia ficus-indica var. saboten.* The effects on processing characteristics of cooked noodles were investigated in combination with transglutaminase (TGase), plant extracts, wheat gluten and chicken breast. Cooking time was very short as 340 second in CB (cooked breast), compared to other treatments. In contrast, NCB (non cooked breast) took a long time as 779 second. And also, CB was higher than NCB, where showed 146.3% in CB and 61.5% in NCB in water absorption ratio during cooking of noodles. Tubidity of soup was lowest as 0.240 in NCBT (non cooked breast transglutaminase), which means a lowest loss of solid in noodle during cooking. In case of treatment of TGase, overall texture properties were higher than other samples in hardness, cohesivness, springness and gumminess. In sensory evaluations, cooked noodles treated with TGase showed a higher than other treatment in overall acceptability.

Index terms : chicken breast, wheat gluten, transglutaminase, noodle

I.   INTRODUCTION

According to advance economic condition, consuming requirement of various high quality noodle products is increasing. We selected several kinds of oriental herbs according to other studies. This research was conducted to investigate functional properties composed of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten* . And according to the result, we developed the formula of noodle products added to Chicken Breast contained with *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*
. This study was designed to examine the physicochemical characteristics of noodle with chicken breast through its antioxidative activities. This study was carried out to investigate the effect of chicken breast added with *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*

II.   MATERIALS AND METHODS

The used materials was composed of gluten,transglutaminase(Activa),corn oil,oligosachride and *Opuntia ficus-indica var. Saboten*. The reagent was high quality prepared in Sigma company.

This experiment was conducted to investigate antioxidant ability and physicochemical characteristics of noodle by the method of Total polyphenol content,,Electron donating ability, Xanthine oxidase inhibition rate(%)of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten* and water absorption rate , volume expension ratio and texture properties of noodle with *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*

III. Results and Discussion

Table 1. Cooking properties of noodles prepared with chicken breast, transglutaminase and extracts powder of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*

Samples[1]	Cooking time (Second)	Water absorption (%)	Volume increasing rate (%)	Turbidity of soup (A_{375})
CB	$304^{a2)}$	146.3^d	246.3^d	0.421^c
CBT	390^b	126.0^c	225.8^c	0.341^b
NCB	779^c	61.5^a	161.5^a	0.246^a
NCBT	761^c	80.5^b	180.5^b	0.240^a

[1]CB: noodle added with cooked breast, CBT: noodle added with cooked breast and TGase, NCB: noodle added with non cooked breast, BCBT: noodle added with non cooked breast and TGase

[2]Means with different letters within a column are significantly different from each other at a=0.05 as determined by Duncan's multiple range test.

Table 2 Texture values of noodles prepared with chicken breast, transglutaminase and extracts powder of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*

Samples[1]	Hardness(g/cm^2)	Cohesivness(%)	Springness(%)	Gumminess(%)
CB	$547.8^{b2)}$	52.3^a	54.1^b	116.7^b
CBT	686.9^d	81.5^c	87.9^d	150.7^d
NCB	529.0^a	51.7^a	52.5^a	109.1^a
NCBT	589.3^c	63.4^b	71.1^c	141.7^c

[1]Simbols are the same as those in Table 2.

[2]Means with different letters within a column are significantly different from each other at a=0.05 as determined by Duncan's multiple range test.

Table 3 Sensory evaluation of noodles prepared with chicken breast, transglutaminase and extracts powder of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*

Samples[1]	Color	Flavor	Chewiness	Overall acceptability
CB	4.1[a2]	2.7[a]	2.7[a]	2.6[a]
CBT	4.1[a]	2.8[a]	3.9[b]	3.1[b]
NCB	4.0[a]	2.6[a]	2.8[a]	2.7[a]
NCBT	4.0[a]	2.7[a]	3.8[c]	3.2[b]

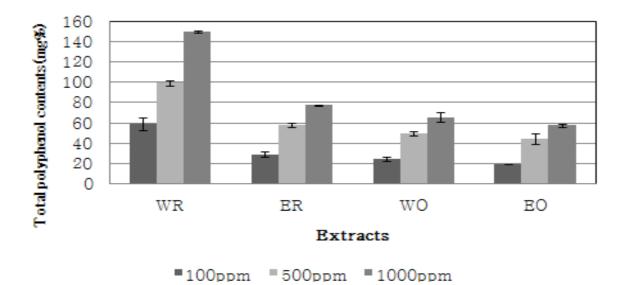1) Simbols are the same as those in Table 2.

Fig. 1. Total polyphenol contents of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*.

WR : Hot water extract of *Rubus coreanum miquel*, ER : 70% Ethanol extracts of *Rubus coreanum miquel*, WO : Hot water extract of *Opuntia ficus-indica var. saboten*, EO : 70% Ethanol extracts of *Opuntia ficus-indica var. saboten*
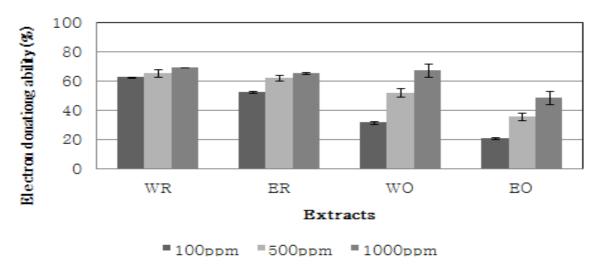

Fig. 2. Electron donating ability of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*.
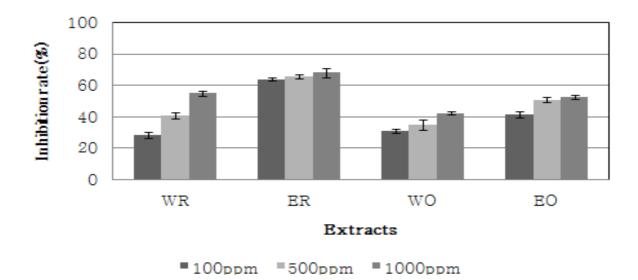
Fig. 3. Xanthine oxidase inhibition rate of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten*. Simbols are the same as those in Fig. 1.

IV. CONCLUSION

These studies were carried out to investigate functional properties of *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten* by the antioxidant ability. At the same time, the effects on processing characteristics of cooked noodles were investigated in combination with transglutaminase (TGase), plant extracts, wheat gluten and chicken breast.. In conclusion, chicken noodle with *Rubus coreanum Miquel* and *Opuntia ficus-indica var. saboten* was very good quality and texture properties on the basis of sensory evaluations and physicochemical characteristics of cooked noodles treated with TGase.

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