

ANETA CEGIELKA, KAMILA MŁYNARCZYK

Department of Food Technology
Warsaw University of Life Sciences – SGGW

THE EFFECT OF ADDITION OF THE WHEAT FIBRE VITACEL WF 400 ON THE QUALITY OF CHICKEN HAMBURGERS*

Summary. A study has been conducted on the effect of addition of wheat fibre Vitacel WF 400 (1.0, 2.0 or 3.0% in relation to the mass of batter) on the chemical composition and sensorial quality of chicken hamburgers. The obtained results showed that the enrichment of chicken hamburgers with wheat fibre resulted in significant increase in yield, change of the product's basic chemical composition and lowering of their caloric value. However, it had no significant effect on the instrumentally measured texture (shear force) of chicken hamburgers. The addition of Vitacel WF 400 preparation did not affect significantly such sensory attributes of hamburgers as desirability of colour, aroma, taste and juiciness. The highest scores for hardness, consistency and overall desirability were recorded for the product containing 2.0% of wheat fibre.

Key words: chicken meat, hamburgers, wheat fibre, quality

Introduction

The meat industry, striving to keep pace with the changing tastes of contemporary consumers, attempts to improve the nutritional value of processed meats without losing their high sensory quality. Such goals may be reached through the introduction of components into meat products formulations, which do not appear in meat naturally, but are advantageous, both from the nutritional and from the technological point of view (LANDER 2004, PYRCZ and KOWALSKI 2009, SIEG 2005).

The use of nutritional fibre preparations, obtained from grains and other plant sources has proved valuable in meat processing. The greatest popularity was gained by different kinds of wheat fibre preparations, with properties adapted to the needs of different groups of meat products. Among the preparations' properties that make them

*The research was financed by grant No. N N312 210936 from the Ministry of Science and Higher Education in the year 2009.

valuable for meat processing one should mention the very high water and fat binding ability, fibrous molecule structure, neutral taste and aroma, as well as light colour. The positive effect of wheat fibre on the quality of processed meats is reflected in e.g. increased production yield and improved rheologic properties of meat products. In literature also the nutritional aspect of fibre preparations is emphasized: it increases the level of nutritive fibre and lowers the caloric value of meat products (the role of a partial substitute of animal fat) (BACKERS and NOLL 1998, MAKALA 2003 a, OHR 2004, TROEGER et AL. 2005, SIEG and VOGELBACHER 2008).

Numerous studies confirm the functionality of wheat fibre preparations in the technology of meat processing. Among other things, it has been demonstrated that their addition may have a favourable effect on the production of processed meats, belonging to what is known as convenience food (CEGIELKA and PEĆZKOWSKA 2008, DASIEWICZ et AL. 2005).

The present work aimed at determining the effect of an addition of the wheat fibre Vitacel WF 400 on the quality and sensory desirability of chicken hamburgers.

Material and methods

The studies were conducted on chicken hamburgers – model meat products. During each of the four experimental replications performed, four hamburger variants were produced according to the basic formulation. The basic formulation of the control product (PK) was composed of raw materials such as meat of chicken thigh (85%) and yowl (15%). The addition of water amounted to 15% of the weight of raw materials. The batter also consisted of kitchen salt (1.8% of the batter weight), soy protein isolate Supro EX 33 (1.5%) and natural ground pepper (0.2%). The remaining hamburger variants contained an addition of the wheat fibre Vitacel WF 400 (JRS, Rettenmeier Polska Ltd.): 1.0% (P1), 2.0% (P2) or 3.0% (P3). The aim of the fibre addition was to increase the level of nutritional fibre in chicken hamburgers and to determine its effect on chosen determinants of the quality of the model meat products. The production process of hamburgers was as follows: the raw materials (chicken thigh meat (2.0 kg) and yowl (0.5 kg) were minced in a laboratory grinder (through a 5 mm steel plate). The batters were produced in a laboratory mixer (total mixing time: 15 min). The wheat fibre preparation was added in unhydrated form, whereas the soy protein isolate – after prior rehydration (1:4). The hamburgers were formed in flat circles (about 90 mm in diameter and 8 mm thick), using a manual former. To prevent the batter from sticking to the metal parts of the former, its working surfaces were covered with polyethylene foil. In order to retain the shape of the hamburgers, they were frozen – still wrapped in foil – at a temperature of -28°C for 30 min. Next, the hamburgers were thermally processed on an electric grill with ceramic heating plates (top and bottom). The temperature of the heating plates amounted to 200°C . The thermal processing was conducted until the temperature in the centre of the product reached 72°C (6 min). After cooling at room temperature (about 30 min), the hamburgers were placed in a cold storage room at $4-6^{\circ}\text{C}$. The quality evaluation of the product was performed after 24 h.

Chicken hamburgers underwent the following tests:

- *assessment of yield after thermal processing* – the yield was calculated as a ratio between the weight of the ready portion of the product (after thermal processing

and cooling) and the weight of the batter used for its production, expressed as a percentage;

- *analysis of basic chemical composition* – in model products there were determined: the content of water (PN-ISO 1442:2000), protein (PN-75/A-04018, 1975), fat (PN-ISO 1444:2000) and chlorides (PN-A-82112:1973); based on the obtained results of determinations, caloric value was calculated;
- *pH measurement* (PN-A-82058:1997);
- *texture measurement* – for this measurement the universal testing machine Zwicki 1120 was used with the Warner-Bratzler device; the maximum cutting force (Fmax) was read at the head movement of 50 mm/min on samples 20 × 90 × 8 mm (width × length × height); three measurements were made for each product in each experimental replication;
- *determination of fatty acid composition* – fatty acid profile was determined once, in the model products obtained in the last experimental trial, the analyses were conducted at the Analytical Centre of Warsaw University of Life Sciences by gas chromatography, on methyl esters, using an apparatus with a high-polar column and flame-ionization detector; the analysis was indicative, rendering it possible to obtain at a further research a product of improved nutritional value, i.e. with increased content of nutritive fibre, lower caloric value and nutritionally more desirable fatty acid composition;
- *sensory profile evaluation* – in sensory profile evaluation (PN-ISO 41219:1998) following determinants were characterized on a scale from 0 to 10 scores: desirability of colour, aroma, taste, hardness, juiciness, consistence and overall desirability of the products; the sensory evaluation was performed by a trained team of eight employees and students of the Division of Meat Technology, Warsaw University of Life Sciences; the samples of the products were prepared “warm” (product were warmed up on the electric grill; temperature about 60°C).

The obtained results were subjected to a statistical analysis using the Statgraphics 4.1 programme. The single-factor analysis of variance, Tukey test and correlation analysis ($P \leq 0.05$) were carried out.

Results and discussion

The results obtained for thermal processing yield, chemical composition and caloric value of model chicken hamburgers are presented in Table 1. It was ascertained that with the increased addition of the wheat fibre Vitacel WF 400 to the batter the thermal loss gradually decreased. The thermal processing yield of hamburgers containing 2.0 or 3.0% fibre (P2 and P3, respectively) was significantly higher than that of the control product (PK). This may be explained by the ability of wheat fibre to bind water and fat and to retain these components in the ready meat product.

The results of studies on the possibility of application of wheat fibre preparations for different types of meat products as a functional additive or partial fat substitute also indicate a positive effect of these components, i.e. decreased thermal loss and increased production yield (BILSKA et AL. 2002, MAKALA 2003 a, b, DASIEWICZ et AL. 2005, DOLATA et AL. 2005, MAKALA and OLKIEWICZ 2005, CEGIELKA and PEĆZKOWSKA 2008).

Table 1. The effect of addition of the wheat fibre Vitacel WF 400 on the yield, chemical composition and the caloric value of chicken hamburgers

Tabela 1. Wpływ dodatku preparatu błonnika pszennego Vitacel WF 400 na wydajność, skład chemiczny oraz wartość kaloryczną hamburgerów z mięsa kurcząt

Variant	Yield (%)		Protein (%)		Water (%)		Fat (%)		NaCl (%)		Caloric value (kcal)	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
PK	81.9 ^a	±1.6	19.3 ^c	±0.32	63.9 ^a	±0.60	12.8 ^b	±0.06	2.1 ^a	±0.05	192.9 ^c	±0.82
P1	84.7 ^{ab}	±1.4	18.3 ^b	±0.13	64.6 ^{ab}	±0.29	12.4 ^b	±0.17	2.0 ^a	±0.06	187.1 ^{bc}	±1.64
P2	85.5 ^b	±1.9	17.3 ^a	±0.17	65.1 ^{bc}	±0.36	12.3 ^b	±0.56	2.0 ^a	±0.06	183.6 ^{ab}	±4.60
P3	87.1 ^b	±1.9	17.4 ^a	±0.35	65.7 ^c	±0.53	11.4 ^a	±0.32	2.1 ^a	±0.09	178.0 ^a	±3.39

 \bar{x} – mean value, SD – standard deviation.

PK – control product, P1 – product with addition of 1.0% wheat fibre preparation, P2 – product with addition of 2.0% wheat fibre preparation, P3 – product with addition of 3.0% wheat fibre preparation.

Different indices of letters in columns indicate that the results differ statistically significantly for $P \leq 0.05$.

The addition of Vitacel WF 400 to the hamburger batters had a significant influence on their chemical composition. Increase of the level of fibre led to a decrease in the content of protein and fat, with a simultaneous increase of water in the model products (variants P1-P3), when compared with the control (PK).

Similarly, other studies demonstrated that wheat fibre preparations, due to the high water binding ability, render it possible to increase the content of this component in meat products, simultaneously decreasing the content of protein (MAKAŁA 2002, DASIEWICZ et AL. 2005, MAKALA and OLKIEWICZ 2005, CEGIELKA and PEĆZKOWSKA 2008, KRZYWDZIŃSKA-BARTKOWIAK et AL. 2008). A significant decrease in the fat content was recorded for those meat products in which wheat fibre preparations were used as a partial substitutes for the animal fat (MAKAŁA et AL. 2004, DOLATA et AL. 2005, PIOTROWSKA et AL. 2009). However, the use of wheat fibre preparations as functional additives does not always result in a significant decrease of the content of fat in meat products (TYBURCY et AL. 2003, MAKALA and OLKIEWICZ 2005).

Chicken hamburgers, containing 2.0 or 3.0% of the wheat fibre Vitacel WF 400 (P2 and P3, respectively), were characterized by significantly lower caloric value than the control product (PK). The results reported by other authors indicate that introducing wheat fibre into the meat product formulations resulted in a decrease of their caloric value, especially when those additives were used to replace the animal fat (DOLATA et AL. 2005, PIOTROWSKA et AL. 2009).

The results of pH and shear force (Fmax) of hamburgers are given in Table 2. Irrespectively of the amount of the Vitacel WF 400 preparation added, there were found no significant differences in the pH of the ready products. In turn, the increasing amount of fibre added to the batter caused a gradual increase of the shear force measured. Despite the fact, that the increase of the shear force value obtained for products containing the fibre preparation did not prove significant statistically, the obtained results indicate that such hamburgers were somewhat “harder” and the texture was “stronger”.

Table 2. The effect of addition of the wheat fibre Vitacel WF 400 on the pH and the shear force of chicken hamburgers

Tabela 2. Wpływ dodatku preparatu błonnika pszennego Vitacel WF 400 na pH i siłę cięcia w hamburgerach z mięsa kurcząt

Variant	pH		Shear force (N)	
	\bar{x}	SD	\bar{x}	SD
PK	6.4 ^a	±0.06	29.10 ^a	±3.78
P1	6.4 ^a	±0.06	29.12 ^a	±2.84
P2	6.4 ^a	±0.05	30.41 ^a	±2.86
P3	6.4 ^a	±0.08	32.37 ^a	±5.15

Explanations: like in Table 1.

The fact that wheat fibre “strengthens” the texture of meat products was demonstrated, among others, in the case of delicatessen (DASIEWICZ et AL. 2005), chicken hamburgers (CEGIELKA and PEĆZKOWSKA 2008) and fine comminuted sausages (KRICKMEIER and SCHNAECKEL 2008). In turn, if the preparation used was in a rehydrated form (i.e. as a fat replacer) the value may decrease of certain instrumentally measured parameters of texture (PIOTROWSKA et AL. 2009).

The results are given in Table 3 of the fatty acid determinations performed on hamburgers produced in the last experimental replication. Irrespectively of the amount of wheat fibre added to chicken hamburgers, a similar percentage content of UFA (> 60%) and PUFA (> 15%) was found in the total fatty acid pool. Among the PUFA the highest quantity was recorded for linoleic (C18:2, all-cis-9,12) and alpha-linolenic (C18:3, all-cis-9,12,15) acids. Irrespectively of the variant of model product, the ratio of PUFA to SFA was not higher than 0.52, but the ratio of PUFA n-6 to PUFA n-3 exceeded 9.8. The PUFA n-6/PUFA n-3 ratio was considered as nutritionally undesirable.

According to the dietary recommendations the PUFA/SFA ratio in food should amount between 0.4 and 1.0, and the PUFA n-6/PUFA n-3 ratio should not exceed 4 (WOOD et AL. 2004). The results obtained showed that activities may be taken to change the unfavourable PUFA n-6/PUFA n-3 ratio. The results of the other study on quality of hamburgers purchased on Polish market showed that the quality can vary broadly, not always being satisfactory from the nutritional point of view (KRYGIER and MAKSYMOWICZ 2008).

The results of the evaluation of sensory characteristics of chicken hamburgers are given in Table 4. It was ascertained that the increase of wheat fibre level in hamburger batters had no significant effect on the desirability of colour, aroma or taste, but it did affect significantly the hardness, juiciness and consistence of the model products. The most desirable hardness, juiciness and consistence were recorded for hamburgers containing 2.0% of the Vitacel WF 400 (P2). The overall desirability of the product containing 2.0% of fibre (P2) was also significantly higher, when compared with the remaining variants of the product. Although there was found no significant relation between the results of the instrumentally measured hardness of products (expressed as the

Table 3. The fatty acid composition in the examined chicken hamburgers of the last experimental replication (the percentage of the sum of acids)

Tabela 3. Skład kwasów tłuszczowych w hamburgerach z mięsa kurcząt wytworzonych w ostatniej serii doświadczalnej (udział procentowy w puli kwasów tłuszczowych)

Group of fatty acids	Variant			
	PK	P1	P2	P3
Sum of unsaturated fatty acids (UFA)	60.88	60.55	60.80	61.04
Sum of saturated fatty acids (SFA)	33.52	34.11	33.86	33.66
UFA/SFA	1.82	1.77	1.80	1.81
Sum of monounsaturated fatty acids (MUFA)	44.64	44.18	44.24	43.47
Sum of polyunsaturated fatty acids (PUFA)	16.35	16.47	16.67	17.69
PUFA/SFA	0.49	0.48	0.49	0.52
PUFA n-6	14.92	15.31	15.23	16.06
PUFA n-3	1.43	1.16	1.44	1.63
PUFA n-6/PUFA n-3	10.4	13.1	10.6	9.8

PK – control product, P1 – product with addition of 1.0% wheat fibre preparation, P2 – product with addition of 2.0% wheat fibre preparation, P3 – product with addition of 3.0% wheat fibre preparation.

Table 4. The effect of addition of the wheat fibre Vitacel WF 400 on the sensory profile of chicken hamburgers

Tabela 4. Wpływ dodatku preparatu błonnika pszennego Vitacel WF 400 na jakość sensoryczną hamburgerów z mięsa kurcząt

Sensorial attribute	Variant							
	PK		P1		P2		P3	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
Desirability of colour	6.1 ^a	±0.18	6.0 ^a	±0.17	6.3 ^a	±0.22	6.0 ^a	±0.17
Desirability of aroma	6.2 ^a	±0.18	6.0 ^a	±0.21	6.2 ^a	±0.13	6.3 ^a	±0.33
Desirability of taste	6.1 ^a	±0.13	6.1 ^b	±0.09	6.2 ^a	±0.24	6.2 ^a	±0.24
Desirability of hardness	5.7 ^a	±0.09	5.9 ^b	±0.15	7.1 ^c	±0.14	7.0 ^c	±0.12
Desirability of juiciness	6.1 ^{ab}	±0.09	6.3 ^{bc}	±0.13	6.4 ^c	±0.19	5.9 ^a	±0.19
Desirability of consistency	6.8 ^{ab}	±0.28	6.6 ^a	±0.23	7.6 ^c	±0.12	6.9 ^b	±0.13
Overall desirability	5.5 ^a	±0.33	6.2 ^b	±0.21	7.6 ^c	±0.26	6.6 ^b	±0.22

Explanations: like in Table 1.

values of F_{max}) and the results of sensory evaluation of hardness, or between the results of instrumentally measured hardness and the results of sensory evaluation of consistence (correlation coefficients amounted to $R = 0.26$ and $R = 0.25$, respectively), one may assume that the slight changes in hamburgers' texture, caused by the addition of wheat fibre, were positively noticed by the evaluating team. Moreover, the scores granted in the evaluation of sensory attributes (exceeding 5 in a 10-point scale) indicate the consumer acceptance of chicken hamburgers containing addition of wheat fibre.

Results reported by other authors confirm that addition of wheat fibre preparations to various kinds of meat products had no significant effects on the sensory value of colour, aroma and taste (BILSKA et AL. 2002, DASIEWICZ et AL. 2005, TROEGER et AL. 2005, CEGIELKA and PEĆZKOWSKA 2008, KRICKMEIER and SCHNAECKEL 2008). The sensory evaluation of texture characteristics of meat products containing wheat fibre showed that this additive may cause their slight improvement (BILSKA et AL. 2002, DASIEWICZ et AL. 2005, TROEGER et AL. 2005, CEGIELKA and PEĆZKOWSKA 2008) or deterioration (MAKAŁA and OLKIEWICZ 2005, PIOTROWSKA et al. 2009).

Conclusions

The application of 2.0 or 3.0% wheat fibre Vitacel WF 400 to the batter led to a significantly increased yield of chicken hamburgers after thermal processing. Except for the chloride content, the chemical composition of chicken hamburgers was significantly affected by the addition of the wheat fibre: the content of water increased, while that of fat and protein decreased. The range of changes was the highest for the product containing 3.0% of wheat fibre. The changes in the chemical composition were related to a significant decrease in the caloric value of hamburgers. Irrespectively of the addition level of the Vitacel WF 400, model hamburgers were characterized by a similar percentage content of SFA and UFA. On the basis of instrumental measurements it was demonstrated that the addition of fibre had no significant effect on the hamburgers' pH and texture. The sensory desirability of colour, aroma and taste of the model products did not deteriorate significantly as the result of the addition of the wheat fibre. The product containing 2.0% of the wheat fibre Vitacel WF 400 was characterized by the highest desirability of hardness, juiciness and consistence, as well as the overall sensory desirability.

On the basis of the results obtained one may state that the addition of 2.0% of the fibre Vitacel WF 400 did not result in a deterioration of the sensory acceptance of chicken hamburgers, rendering it possible to increase the yield of the ready product and lower its caloric value. Simultaneously, it was shown that it is necessary to study the possibility of increasing the nutritive value (i.e. change the PUFA n-6/PUFA n-3 ratio) and improving the sensory acceptance of hamburgers containing wheat fibre.

References

- BACKERS T., NOLL B., 1998. Ballaststoffe halten Einzug in der Fleischverarbeitung. *Fleischwirtschaft* 78, 4: 316-320.
- BILSKA A., KRYSZTOFIK K., SĘK P., UCHMAN W., 2002. Wpływ dodatku preparatu błonnika Vitacel na jakość wędliny typu mielonka. *Acta Sci. Pol. Technol. Aliment.* 1, 1: 47-53.

- CEGIELKA A., PĘCZKOWSKA M., 2008. Wpływ wielkości dodatku preparatu błonnika pszennego na jakość hamburgerów drobiowych. *Rocz. Inst. Przem. Mięsn. Tłuszcz.* 46, 2: 83-91.
- DASIEWICZ K., SŁOWIŃSKI M., GAŁĘZIEWSKI R., 2005. Próba zastosowania błonnika pszennego „Vitacel” do produkcji drobno rozdrobnionych wyrobów garnażeryjnych z mięsa drobiowego. *Mięso Wędliny* 2: 30-34.
- DOLATA W., PIOTROWSKA E., SZCZEPANIAK B., 2005. Wpływ częściowej wymiany tłuszczu preparatem błonnikowym pszennym na teksturę i wybrane cechy sensoryczne wędlin drobno rozdrobnionych. *Bromatol. Chem. Toksykol. Supl.*: 443-447.
- KRICKMEIER J., SCHNAECKEL W., 2008. Beeinflussung der technologischen und sensorischen Qualitaet von Bruehwursten durch funktionelle Inhaltsstoffe. *Fleischwirtschaft* 88, 3: 110-113.
- KRYGIER K., MAKSIMOWICZ K., 2008. Jakość hamburgerów dostępnych na polskim rynku. *Przem. Spoż.* 62, 1: 27-29.
- KRZYWDZIŃSKA-BARTKOWIAK M., DOLATA W., PIĄTEK M., MICHALSKI K., 2008. Wpływ wymiany tłuszczu zwierzęcego tłuszczem roślinnym i błonnikiem pokarmowym na jakość farszów i kielbas drobno rozdrobnionych. *Żywn. Nauka Technol. Jakość* 59, 4: 61-67.
- LANDER S., 2004. Hochfunktionelle Weizenfasern. Unloesliche Ballaststoffe und ihr Zusatznutzen beim Einsatz in Fleischwaren. *Fleischwirtschaft* 84, 7: 45-47.
- MAKAŁA H., 2002. Rola wybranych preparatów błonnikowych w kreowaniu jakości modelowego wyrobu mięsnego. *Rocz. Inst. Przem. Mięsn. Tłuszcz.* 39: 147-157.
- MAKAŁA H., 2003 a. Błonnik w wyrobach mięsnych. *Gosp. Mięsna* 55, 8: 24-28.
- MAKAŁA H., 2003 b. Wpływ preparatów błonnika ziemniaczanego i pszennego oraz inuliny na wybrane wyróżniki fizykochemiczne i reologiczne modelowej konserwy mięsnej. *Żywn. Nauka Technol. Jakość* 36, 3: 21-30.
- MAKAŁA H., OLKIEWICZ M., 2005. Rola wybranych preparatów błonnika w kształtowaniu wyróżników tekstury produktu drobno rozdrobnionego. *Rocz. Inst. Przem. Mięsn. Tłuszcz.* 42/43: 229-239.
- MAKAŁA H., OLKIEWICZ M., MOCH P., 2004. Rola wybranych preparatów błonnika w kształtowaniu struktury i jakości modelowego wyrobu mięsnego. *Rocz. Inst. Przem. Mięsn. Tłuszcz.* 41: 223-229.
- OHR L.M., 2004. Fortyfyng with fiber. *Food Technol.* 58, 2: 71-75.
- PIOTROWSKA E., DOLATA W., BARANOWSKA H.M., RETZLER R., NIEDBAŁA D., 2009. Jakość kielbas kutrowanych z błonnikiem pokarmowym wyprodukowanych w warunkach przemysłowych. *Mięso Wędliny* 7: 32-35.
- PN-75/A-04018, 1975. Produkty rolniczo-żywnościowe. Oznaczanie azotu metodą Kjeldahla i przeliczanie na białko. PKN, Warszawa.
- PN-A-82112:1973. Mięso i przetwory mięsne. Oznaczanie zawartości chlorków. PKN, Warszawa.
- PN-A-82058:1997. Mięso i przetwory mięsne. Pomiar pH. PKN, Warszawa.
- PN-ISO 41219:1998. Analiza sensoryczna. Metodologia. Ocena produktów żywnościowych przy użyciu metod skalowania. PKN, Warszawa.
- PN-ISO 1442:2000. Mięso i przetwory mięsne. Oznaczanie zawartości wody. PKN, Warszawa.
- PN-ISO 1444:2000. Mięso i przetwory mięsne. Oznaczanie zawartości tłuszczu wolnego. PKN, Warszawa.
- PYRCZ J., KOWALSKI R., 2009. Innowacyjne dodatki technologiczne w przemyśle mięsnym. *Przem. Spoż.* 63, 3: 28-31.
- SIEG J., 2005. Angereichert mit Ballaststoffen. Funktionelle Zutaten zur Entwicklung von Fleisch- und Wurstwaren im Wellness-Segment. *Fleischwirtschaft* 85, 4: 60-64.
- SIEG J., VOGELBACHER A., 2008. Effekt resultiert aus gezielter Kombination. Moeglichkeiten der Herstellung ballaststoffreicher und fettreduzierter Fleischerzeugnisse mittels Getreide und Gemuesefasern. *Fleischwirtschaft* 88, 12: 59-61.
- TROEGER K., NITSCH P., MÜLLER W.D., MÜNCH S., 2005. Kein Angriff auf Geschmack und Textur. *Fleischwirtschaft* 85, 7: 54-56.

Cegielka A., Młynarczyk K., 2010. The effect of addition of the wheat fibre Vitacel WF 400 on the quality of chicken hamburgers. *Nauka Przyr. Technol.* 4, 5, #55.

TYBURCY A., CÍWIEK J., ADAMCZAK L., 2003. Wpływ preparatu błonnika pszennego i transglutaminazy oraz stopnia rozdrobnienia surowca mięsnego na właściwości kielbasy imitującej salami. *Żywn. Nauka Technol. Jakość* 34, 1: 72-78.

WOOD J.D., RICHARDSON R.I., NUTE G.R., FISHER A.V., CAMPO M.M., KASAPIDOU E., SHEARD P.R., ENSER M., 2004. Effects of fatty acids on meat quality: a review. *Meat Sci.* 66, 1: 21-32.

WPŁYW DODATKU PREPARATU BŁONNIKA PSZENNEGO VITACEL WF 400 NA JAKOŚĆ HAMBURGERÓW Z MIĘSA KURCZĄT

Streszczenie. W pracy przeprowadzono badania nad wpływem dodatku preparatu błonnika pszennego Vitacel WF 400 (w ilości 1,0, 2,0 lub 3,0% w stosunku do masy składników farszu) na skład chemiczny i jakość sensoryczną hamburgerów z mięsa kurcząt. Stwierdzono, że wzbogacenie hamburgerów drobiowych błonnikiem pszennym spowodowało istotny wzrost wydajności gotowego wyrobu, zmiany w jego podstawowym składzie chemicznym oraz zmniejszenie kaloryczności, natomiast nie różnicowało istotnie tekstury hamburgerów mierzonej instrumentalnie (siła cięcia). Zastosowanie dodatku preparatu Vitacel WF 400 nie spowodowało pogorszenia ocenianych sensorycznie: barwy, zapachu, smaku i soczystości hamburgerów. Najwyższe noty w ocenie twardości, związania oraz ogólnej pożądalności sensorycznej uzyskał produkt zawierający 2,0% dodatku błonnika pszennego.

Słowa kluczowe: mięso kurcząt, hamburgery, błonnik pszenny, jakość

Corresponding address – Adres do korespondencji:

Aneta Cegielka, Katedra Technologii Żywności, Szkoła Główna Gospodarstwa Wiejskiego w Warszawie, ul. Nowoursynowska 159 C, 02-787 Warszawa, Poland, e-mail: aneta_cegielka@sggw.pl

Accepted for print – Zaakceptowano do druku:

27.07.2010

For citation – Do cytowania:

Cegielka A., Młynarczyk K., 2010. The effect of addition of the wheat fibre Vitacel WF 400 on the quality of chicken hamburgers. *Nauka Przyr. Technol.* 4, 5, #55.