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The effect of a diet based on semifinished products from plant and animal raw materials on reproductive capacity, growth, and development of the organism

Gennadii Tkach

Doctor of Medical Sciences, Professor
National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine
<https://orcid.org/0000-0002-6482-4792>

Alina Omelian*

PhD in Agricultural Sciences, Associate Professor
National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine
<https://orcid.org/0000-0001-9004-5250>

Yurii Kushnir

Postgraduate Student
National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine
<https://orcid.org/0000-0002-6364-8117>

Olena Altanova

PhD in Pedagogical Sciences
National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine
<https://orcid.org/0000-0002-2783-4932>

Abstract. The demand among the population for protein products, which are essential for a healthy diet, is a pressing issue today, which constantly requires scientists and manufacturers to search for alternative protein analogues. That is why the aim of the research was to study the impact of a diet based on plant and animal raw materials on the reproductive capacity, growth,

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*Corresponding author



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and development of the body. In the experiment, the duration of pregnancy in pregnant females was determined; the average number of rats born per female of the respective group; the weight of females before pregnancy; the weight of females on the 7th, 14th and 21st day of pregnancy. The postnatal development of rats of the control and experimental groups was compared. In newborn rats, the following were determined: age of ear drum detachment; craniocaudal size at birth; craniocaudal size on the 5th day; age of hair coat appearance; age of eye-opening; weight of rats at birth; weight of rats on the 7th, 14th and 30th day of life. The results obtained indicate that there is no negative effect of the vegetable semifinished product using soya-wheat texture and meat cutlet on the reproductive functions of rats and the development of offspring. During the experiment, female rats showed no signs of toxicosis, visible pregnancy disorders, or physiological disorders. During the dynamic observation of the weight of experimental females in all experimental groups, no decrease in weight gain was recorded compared to control animals. The weight and postnatal dimensions of newborn rats of the experimental groups did not differ from those of the control. For the first time in laboratory animals, based on an integrated approach using modern research methods, the effect of long-term consumption of food based on semifinished products from soy-wheat texture and meat cutlets on the reproductive functions of rats and the development of offspring was studied, which is of practical value in the context of the health of females and offspring of mammals under the influence of an alternative nutritional factor

Keywords: polymorphism; restriction; electrophoresis; allele; amplification

Introduction

The normal course of energy metabolism at the molecular level results in the dynamic interaction of catabolism and anabolism. With food, a person receives macro- and microelements, substances necessary for the synthesis of organic compounds that act as regulators and biological catalysts, such as hormones and enzymes. To perform these functions, in different conditions and at different stages of the body's life, nutrients of the appropriate quality and quantity are required. Hence, the main requirement for a rational diet is that the quantity and quality of food meet the needs of the body. Failure to meet this requirement leads to various diseases and nutritional inadequacies, stunted growth, physiological and mental development (Sautchuk & Eliseev, 2022).

The growing demand among the population for meat (protein) products, which are essential for a healthy diet, constantly requires scientists and manufacturers to search for alternative protein analogues, which is actively pursued

in their research activities by S. Smetana *et al.* (2021) and L. Bal-Prylypko *et al.* (2022). Recently, there has been a significant expansion of the market for “artificial” meat of plant origin, which is increasingly used by consumers around the world and in Ukraine (Bakhsh *et al.*, 2022). According to O. Huk (2022), the plant-based meat industry is expected to reach USD 20.7 billion with a total annual growth rate of about 8.6 % and by 2040 could account for up to 60 % of the global meat market, while meat, poultry, and seafood production will amount to USD 7.3 trillion. Meat analogues are defined as food products that mimic traditional meat products in terms of consistency, organoleptic, aesthetic, and chemical characteristics. Meat substitutes include many products that are not necessarily based only on plant material, but may contain animal protein, milk, eggs, fish, or insect components (Yang *et al.*, 2023). There is a diverse range of vegetable meat analogues that is constantly being improved and is widely available

in grocery chains in the form of cutlets, burgers, fillets, minced meat and nuggets. Plant-based proteins derived from wheat, lentils, soybeans, peas, and beans are widely consumed by different population groups around the world and are one of the key structure-forming and nutritional components in meat analogues (Kyriakopoulou *et al.*, 2021).

According to the existing paradigm of recent decades, animal proteins have been considered the main dietary source of protein, but changing food consumption patterns and culture among the world's population has led to the significant use of plant proteins and, as a result, its production has increased dramatically in the agricultural and food industries. There has also been a long-standing and justified debate about the health benefits of eating plant-based foods as opposed to meat products, but the research is heterogeneous and, in many cases, highly controversial (O'Keefe *et al.*, 2022). Scientific review by L.P. Penkert *et al.* (2021) generally suggests that meat is a source of high-quality protein, but its amino acid composition is very different from plant protein, which affects liver metabolism. On the one hand, the consumption of plant-based foods is generally considered healthy and modern, but studies by A. Kaleda *et al.* (2021) confirmed that most plant-based proteins, which come from legumes and grains, are lower in fat and protein compared to meat products. The macro- and micro-nutrient composition of meat analogue products often coincides with that of traditional meat products, but the research by S.R. Hertzler *et al.* (2020) studying the amino acid composition of plant proteins provides insight into the low content of lysine, cysteine and methionine in meat substitutes.

In arguing for the benefits of a plant-based diet, J.F. O'Keefe *et al.* (2022) highlight the negative impact on human health of high meat consumption, especially red and processed meat, and link excessive meat consumption to higher rates of coronary heart disease, type 2 diabetes, and certain gastrointestinal cancers.

In addition to quality indicators, products must be safe and provide the body with a full range of nutrients and have a positive impact on its development and vitality.

The study aimed to investigate the impact of long-term consumption of plant-based and meat-based food on reproductive function, pre- and postnatal development of offspring.

The main objectives of the study were:

1. To systematically summarize scientific data on the impact of semifinished products made from vegetable and meat raw materials on the body.

2. To simulate and perform an experiment during normal pregnancy in white rats with consumption of semifinished products from vegetable and meat raw materials.

3. To conduct a meta-analysis to assess the total effect of semifinished products from vegetable and meat raw materials on the body weight of pregnant females, the weight of rats at birth, the weight of rats on the 7th, 14th and 30th days of life, the general physical development of offspring, the rate of appearance of basic sensory and motor reflexes during the feeding period, emotional and motor behaviour, the appearance of hair and eye-opening.

Materials and Methods

To systematically summarize scientific data on the effects of semifinished products made from vegetable and meat raw materials on the body, experiments were conducted using the method of group analogues at the vivarium of the National University of Life and Environmental Sciences of Ukraine on 30 pregnant female white laboratory rats aged six to twelve months and their offspring (30 rats). The experimental animals were housed in a room with a controlled temperature (20-23°C) and humidity (approximately 50%) according to a 12:12 light:dark schedule. To facilitate the measurement of food intake, rats were housed in individual suspended stainless steel mesh cages. The food was pre-weighed (in grams) and fed

into the cages to the animals. After 24 hours, the rats were briefly removed from the cages and weighed, and the amount of food remaining at the bottom of the cages or poured onto plastic sheets placed under each cage was recorded and the weight of the food consumed was calculated. The animals were cared for in vivarium conditions in accordance with the regulations: “European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes” (1986), as well as Law of Ukraine No. 3447-IV “On the Protection of Animals from Cruel Treatment” (2006, February).

The animals were divided into the following groups:

Group I – animals of the control group, which received drinking water and commercial standard food (18 % protein) in the form of dry granular feed containing all the substances necessary for normal life throughout the experiment.

Group II – rats of the experimental group received frozen chopped meat cutlets and drinking water. The nutritional value per 100 g of product was: energy value – 264 kcal, proteins – 22.4 g, fats – 19.0 g, of which saturated fats – 18.7 g, carbohydrates – 0.8 g, salt – 0.63 g. After defrosting, the semifinished product was cooked in a frying pan over high heat for 4-5 minutes on each side.

Group III – animals of the experimental group received quick-frozen vegetable semifinished products using soya-wheat texture and drinking water. Their nutritional value per 100 g of product was: energy value – 159.50 kcal, proteins – 14.77 g, fats – 11.76 g, carbohydrates – 5.10 g, salt – 1.52 g. After defrosting, the semifinished product was cooked in a frying pan over high heat for 4-5 minutes on each side.

Animals began receiving the specified feed 2 weeks before pregnancy, during pregnancy and one month after the birth of the offspring. The weight of pregnant and newborn rats was determined using electronic scales ACOM JW (Germany) with an accuracy of 0.01 g. In the experiment, the following parameters were

determined in pregnant females: duration of pregnancy, days; average number of rats born per female of this group, pcs; weight of females before pregnancy, g; weight of females on the 7th, 14th and 21st day of pregnancy, g.

Statistical data processing was performed using a package of applied statistical computer programs – MS Excel 2016 and SPSS-17. The mean values between the three groups of rats were compared by one-factor analysis of variance (ANOVA) followed by the Bonferroni post hoc test. Comparison of the frequencies of distribution of various parameters in subgroups was performed using the Pearson’s test. The value of $p < 0.05$ was considered significant. The approaches of observation, comparison, analysis, and generalization of data were used to conduct general scientific research. Observation included recording important indicators that characterize the nature of ontogenesis. The methods of comparison and analysis were used to record the results that were in the array of data obtained. The approach of generalization was used to describe the research results, their logical and consistent presentation, and to formulate the author’s conclusions.

Results and Discussion

During the experiment, pregnant females of all groups showed no signs of toxicosis, visible disorders of pregnancy and physiological functions. The duration of pregnancy in group 3 was the highest – 22.5 days, which is 5.8% more than in group 2 and 1.3% more than in the control. In general, there was no statistical difference between the groups in terms of pregnancy duration. In a pairwise comparison between the groups, no significant difference was found (Table 1). The average number of rats born from females of each group was almost the same between the groups. The difference ranged from 0.2 to 0.4 ($p = 0.716$). There was no statistically significant difference between the comparison groups when analysing the weight of females during pregnancy

(Table 1). The weight of females before pregnancy and on the 7th day of pregnancy was the highest in the group, where semifinished products from soya-wheat texture were consumed. On the 7th day of pregnancy, the difference was 0.7 % compared to the group that consumed

meat cutlets and the control group. From the 14th day of pregnancy until the end of the experiment, females of the control group had the highest weight. The difference in weight of females on the 21st day of pregnancy ranged from 0.8-3.6 %.

Table 1. Massometric indicators of pregnant females (n = 10)

	I group, control	II group, meat cutlet	III group, semifinished products from soy-wheat texture	p
Duration of pregnancy, day	22.2 ± 1.55	21.2 ± 2.09	22.5 ± 1.72	0.258
		p = 0.676*	p > 0.05**	
			p = 0.355***	
The average number of rats born from a female of this group, pcs	7.3 ± 1.06	6.9 ± 0.99	7.1 ± 1.19	0.716
		p > 0.05*	p > 0.05**	
			p > 0.05***	
Weight of females before pregnancy, g	224.90 ± 20.18	227.65 ± 20.91	226.99 ± 17.71	0.948
		p > 0.05*	p > 0.05**	
			p > 0.05***	
Weight of females on the 7 th day of pregnancy, g	238.78 ± 19.08	239.01 ± 19.29	240.58 ± 14.09	0.970
		p > 0.05*	p > 0.05**	
			p > 0.05***	
Weight of females on the 14 th day of pregnancy, g	264.12 ± 14.87	261.06 ± 18.95	263.97 ± 18.02	0.907
		p > 0.05*	p > 0.05**	
			p > 0.05***	
Weight of females on the 21 st day of pregnancy, g	303.53 ± 15.45	293.11 ± 19.37	301.07 ± 14.16	0.349
		p = 0.506*	p > 0.05**	
			p = 0.867***	

Note: n is the number of rats in the group; p – difference between groups; * – difference between the control group and the group of animals that consumed meat cutlets; ** – difference between the control group and the group of animals that used semifinished products; *** – difference between the group of animals that used meat cutlets and semifinished products

Source: developed by the authors

Comparative characteristics of postnatal development of rats of all study groups are presented in Table 2. No significant difference between the comparison groups was found

in the analysis of the adhesion of the auricles (p = 0.766), craniocaudal size at birth (p = 0.891) and on day 5 (p = 0.882), and the appearance of the coat (p = 0.318).

Table 2. Indicators of postnatal development of rats (n = 10)

	I group, control	II group, meat cutlet	III group, semifinished products from soy-wheat texture	p
Detachment of auricles, day	3.9 ± 0.88	4.1 ± 0.88	3.8 ± 1.03	0.766
		p > 0.05*	p > 0.05**	
			p > 0.05***	
Craniocaudal size at birth, cm	5.03 ± 0.21	4.97 ± 0.29	5.02 ± 0.32	0.891
		p > 0.05*	p > 0.05**	
			p > 0.05***	
Craniocaudal size on the 5 th day, cm	5.32 ± 0.08	5.29 ± 0.11	5.34 ± 0.29	0.882
		p > 0.05*	p > 0.05**	
			p > 0.05***	
The appearance of a woolen coat, day	6.1 ± 0.31	5.7 ± 0.3	6.3 ± 0.21	0.318
		p = 0.962*	p > 0.05**	
			p = 0.422***	
Opening eyes, day	12.6 ± 0.52	14.2 ± 0.51	12.4 ± 0.48	0.034
		p = 0.099*	p > 0.05**	
			p = 0.053***	
Weight of rats at birth, g	5.99 ± 0.39	5.41 ± 0.29	5.76 ± 0.34	0.003
		p = 0.002*	p = 0.451**	
			p = 0.09***	
Weight of rats on the 7 th day of life, g	8.49 ± 0.43	7.83 ± 0.39	8.12 ± 0.46	0.006
		p = 0.005*	p = 0.178**	
			p = 0.421***	
Weight of rats on the 14 th day of life, g	16.32 ± 1.32	15.69 ± 1.29	16.18 ± 0.71	0.45
		p = 0.701*	p > 0.05**	
			p > 0.05***	
Weight of rats on the 30 th day of life, g	59.77 ± 7.31	53.71 ± 2.73	58.13 ± 4.19	0.036
		p = 0.04*	p > 0.05**	
			p = 0.191***	

Note: n is the number of rats in the group; p – difference between groups; * – difference between the control group and the group of animals that consumed meat cutlets; ** – difference between the control group and the group of animals that used semifinished products; *** – difference between the group of animals that used meat cutlets and semifinished products

Source: developed by the authors

However, it is worth noting that the adhesion of the ears was faster by 2.6-7.9 % in the group whose mothers consumed vegetable-based semifinished products (3.8 days), the craniocaudal size of rats at birth was larger in the control group (5.03 cm); however, on

the 5th day of life, the representatives of the group whose mothers consumed semifinished products from soya-wheat texture were larger – 5.34 cm, which is 0.9% more than in the 2nd group, whose mothers consumed meat cutlets, and 0.4% more than in the control group. The

hair coat appeared faster in rats whose mothers consumed meat cutlets – 5.7 days, which is 7.0% faster than the control and 10.5% faster than the group whose mothers consumed semifinished products from soya-wheat texture. A statistical difference between the comparison groups was noted in eye-opening ($p = 0.034$). This sign of development was fastest in offspring whose mothers received semifinished products with soya-wheat texture – 12.4 days, which is 14.5% faster than in group 2, whose mothers consumed meat cutlets, and 1.6% faster than in the control group. At the same time, no significant difference was found in the groups after pairwise comparison. The study of the weight of newborn rats showed a significant difference between the comparison groups at birth ($p = 0.003$), on the 7th ($p = 0.006$) and 30th day of postnatal development ($p = 0.036$). In general, during the experiment, the weight of rats at birth was the highest in the control group. The difference in the mass parameters of newborn rats was 0.23–0.58 g or 3.8–9.7%, at 7 days of age – 0.37–0.66 g or 4.4–7.8%, at 14 days of age – 0.14–0.63 g or 0.9–3.7%, at 30 days of age – 1.64–6.06 g or 2.7–10.1%. At the same time, a posteriori analysis by the Bonferroni method showed that the weight of newborn rats from mothers who received semifinished meat products was statistically lower than in the control group ($p = 0.002$). There was no statistically significant difference in birth weight between the groups of rats whose mothers consumed semifinished products and the control group ($p = 0.451$). There was also no significant difference in birth weight between the 2nd and 3rd experimental groups ($p = 0.09$). On the 7th day of life, the situation between the comparison groups was like that at birth. On the 14th day of the study, there was no statistical difference in weight between the groups. On day 30, it was found that the weight of newborn rats whose mothers received semifinished products did not differ from the control group ($p > 0.05$). On day 30, the weight of animals whose mothers ate

meat cutlets was statistically different from the control group ($p = 0.04$).

Thus, the results obtained indicate that there is no negative effect of the vegetable semifinished product using soya-wheat texture and meat cutlet on the reproductive functions of rats and the development of offspring. During the experiment, female rats showed no signs of toxicosis, visible pregnancy disorders, or physiological disorders. During the dynamic observation of the weight of experimental females in all experimental groups, no decrease in weight gain was recorded compared to control animals. The weight and postnatal dimensions of newborn rats of the experimental groups did not differ from those of the control. At the same time, there was a difference in weight between the control and experimental groups of newborn rats.

N. Omelchenko & G. Dronik (2018) showed in their study no negative effect of heat-treated genetically modified soybeans in the feed on the reproductive functions of rats and the physical development of their offspring. All the studied parameters were within the physiological norm. The authors did not observe a decrease in the weight of the animals during the experiment, which received heat-treated soya beans. However, the researchers did find a decrease in the number of newborn rats in the group that consumed genetically modified soybeans. They suggest that this may be due to the influence of phytoestrogens and other biologically active substances in genetically modified soybeans, which cause disruption of embryonic development and, as a result, the birth of physiologically weak and non-viable offspring. The results of the author's research are not consistent with those presented in the publication, where no reduction in the number of newborn pups was observed in the group of females who consumed vegetable semifinished products using soy-wheat texture.

I.V. Chorna & G. Dronik (2018) also showed in their research that when soybean was added to the diet of female rats, the number of

offspring was within the range of the control group, which is consistent with the presented studies. The authors observed an increase in the weight of newborn pups whose mothers received soybean feed compared to the control. At the same time, from day 3 to day 20, the researchers noted a decrease in the weight of the offspring, which may be due to the residual effect of soy bioflavonoids. The weight of 2-month-old rats was higher than that of the control group, which proves the positive impact of soy on offspring growth, the high level of soy protein absorption by animals and its biological value.

The timing of the ear flaps and the appearance of a woolly coat in newborn rats in the presented studies coincided with the results of N. Omelchenko & G. Dronik (2018). However, the opening of eyes in the authors' experimental pups was observed earlier compared to the researcher's data. An analysis of this year's research has shown that the scientific community has focused on the role of diets in high fat. And although their research is consistent with the authors' study of the reactions of pregnant females and their offspring, in general, the results of the experiments are incomparable due to the difference in the objects and partially in the subjects of the studies. C.C. Lapa Neto *et al.* (2023) studied the effect of a high-fat diet on the body of pregnant and lactating females and changes in the liver of their offspring, which is in stark contrast to the studies presented here, given the additional difference in the observed indicators. Although T.L. He *et al.* (2023), like the authors, observed fetal growth, the rest of the indicators and the study as a whole are not consistent.

Also, over the past year, there have been scientific papers on the study of reproductive functions and body development, which is consistent with the authors' research. However, the factors of influence that interest the authors differ. Scientists from the United States of America, England, the Kingdom of Belgium, the People's Republic of China, and the Republic of Kazakhstan focused their research on the

impact of trace elements: W. Ali *et al.* (2023) – Cadmium, and F.J. Murray *et al.* (2023) – Copper. The scientific search has shown the interest of the scientific community in alternative factors of influence on reproductive function and fetal development, which allows comparing the authors' studies. However, the mechanism of action of the exposure factors (*Chrysobalanus icaco* leaf extract (Rodrigues *et al.*, 2023), *Agaricus bisporus* mushroom (Ng, 2020; Caetano *et al.*, 2023) is not consistent and the comparison of results in such conditions is incorrect. The current array of scientific publications shows the interest of researchers in the reproductive function of females, which is consistent with the presented studies, but mostly there is a desire to improve pathological diabetic manifestations in pregnancy, which is not consistent with the objectives of the presented studies. E. Klöppel *et al.* (2023) investigated the role of calcium and vitamin D supplementation on tolerance to diabetic symptoms during pregnancy.

There are studies that agree on the main objectives of the researchers, but there are discrepancies in the results of the experiments. S.D. Simons and P.V. Johnston (1976) confirmed the negative effects of limiting animal protein (casein) in the diet of rats. The researchers recorded a slowdown in brain development and a disruption in the composition of the myelin sheath of nerve fibres, indicating a general delay in the development of offspring in the postnatal period, which was not observed in the authors' studies of plant-based semifinished products, which were also deficient in animal proteins. There is an assumption that the delayed development of rats in the US researchers was caused specifically by a deficiency of casein (a protein in dairy products), and the studies are quite outdated and require clarifying experiments using modern methods. This inconsistency in results suggests that studies should be repeated with the addition of casein control in females and their offspring.

Current research confirms the importance of protein control in the diet of pregnant females and their offspring. V.S. Moullé *et al.* (2023) experimentally demonstrated that groups with lower protein content during pregnancy and lactation were characterized by lower weight parameters compared to groups with a balanced diet. These studies are consistent with the authors' in the context of the overall goal, but do not agree on the results, since V.S. Moullé *et al.* (2023) fed the study group a limited level of protein, and the authors of the presented studies did not bring the level of protein to a deficiency in any of the groups, but its origin was different.

Thus, there are similar studies on the effect of different diets on the pre- and postnatal development of rats among modern scientific works, but there was no complete agreement on the specifics of diets. This confirmed the scientific novelty of the studies conducted by the authors and provided many grounds for further research in this area.

Conclusions

Thus, analysing the results of the study, there was no negative effect of adding soya-wheat texture to animal feed on reproduction, pre- and postnatal development of rats. Pregnancy of female rats was without signs of toxicosis, visible disorders of pregnancy and physiological functions. The duration of pregnancy in group 3 was the highest, 5.8 % longer than in group 2 and 1.3 % longer than in the control group. However, the difference was not statistically significant. In general, no significant differences were found in the average number of newborn rats and the weight of pregnant females during the experiment. The difference in the average number of newborn rats ranged from 0.2 to 0.4 ($p = 0.716$). The weight of females before pregnancy and on the 7th day of pregnancy was the highest in the group, where semifinished products from soya-wheat texture

were consumed. From the 14th day of pregnancy until the end of the experiment, females of the control group had the highest weight. The postnatal parameters of the rats were within the physiological norm. The adhesion of the auricles was faster in the group whose mothers consumed vegetable-based semifinished products, the craniocaudal size of rats at birth was larger in the control group, but on the 5th day of life of the offspring, an increase in the weight of newborn animals whose mothers consumed soy-wheat texture semifinished products was noted. The hair coat appeared faster in rats whose mothers consumed meat cutlets. The opening of the eyes started the fastest in offspring whose mothers received semifinished products with soya-wheat texture (12.4 days), the difference between the groups was statistically significant ($p = 0.034$). The study of mass parameters of offspring showed a significant difference between the comparison groups, respectively at birth – $p = 0.003$, on the 7th day of postnatal development – $p = 0.006$ and on the 30th day – $p = 0.036$. A posteriori analysis by the Bonferroni method showed a statistically significant difference in the weight of newborn rats whose mothers received semifinished meat products with the control group, and a similar situation was observed at the end of the experiment.

The results obtained can serve as a basis for further studying the effect of soy-wheat texture on organ morphology and will help solve the current problem of plant-based nutrition. Another prospect for further research is to study the morphology of organs in laboratory pregnant rats and their offspring after consumption of soy-wheat, pea, and soy texture by adult animals.

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Conflict of Interest

None.

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Вплив раціону на основі напівфабрикатів з рослинної і тваринної сировини на відтворювальну здатність, ріст і розвиток організму

Геннадій Федорович Ткач

Доктор медичних наук, професор

Національний університет біоресурсів і природокористування України

03041, вул. Героїв Оборони, 15, м. Київ, Україна

<https://orcid.org/0000-0002-6482-4792>

Аліна Миколаївна Омелян

Кандидат сільськогосподарських наук, доцент

Національний університет біоресурсів і природокористування України

03041, вул. Героїв Оборони, 15, м. Київ, Україна

<https://orcid.org/0000-0001-9004-5250>

Юрій Миколайович Кушнір

Аспірант

Національний університет біоресурсів і природокористування України

03041, вул. Героїв Оборони, 15, м. Київ, Україна

<https://orcid.org/0000-0002-6364-8117>

Олена Борисівна Альтанова

Кандидат педагогічних наук

Національний університет біоресурсів і природокористування України

03041, вул. Героїв Оборони, 15, м. Київ, Україна

<https://orcid.org/0000-0002-2783-4932>

Анотація. Актуальним питаннями сьогодення є попит серед населення на білкові продукти, які необхідні для здорового харчування людини, що постійно вимагає від науковців та виробників займатися пошуком альтернативних аналогів білка. Саме тому метою наукової роботи було дослідження впливу раціону на рослинній і тваринній сировині на відтворювальну здатність, ріст і розвиток організму. В експерименті у вагітних самок визначали тривалість вагітності; середню кількість народжених щурів від самки відповідної групи; вагу самок до вагітності; вагу самок на 7-му, 14-ту та 21-шу добу вагітності. Проведено порівняння постнатального розвитку щурів контрольної та дослідних груп. У новонароджених щурів визначали: вік відлипання вušних раковин; краніокаудальний розмір при народженні; краніокаудальний розмір на 5-ту добу; вік появи шерстяного покриву; вік відкривання очей; вага щурів при народженні; вага щурів на 7-му, 14-ту та 30-ту добу життя. Отримані результати свідчать про відсутність негативного впливу рослинного напівфабрикату з використанням соєво-пшеничного текстурату та м'ясної котлети на репродуктивні функції щурів та розвиток потомства. Протягом експерименту у щурів-самок не було ознак токсикозу, видимих порушень вагітності, порушення фізіологічних функцій. Під час динамічного спостереження за вагою дослідних самок у всіх експериментальних групах не зареєстровано зниження приросту ваги порівняно з контрольними тваринами. Вага та постнатальні розміри новонароджених щурів експериментальних груп не відрізнялись від контролю. Вперше на лабораторних тваринах, на основі комплексного підходу з використанням сучасних методів дослідження проведено вивчення впливу тривалого споживання їжі на основі напівфабрикатів із соєво-пшеничного текстурату та м'ясної котлети на репродуктивні функції щурів та розвиток потомства, що має практичну цінність у контексті здоров'я самок і потомства ссавців під дією альтернативного аліментарного чинника

Ключові слова: вагітність; розвиток до народження та під час народження; соєво-пшеничний текстурат; сировинні матеріали м'яса