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RECIPES OF COMPOUND FEEDS FOR BUDGERIGARS AND THEIR QUALITY

Abstract

The article describes that budgerigar are the most widespread group of poultry. They are the 4th most popular pet in Ukraine after cats and dogs. Budgerigars are unpretentious, but they need a full and balanced diet and comfortable keeping conditions. The feasibility of using pelleted feed for a balanced and complete feeding of budgerigars is justified. It should make up at least 75% of the diet. It has been proven that pellets have a good effect on the parrot's body, because compressed feed contains much more nutrients, vitamins and microcomponents for the good development of the parrot's body. It is established that creation of a compound feed model with the help of recipe calculation optimization programs allows you to produce an effective compound feed. It allows to meet the needs of animals in nutrients and biologically active substances for life support, health, development, reproduction and obtaining high productivity. Recipe calculation programs permit you to choose components from the available raw materials, taking into account their quality, in the optimal ratio and the minimum cost of the finished product. As practice shows, the use of optimization programs of compound feed recipes allows you to reduce the cost of the product by 5 – 7%. It is proven that budgerigars should receive high-quality and balanced feed for normal development. The program complex for calculation and optimization of compound feed recipes "Korm Optima Expert" was used to develop recipes of pelleted compound feed for budgerigars with minimal cost. They meet the feeding standards and restrictions on the introduction of components and can be used for their complete feeding. Experimental samples of compound feed were made in accordance with the developed recipes of pelleted compound feed for budgerigars. Physical properties and chemical composition were studied in the experimental samples. It is established that the experimental samples are characterized by satisfactory physical properties and are balanced in content of nutrients and biologically active substances and meets the physiological needs and feeding standards of the budgerigars. The cost of raw materials for the developed pelleted feed is on average 10 UAH per 1 kg. It is advisable to produce pelleted feed for budgies, because the low cost and high quality will attract owners of budgies.

Key words: budgerigar, pelleted feed, compound feeds for budgerigars, physical properties, chemical composition, amino acid composition, nutritional indicators, compound feed recipes.

Introduction

Budgerigars are the most widespread group of poultry. They are the 4th most popular pet in Ukraine after cats and dogs. Graceful small parrots with bright feathers and a friendly character get along well with their owners and do not require complex care, which earned them the warm affection of their owners [1, 2].

Budgerigars are unpretentious, but they need a full and balanced diet and comfortable keeping conditions. Their health, well-being and life expectancy depend on it. Budgerigars prefer various grains, seeds, vegetables and fruits. Particular attention should be paid to the presence of sunflower seeds, oats and millet in the diet of poultry. However, feeding exclusively with seeds leads to an imbalance in the content of crude fat and other nutrients and biologically active substances.

The market offers a wide range of ready-made grain mixtures, sticks and crackers for budgies. All of them include substances that are necessary for full nutrition. However, the best option for a balanced and complete feeding of budgerigars is the use of pelleted feed. It should make up at least 75% of the diet [3, 4].

The advantages of using pelleted feeds in the budgerigar's diet:

- lack of selective consumption of individual components;
- lack of need for additional vitamin/amino acid/mineral supplements;

- improving the feed sanitary quality;
- improvement of taste and aromatic properties;
- increasing the digestibility of nutrients;
- increasing the productive effect of compound feed by 10-12%.

All rations for exotic birds are still in the development stage and pelleted feeds are no exception. Scientists around the world argue about the impact of such feed on parrots, but parrots themselves are the best critics of the quality, nutrition and taste of their feed. Once they tasted a pellet, they are no longer satisfied with the usual feed mixture. It has been proven that pellets have a good effect on the parrot's body, because compressed feed contains much more nutrients, vitamins and microcomponents for the good development of the parrot's body.

Pelleted feed is not a new product, but it is not widespread in Ukraine. This kind of feed is mainly distributed in the USA. Americans are confident in the composition and quality of such feed. The pellets do not leave husks, so no dust is formed.

Versel-Laga NutriBird B14 Maintenance is the onliest company officially represented in Ukraine that produces pelleted feed for budgerigars. However, the price of such feed does not correspond to the wallet of Ukrainians. You have to pay UAH 272 for 800g for fodder, while manufacturers of grain mixtures put a price tag



on their product only within UAH 50 per 1 kg in Ukraine [5].

Reducing the production cost is of great importance in the competition conditions on the compound feed market. The main way to solve this problem is to optimize the composition of the ration, namely to obtain balanced feed in terms of nutrients and biologically active substances with minimal cost.

The implementation of information technologies ensures the stable functioning and development of modern compound feed production. Creation of a compound feed model with the help of recipe calculation optimization programs allows you to produce an effective compound feed. It allows to meet the needs of animals in nutrients and biologically active substances for life support, health, development, reproduction and obtaining high productivity. Recipe calculation programs permit you to choose components from the available raw materials, taking into account their quality, in the optimal ratio and the minimum cost of the finished product. They also provide an opportunity to assess the feasibility of introducing a particular additive, both from a biological and an economic point of view. The quality of the final product and the conformity of the estimated nutritional values with the actual ones depends on the accuracy of the recipe calculations and the consideration of all destabilizing factors in the manufacturing process.

As practice shows, the use of optimization programs of compound feed recipes allows you to reduce the cost of the product by 5 – 7%.

Purpose and objectives of the analysis

The aim of the study was to develop complete feed recipes for budgerigars and determine their physical properties and chemical composition. Standard methods of analysis were used for the research.

Results and its discussion

Budgerigars should receive high-quality and balanced feed for normal development. Therefore, developing recipes of high-quality pelleted compound feed for budgerigars using available domestic raw materials is an urgent task.

We used the program complex for calculation and optimization of compound feed recipes "Korm Optima Expert" to develop recipes of pelleted compound feed for budgerigars. It is intended for calculating recipes of compound feed and PMVA for all species and sex-age groups of animals, poultry and fish. The normative base of the program complex is formed on the basis of normative documents on feeding agricultural animals and poultry, approved by the Ministry of Agriculture and Food of Ukraine, as well as on the basis of methodological documents issued by research institutes specializing in the field of feeding.

The software complex for calculating optimal compound feed recipes allows:

- to calculate optimal recipes of compound feed with minimum cost, which are balanced according to quality indicators;
- to calculate optimal recipes of concentrates, including addressed ones, oriented to the consumer's raw materials;

- calculate the need for raw materials for the fodder program for any period of time;

- keep records of costs and raw material balances, calculate the needs of raw materials for the fodder program for any period of time;

- automatically adjust the amino acid composition of raw materials when the crude protein level changes;

- set the limits of the ratio of nutritional indicators (energy to protein, energy to amino acids, calcium to phosphorus, etc.);

- evaluate the market value of raw materials;

- to form printed forms of the prescription of the quality certificate;

- automatically take into account the effect of enzyme preparations when they are introduced into the recipes of compound feeds and concentrates.

The following components were selected for the development of complete feed recipes for budgerigars: barley without husk, oats without husk, millet, sorghum, sunflower seeds, flax, soybean meal, sunflower meal, fodder yeast, sunflower oil, salt, baking soda, DL - methionine, premix 1%, natufos E 5000.

The nutritional value and cost of compound feed components are given in the table. 1.

The optimal composition of compound feed recipes for budgerigars with minimal cost was obtained on the basis of the work carried out with the help of the "Korm Optima Expert" software complex. They meet the feeding standards and restrictions on the introduction of components and can be used for their complete feeding (Table 2).

Experimental samples of compound feed were made in accordance with the developed recipes of pelleted compound feed for budgerigars. Recipes of compound feed are given in table. 2. Recipes 256-5 and 256-14 do not differ significantly in the composition of components. In recipe 256-3 the content of fodder yeast is reduced by increasing the content of soybean meal. This leads to an increase in cost by more than UAH 100 per 1 ton. Sunflower meal is additionally introduced into recipe 256-4 due to a decrease in the content of soybean meal. The cost of such a recipe is lower than 256-3 by UAH 170 per 1 ton. The physical properties and chemical composition of the experimental samples were studied.

Study of physical properties. Compound feeds were investigated according to the following indicators: moisture content, angle of repose, flowability and bulk density. The research results are given in table 3.

As can be seen from the obtained data, experimental samples are characterized by satisfactory physical properties.

Study of chemical composition. The feed value of compound feed, which was produced according to the above recipes, was evaluated based on the nomenclature of guaranteed compound feed quality indicators, taking into account the detailed norms of feeding budgies according to the following indicators: crude protein, crude fat, crude fiber, mass fraction of calcium, phosphorus, lysine, methionine + cystine, threonine, tryptophan.

Data on the study of chemical and amino acid composition of feed for budgerigars are given in the table 4.

**Table 1 - Nutritional value and cost of feed components for budgerigars [6]**

Component	Metabolizable energy, KCal / 100 g	The mass fraction, %											Price, UAH/kg (september 2021 y.)	
		moisture	crude protein	crude fat	linoleic acid	crude fiber	Ca	P	Na	lysine	methionine	threonine		tryptophan
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Barley without husk	281	13,0	12,2	2,5	1,04	2,2	0,06	0,33	0,05	0,42	0,19	0,39	0,15	5,80
Oats without husk	287	12,0	12,2	4,70	1,63	2,2	0,10	0,30	0,03	0,50	0,20	0,40	0,17	6,50
Millet	276	13,0	8,7	3,8	1,29	8,7	0,08	0,35	0,03	0,27	0,21	0,34	0,14	6,10
Sorghum	295	13,0	9,5	3,10	1,08	3,0	0,05	0,28	0,03	0,22	0,17	0,32	0,12	5,10
Sunflower seeds	541	6,0	27,0	55,0	50,05	1,5	0,20	0,30	0,02	0,62	0,40	0,58	0,20	15,7
Flax	349	10,0	22,0	37,3	5,67	7,0	0,25	0,66	0,03	0,44	0,51	0,88	0,34	18,0
Sunflower meal, CP40%	228	10,0	40,0	1,70	0,81	16,0	0,36	1,10	0,08	1,37	0,88	1,42	0,53	7,00
Soybean meal, CP40%	230	9,0	40,0	1,20	0,48	10,6	0,37	0,65	0,05	2,42	0,53	1,58	0,55	13,50
Fodder yeast, CP44%	220	9,0	44,0	1,50	0,06	1,40	0,52	1,39	0,16	2,99	0,44	2,16	0,56	6,90
Sunflower oil	853	0,2	0	99,8 0	62,9	0	0	0	0	0	0	0	0	15,00
Salt	0	3,0	0	0	0	0	0,50	0	37,2	0	0	0	0	1,20
Baking soda	0	1,0	0	0	0	0	0	0	27,0	0	0	0	0	9,80
DL-methionine 98,5 %	502	0,2	58,1	0	0	0	0	0	0	0	98,5	0	0	110,00
Natufos E 5000	4800	5,0	3600,0	0	0	0	160 0,0	160 0,0	24,5	192,0	16,0	208	48,0	50,00
Premix for young geese 1-8 weeks, 1%	0	5,0	0	0	0	0	0	0	0	0	0	0	0	40,00

FEED, QUALITY, TECHNOLOGY AND ANIMAL FEED
Table 2 - Composition and nutritional value of the calculated compound feed recipes for budgerigars

Components and quality indicators	PC-256-5	PC-256-14	PC-256-3	PC-256-4
1	2	3	5	6
Barley without husk	20,0	20,0	20,0	20,0
Oats without husk	8,4	8,0	8,0	8,0
Millet	40,0	40,0	40,0	40,0
Sorghum	10,0	10,0	10,0	10,0
Sunflower seeds	5,0	5,0	5,0	5,0
Flax	3,0	3,0	3,0	3,0
Sunflower meal, CP 40 %	-	-	-	3,5
Soybean meal, CP 40 %	6,7	6,0	8,0	4,5
Fodder yeast, CP 44 %	4,0	5,0	3,0	3,0
Sunflower oil	1,35	1,45	1,45	1,45
Salt	0,3	0,3	0,3	0,3
DL-methionine 98,5 %	0,05	0,05	0,05	0,05
Natufos E 5000	0,1	0,1	0,1	0,1



1	2	3	5	6
Premix for young geese 1-8 weeks, 1 %	1,0	1,0	1,0	1,0
Total	100	100	100	100
Price of feed, UAH/t	10036,00	10010,00	10120,00	9948,00
Metabolizable energy, KCal/100 g	380	380	380	379
The mass fraction, %:				
crude protein	18,24	18,33	18,33	18,12
crude fat	8,09	8,18	8,17	8,19
c18:2 ω6	4,53	4,58	4,59	4,60
crude fiber	5,23	5,19	5,31	5,72
lysine	0,79	0,80	0,79	0,75
methionine	0,31	0,31	0,32	0,32
methionine + cystine	0,60	0,60	0,61	0,62
threonine	0,75	0,75	0,74	0,73
tryptophan	0,24	0,24	0,24	0,24
arginine	1,08	1,07	1,09	1,09
isoleucine	0,8	0,81	0,80	0,79
leucine	1,44	1,45	1,45	1,42
valine	0,92	0,93	0,92	0,92
histidine	0,4	0,39	0,40	0,39
phenylalanine	0,87	0,87	0,88	0,86
phenylalanine + tyrosine	1,13	1,13	1,15	1,11
calcium	1,72	1,72	1,72	1,72
phosphorus	1,99	2,00	1,99	2,00
phosphorus available	1,45	1,46	1,44	1,45
sodium	0,20	0,20	0,20	0,20

Table 3 – Physical properties of compound feeds

Indicators	PC-256-5	PC-256-14	PC-256-3	PC-256-4
Moisture content, %	12,6	12,25	12,5	12,7
Angle of repose, degree	41	40	45	47
Flowability, cm/s	6,3	6,1	5,9	6,8
Bulk density, kg/m ³	660	655	640	672

Table 4 - Chemical and amino acid composition of feed for budgerigars (based on dry matter)

Nutrients	PC-256-5	PC-256-14	PC-256-3	PC-256-4
Dry matter, %	87,4	87,7	88,4	88,7
Crude protein, %	20,90	20,90	20,70	20,4
Crude fat, %	9,26	9,33	9,24	9,23
Crude fiber, %	5,98	5,92	6,00	6,45
Calcium, mg%	1,97	1,96	1,95	1,94
Phosphorus, mg%	2,28	2,28	2,25	2,25
Lysine, %	0,90	0,91	0,89	0,85
Methionine + cystine, %	0,69	0,68	0,69	0,70
Threonine, %	0,86	0,86	0,84	0,82
Tryptophan, %	0,27	0,27	0,27	0,27

Data analysis of table 4 shows that the produced feeds are balanced in content of nutrients and biologically active substances and meets the physiological needs and feeding standards of the budgerigars. At the same time, there is no significant difference in the content of nutrients and biologically active substances in the experimental samples of compound feed. This is due to the close composition of the recipes.

Conclusions

The optimal recipes of complete feeds for budgerigars with a minimum price were calculated and experimental samples were made, based on theoretical and experimental research. The evaluation of quality indicators of compound feeds experimental samples determined that they meet the regulatory and technical documentation and feeding requirements.



The cost of raw materials for the developed pelleted feed is on average 10 UAH per 1 kg. We believe that it is advisable to produce pelleted feed for budgies,

because the low cost and high quality will attract owners of budgies.

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РЕЦЕПТИ КОМБІОРМІВ ДЛЯ ХВИЛЯСТИХ ПАПУГ ТА ЇХ ЯКІСТЬ

Анотація

У статті зазначено, що хвилясті папужки є найпоширенішою групою домашньої птиці. Вони займають 4 місце за популярністю в Україні після котів і собак. Хвилясті папужки невибагливі, але потребують повноцінного збалансованого харчування і комфортних умов утримання. Обґрунтована доцільність використання гранульованих комбікормів для збалансованої та повноцінної годівлі хвилястих папуг. Вони повинні складати не менше 75% раціону. Доведено, що гранули добре впливають на організм папуги, адже в пресованому кормі набагато більше поживних речовин, вітамінів і мікрокомпонентів для гарного розвитку організму папуги. Встановлено, що створення моделі комбікорму за допомогою програм оптимізації розрахунку рецептів дозволяє виготовити ефективний комбікорм. Це дозволяє задовольнити потреби тварин у поживних і біологічно активних речовинах для життєдіяльності, здоров'я, розвитку, відтворення та отримання високої продуктивності. Програми розрахунку рецептів дозволяють підібрати компоненти з наявної сировини з урахуванням її якості в оптимальному співвідношенні та мінімальній собівартості готового продукту. Як показує практика, використання програм оптимізації рецептур комбікормів дозволяє знизити собівартість продукту на 5 – 7%. Доведено, що для нормального розвитку хвилясті папуги повинні отримувати якісний і збалансований корм. За допомогою програмного комплексу розрахунку та оптимізації рецептів комбікормів «Корм Оптима Експерт» розроблені рецепти гранульованих комбікормів для хвилястих папуг з мінімальною вартістю. Вони відповідають нормам годівлі та обмеженням по введенню компонентів і можуть бути використані для їх повноцінної годівлі. Експериментальні зразки комбікорму виготовлені за розробленою рецептурою гранульованих комбікормів для хвилястих папуг. У дослідних зразках досліджено фізичні властивості та хімічний склад. Встановлено, що дослідні зразки характеризуються задовільними фізичними властивостями та збалансовані за вмістом поживних і біологічно активних речовин і відповідають фізіологічним потребам і нормам годівлі хвилястих папуг. Собівартість сировини для гранульованих кормів, які ми представляємо становить в середньому 10 грн. за 1 кг. Доцільно виробляти гранульовані корми для хвилястих папуг, адже низька вартість і висока якість, що не уступає бельгійському аналогу буде, приваблювати власників хвилястих папуг.

Ключові слова: хвилясті папуги, гранульований комбікорм, комбікорми для хвилястих папуг, фізичні властивості, хімічний склад, амінокислотний склад, показники поживної цінності, рецепти комбікормів.

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