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**АУЫЛ ШАРУАШЫЛЫҒЫ ҒЫЛЫМДАРЫ
АГРОНОМИЯ**

631

1 «
2 «

10-15

1989 1999

20-25

2015

(15)

« »

0,32-0,35
(N₂₀ /)

20

[1].

2015 73,0 96,0%

(20) . () 17%,
 2002 - 32 - -
 ().
 2011-2012
 - [2].
 , - ,
 [3]. 2012 0,32-0,34 -5-40
 (6-8 /) .
 . 2013 -
 (5-10%).
 [4].
 , - ,
 . « »
 « » -4-3
 0,7 1,4 (1) .

1 - - « »
 2015
 « » (15)
 2015 - 2016 , -
 0,7 1,4 (140-
 160) 2,1
 2017 (N₂₀) .

2 -
2017 15
2017 , 15
- 8,3 / 0,5 7,6 / - (1-).

1 - 2016-17

, /

		(2)	,%	(2)	,%
1	()	8,3	0,0	8,3	0,0
2	1,4	10,4	25,1	8,8	6
3	0,7	11,4	37,7	10,1	21
4	+ N ₂₀	11,1	33,7	10,5	23,1
5	1,4 + N ₂₀	12,3	48,2	10,4	25,3
6	0,7 + N ₂₀	15,9	91,6	12,0	44,5
* : 15		N ₂₀ .			

. 2017 -
N₂₀
« »
2017 44,5%, 91,6%-
2018

» 100 « 180

« . . » - « »

1. « » -

2. « » 0,7 -

3. 2,15-2,19%- 13
- 1,92%

4.

1. . 7573 , A01C 7/00
/ . . ; . 15.06.99.

2. . 2530990 , A01C 7/00
/ . .

3. . . ; . 20.08.14. . .
- //

4. , 2014. - . 76-79.
//
: V -
: . , 2017. - . 36-42.

() 2015

(15)

10-15
0,32-0,35

(N₂₀ /)

« »

20

RESUME

Within the framework of creative cooperation between the Nizhne-Volzhsky SRIA and Ural Agricultural Experimental Station, a hospital was established for studying the technology of rejuvenating the stemstalk of old-growth crops of perennial grasses. There is underlined the possibility of mutual development of livestock and crop production sectors through combined sowing of perennial grass-plant grasses.

The first tests of the unit (RANCO type) in 2015 at Ural Agricultural Experimental Station confirmed the effectiveness of this method of rejuvenation of perennial grasses (15 years and older) in the conditions of Western Kazakhstan.

Carrying out a complex of energy-saving measures, including chiling of old-age grain crops and nitrogen fertilizing in the conditions of West Kazakhstan, provides thinning of the thickened sod, improving the water-physical and agrochemical properties of zonal soils and restoring the initial yield of hay and seeds.

In recent studies, it has been proved that the legume component of grass mixtures can be restored by sowing the yellow sweet clay and the sainfoin into the old-growth sapwood prepared by the chisel, which increases the length of use of perennial grasses. At Ural Agricultural Experimental Station, chiseling of 10-15 year old grain with tools equipped with Rancho racks to a depth of 0,32-0,35 m in combination with nitrogen fertilizing (N₂₀ kg / ha) increased the yield of hay.

This will allow not only to collect more forages from low-productive lands, but also to raise the soil fertility of low-humus chestnut soils. An opportunity to increase the longevity of herbage up to 20 years and more on the vast expanses of Western Kazakhstan.

631.68.35.37:633.81

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« - » , ..

10-15 -

5

2017 31 « » :

500- , 2021 - 40%-

2017-2021 . 5 150

60 200 - 50

100 250 , 225 , 4,3

« 47 »

250-300 17-18 , 21,3%

8000-10000 ,

1000-1100 - [1, 2].

(, 1),

13-14%, 10-11

2017-2021

(, , ,) [1].

[3-6].

[7, 8].



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 , 5-10 - .
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 . [9, 10].
 [11].
 6-8 [12, 13].
 5 31 17
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 , ,
 [14-16].
 () , ,
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 AP05130172 «
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 2

[17].

[18].

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3,9 (1

) 5,2 (2) 4,3 . 3,5

3,9 3,0-

4,0 () .

3,4-3,7

45

50 () 54

() 33 () 30 37 ,

(2,19) .

2,13 2,05 -

98,5

106,4 110,5 -

78,2 () 59,4 - ()

()

45-48%

30-32%

22-25%

78,12 15,50 /

71,71 / , 14,49 /

59,41 / , 18,71-11,30 /

5,10 15

10 - 5 72,45 /

15 16,58% (60,44 /)

49,12 / 5 14,79

11,98 10 15

9,84 /

37,02 2/

,2,11 . 2 /

-1,42 . 2 / -23,60 2/ ,

2,09 . 2 / , 36,54 2/

2,01 . 2 /

31,89 2/

85,05 / , 16,16 / . 110,62 / ,
22,12 / .
28,50 / . 135,75 / ,
+ 102,21 19,42 / ,
118,15 23,63 / . 93,12
/ , 18,62 / .
104,14 / , 22,91 /

(2,85 /),
(2,43 /).

2,14 2,36 / .
2,42 / .
1,86 () 2,06 / () .

) , (

5 . 10-15 -

1. - :
www.primeminister.kz/page/article_item-89.



633.11:631.524.85:632.485/9(574.51)

„¹ PhD , , PhD
•²
•³”
1 « » , „
2 « . . - » , ,
3 , , ,

(PUCCINIA GRAMINIS PERS)

(Puccinia graminis Pers)

• .
• , - -19SB, 7-04-4,
85-08, 6-04-4,
(R-S) 186-04-61 .
2017
19- 9-
; Gvk2055-1,
Lutestsens 2, Vladimir, Eritrospermum 85-08, Lutestsens 220-03-45, Eritrospermum 23707, Tornado
22, Lyutestsens 208-08-4, Lyutestsens 27-12, Lyutestsens 7-04-10, P-23-17 Tulaikovskaya, 10
Tobolskaya, Shortandinskaya 2012, Akmola 2, Tselina50, Fiton 41, Pavlodarskaya, Yubileynaya,
Karagandinskaya 31, Fiton- -54sb 1- 9-
19- 30-

50-60%,

21-35 12-20

[1], [2] [3],

[4], [5] [6]

[7].

[8],

[9],

90

Astana, 10, C 29, 10, K 2016-2017 15,

McIntosh en. al.(1995) 10].

5

0-

R- (

MR- (

MS- (

S- (

(1)).



1 -

2017

19- 9- ; GVK 2055-1,
LUTESTSENS 2, VLADIMIR, ERITROSPERMUM 85-08, LUTESTSENS 220-03-45,
ERITROSPERMUM 23707, TORNADO 22, LYUTESTSENS 208-08-4, LYUTESTSENS 27-12,
LYUTESTSENS 7-04-10, P-23-17 TULAIKOVSKAYA, 10 TOBOLSKAYA,
SHORTANDINSKAYA 2012, AKMOLA 2, TSELINA50, FITON 41, PAVLODARSKAYA,
YUBILEYNAYA, KARAGANDINSKAYA 31, FITON- -54SB

1- 9-
19- 30-
(1).

17F1SYNT-OMSK-LIST 90

7

6 , - -19SB, 7-04-4, , ,
85-08, 6-04-4, 25 23 , , 34
(R-S) 2

186-04-61 (1).

1 -

1	2	3	4
SERI	19.06.2017	1 MR	3
STEPNAYA75	19.06.2017	10 MR	2
GVK2055-1	02.07.2017	30 MS	3
LUTESTSENS2	02.07.2017	30 MS	3+
LINE- -19SB	29.06.2017	1 R	1+
KARABALYKSKAYA 20	29.06.2017	30 MS	3+
LUTESCENS 30 69/97	29.06.2017	30 MS	3
KARAGANDINSKAYA 31	03.07.2017	30 MS	3
PAVLODARSKAYA YUBILEYNAYA	01.07.2017	30 MS	3
FITON- -54SB	02.07.2017	30 MS	2++
EKADA148	27.06.2017	30 MS	3
EKADA 113	29.06.2017	5 MR	2
LYUBAVA	29.06.2017	5 MS	3
FITON 41	03.07.2017	30 MS	3
FITON 204	30.06.2017	40 S	3+
VLADIMIR	09.07.2017	30 MS	3
TSELINA50	01.07.2017	40 S	3
TSELINNAYA NIVA	29.06.2017	10 MS	3
ASYLSAPA	30.06.2017	30 MS	3
AKMOLA 2	02.07.2017	40 S	3
AK ORDA	28.06.2017	30 MS	3
SHORTANDINSKAYA 2012	02.07.2017	40 S	3
TSELINNAYA 3S	28.06.2017	30 MS	3
ASTANA	27.06.2017	40 S	3+
ALTAISKAYA70	29.06.2017	30 MS	3
ALTAISKAYA110	26.06.2017	30 MS	3
TOBOLSKAYA	03.07.2017	30 MS	3+
ALTAYSKAYA ZHNITSA	30.06.2017	10 MS	3+

STEPNAYA VOLNA	27.06.2017	40 S	3+
APASOVKA	29.06.2017	30 MS	3+
LUTENSCENS89-06	29.06.2017	30 MS	3+
DUET	29.06.2017	30 MS	3+
PAVLOGRADKA	29.06.2017	10 MS	3-
LUTESCENS89-06	20.06.2017	10 MR	2
ERITROSPERMUM85-08	05.07.2017	10 MR	2+
SEREBRISTAYA	29.06.2017	20 MS	3
OMSKAYA 37	22.06.2017	5 MR	2
LUTESTSENS7-04-4	29.06.2017	R	1+
LUTESTSENS197-04-7	29.06.2017	5 MR	2
LUTESTSENS220-03-45	05.07.2017	5 MR	2+
TULAIKOVSKAYA 10	03.07.2017	10 MR	3
TULAIKOVSKAYA ZOLOTISTAYA	24.06.2017	10 MR	3
TULAIKOVSK 100	30.06.2017	5 MS	3-
GREKUM 650	23.06.2017	5 MS	2++
LUTESCENS 920	24.06.2017	5 MS	3-
EKADA 121	29.06.2017	40 S	3+
P-23-17	02.07.2017	30 MS	3
PAMYATI RUBA	28.06.2017	10 MS	3
CHELYABA 75	27.06.2017	5 MR	2-
ERITROSPERMUM 23707	05.07.2017	30 MS	3
SY TYRA	22.06.2017	10 MR	2++
SY SOREN	21.06.2017	5 MR	2+
SY ROWYN	23.06.2017	5 MR	2
SY INGMAR	23.06.2017	R	2+
SELECT	20.06.2017	1 MR	2+
FORE FRONT	20.06.2017	1 MR	2+
PREVAIL	23.06.2017	1 MR	2++
ADVANCE	24.06.2017	1 MR	2++
BRICK	20.06.2017	10 MR	2+
CARBERRY	20.06.2017	1 R	1+
MUCHMORE	21.06.2017	1 MR	2
URALOSYBIRSKAYA	21.06.2017	1 R	1+
TORNADO 22	05.07.2017	20 MS	3
LYUTESTSENS 1012	30.06.2017	30 MS	3
LYUTESTSENS 7-04-10	03.07.2017	10 MRMS	2
LYUTESTSENS 208-08-4	05.07.2017	5 MS	3-
LYUTESTSENS 27-12	02.07.2017	10 MS	3
ERITROSPERMUM 85-08	30.06.2017	1 MR	1+
LYUTESTSENS 6-04-4	29.06.2017	5 MR	1+
CHEBARKULSKAYA 3	30.06.2017	20 MS	3
LINE 654	26.06.2017	10 MS	2+
	19.06.2017	5 MS	3+
C 29	27.06.2017	30 MS	3+
10	03.07.2017	30 MS	3+
K 15	29.06.2017	40 S	3+
Astana	27.06.2017	40 S	3+
10	26.06.187	30 MS	3+
	29.06.2017	10 MS	3+

(-1),

- 90
- 6
- 19SB, 7-04-4, 25 23 , R-S) 2 34 186-04-61 6 85-08, 6-04-4, 2017 19- 9-
1. // . 171-191. . - 3. - : . . , 1956. -
 2. . - , 1995. - 141 .
 3. . . . / .
 4. . - , 1975. - 288 . « », 2002. - 296 .
 5. : . . . : 01.11. - : . . - 1972. - 24 .
 6. -
 7. // . - : , 1973. - . 97-105.
 8. : , 2010. - 8 .
 9. , 1995. - 3 - 77 . : , 2002. - 367 .
 10. McIntosh R.A., Wellings C.R., Park R.F. Wheat Rusts // An atlas of Resistance Genes / «CSIRO». - ustralia, 1995. - . 80.

(Puccinia qraminis Pers)

- LINE- -
- 19SB, LUTESTSENS7-04-4, CARBERRY, URALOSYBIRSKAYA, ERITROSPERMUM 85-08, LYUTESTSENS 6-04-4, (
- R-S) LYUTESTSENS 186-04-61 SERI. 2017 19 9 , Gvk 2055-1,

Lutestsens 2, Vladimir, Eritropermum 85-08, Lutestsens 220-03-45, Eritropermum 23707, Tornado 22, Lyutestsens 208-08-4, Lyutestsens 27-12, Lyutestsens 7-04-10, P-23-17 Tulaikovskaya, 10 Tobolskaya, Shortandinskaya 2012, Akmola 2, Tselina 50, Fiton 41, Pavlodarskaya, Yubileynaya, Karagandinskaya 31, Fiton-54sb

19 30 ,

1 9 .

RESUME

Stem rust (*Puccinia graminis* Pers) is a common and dangerous disease of wheat. Protecting crops from stem rust is one of the topical issues. Field and laboratory studies to determine the resistance to stem rust of 90 foreign wheat samples and 7 susceptible commercial wheat varieties carried out a phytopathological analysis made, 6 resistant varieties were identified by the artificial infection, this is LINE-C-19SB, LUTESTSENS7-04-4, CARBERRY, URALOSYBIRSKAYA, ERITROSPERMUM 85-08, LYUTESTSENS 6-04-4, 25 varieties of medium-resistant to stem rust and 23 varieties of medium susceptible, 34 varieties susceptible, (RS reaction type) possess 2 varieties LYUTESTSENS 186-04-61 and SERI.

In 2017, the phenolic analysis of summer soft wheat varieties shows that the gestation period has been extended from the second half of June to July. The varieties of these varieties were from June 19 to July 9. It is possible to mark the following varieties as the least late; Lutestsens 2, Vladimir, Eritropermum 85-08, Lutestsens 220-03-45, Eritropermum 23707, Tornado 22, Lyutestsens 208-08-4, Lyutestsens 27-12, Lyutestsens 7-04-10, P-23-17 Tulaikovskaya, 10 Tobolskaya, Shortandinskaya 2012, Akmola 2, Tselina 50, Fiton 41, Pavlodarskaya, Yubileynaya, Karagandinskaya 31, Fiton-C-54sb, the test dates of these varieties from July 1 to July 9. The remaining wheat varieties have been tested from June 19 to June 30, which can be said to be average for gestation.

633.11:631.524.85:632.485/9(574.51)

1 „
2 „
3 „
1 „
2 „
3 „

(PUCCINIA GRAMINIS PERS)

(*Puccinia graminis* Pers)

90 7
6
7-04-4, 23, 34, 85-08, 6-04-4, 25
(R-S) 2 186-04-61

graminis Pers)

65%

(Puccinia

[1].

65%

[2].

[3].

[4]

100%

54,3%

- 91,3%;

24,7%

50%

18-20%

10%

[5].

90

10,

29,

, C

[6].

29,

10, K

15, Astana,

22⁰

37-40⁰

30

18-

2-4

80

[7]

0,001%

(1:300

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. . . [8].

/ ²

(1, 2) .

20

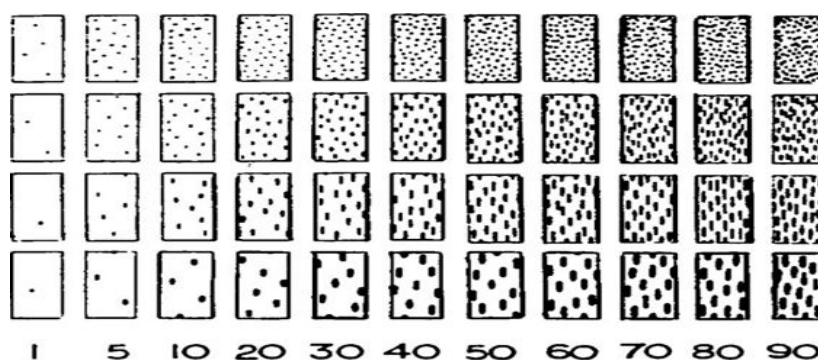
16-18

/)

(0,5-1,0 /)

-250 (0,5

[9] (4).



4 – (1948)

2017

19- 9- ; Gvk2055-1,
 Lutestsens 2, Vladimir, Eritropermum 85-08, Lutestsens 220-03-45, Eritropermum 23707, Tornado
 22, Lyutestsens 208-08-4, Lyutestsens 27-12, Lyutestsens 7-04-10, P-23-17 Tulaikovskaya, 10
 Tobolskaya, Shortandinskaya 2012, Akmola 2, Tselina50, Fiton 41, Pavlodarskaya, Yubileynaya,
 Karagandinskaya 31, Fiton- -54sb 1- 9-
 19- 30-

(1).

17F1SYNT-OMSK-LIST 90 7
 6 , - -19SB, 7-04-4, ,
 85-08, 6-04-4, 25 23
 , 34 , (R-S) 2
 , 186-04-61 (1).

1 -

1	2	3	4
SERI	19.06.2017	1 MR	3
STEPNAYA75	19.06.2017	10 MR	2
GVK2055-1	02.07.2017	30 MS	3
LUTESTSENS2	02.07.2017	30 MS	3+
LINE- -19SB	29.06.2017	1 R	1+
KARABALYKSKAYA 20	29.06.2017	30 MS	3+
LUTESCENS 30 69/97	29.06.2017	30 MS	3
KARAGANDINSKAYA 31	03.07.2017	30 MS	3
PAVLODARSKAYA YUBILEYNAYA	01.07.2017	30 MS	3
FITON- -54SB	02.07.2017	30 MS	2++
EKADA148	27.06.2017	30 MS	3

1

1	2	3	4
EKADA 113	29.06.2017	5 MR	2
LYUBAVA	29.06.2017	5 MS	3
FITON 41	03.07.2017	30 MS	3
FITON 204	30.06.2017	40 S	3+
VLADIMIR	09.07.2017	30 MS	3
TSELINA50	01.07.2017	40 S	3
TSELINNAYA NIVA	29.06.2017	10 MS	3
ASYLSAPA	30.06.2017	30 MS	3
AKMOLA 2	02.07.2017	40 S	3
AK ORDA	28.06.2017	30 MS	3
SHORTANDINSKAYA 2012	02.07.2017	40 S	3
TSELINNAYA 3S	28.06.2017	30 MS	3
ASTANA	27.06.2017	40 S	3+
ALTAISKAYA70	29.06.2017	30 MS	3
ALTAISKAYA110	26.06.2017	30 MS	3
TOBOLSKAYA	03.07.2017	30 MS	3+
ALTAYSKAYA ZHNITSA	30.06.2017	10 MS	3+
STEPNAYA VOLNA	27.06.2017	40 S	3+
APASOVKA	29.06.2017	30 MS	3+
LUTENSCENS89-06	29.06.2017	30 MS	3+
DUET	29.06.2017	30 MS	3+
PAVLOGRADKA	29.06.2017	10 MS	3-
LUTESCENS89-06	20.06.2017	10 MR	2
ERITROSPERMUM85-08	05.07.2017	10 MR	2+
SEREBRISTAYA	29.06.2017	20 MS	3
OMSKAYA 37	22.06.2017	5 MR	2
LUTESTSENS7-04-4	29.06.2017	R	1+
LUTESTSENS197-04-7	29.06.2017	5 MR	2
LUTESTSENS220-03-45	05.07.2017	5 MR	2+
TULAIKOVSKAYA 10	03.07.2017	10 MR	3
TULAIKOVSKAYA ZOLOTISTAYA	24.06.2017	10 MR	3
TULAIKOVSK 100	30.06.2017	5 MS	3-
GREKUM 650	23.06.2017	5 MS	2++
LUTESCENS 920	24.06.2017	5 MS	3-
EKADA 121	29.06.2017	40 S	3+
P-23-17	02.07.2017	30 MS	3
PAMYATI RUBA	28.06.2017	10 MS	3
CHELYABA 75	27.06.2017	5 MR	2-
ERITROSPERMUM 23707	05.07.2017	30 MS	3
SY TYRA	22.06.2017	10 MR	2++
SY SOREN	21.06.2017	5 MR	2+
SY ROWYN	23.06.2017	5 MR	2
SY INGMAR	23.06.2017	R	2+
SELECT	20.06.2017	1 MR	2+
FORE FRONT	20.06.2017	1 MR	2+
PREVAIL	23.06.2017	1 MR	2++
ADVANCE	24.06.2017	1 MR	2++
BRICK	20.06.2017	10 MR	2+
CARBERRY	20.06.2017	1 R	1+

- -19SB, 7-04-4, 85-08,
6-04-4, 25 23 ,
(i R-S) 186-04-61
2017

1. . - , 1995. - 141 .
2. . - : , 2002. - 367 .
3. . - : , 1975. - 72 .
4. Mains E.B., Leighty C.E., Johnston C.O. Inheritance of resistance to leaf rust *Puccinia triticina* Erikss: in crosses in common wheat *Triticum vulgare* Vill // *Journal of Agricultural Research*. - 1926. - Vol. 32. - . 931-971.
5. . : 06.01.11, 06.01.05 / . - : , 2010. - . 8.
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10. : ? // . - , 2011. - 2. - . 5.

(*Puccinia graminis* Pers)

6 , LINE- -19SB, LUTESTSENS7-04-4, CARBERRY,
URALOSYBIRSKAYA, ERITROSPERMUM 85-08, LYUTESTSENS 6-04-4, 25
23 , 34
, (R-S) 2 LYUTESTSENS 186-04-61 SERI.

65%

(Puccinia graminis Pers)

RESUME

The article provides for immune-phytopathological, genetics-selection studies and measures to combat it. Phytosanitary monitoring of the prevalence and development of the disease (Puccinia graminis Pers) in the wheat-growing regions of the country was carried out. Illustrative and high-performance samples were identified through immunopathology and genetics-selection estimates of wheat specimens. Field and laboratory studies to determine the resistance to stem rust of 90 foreign wheat samples and 7 susceptible commercial wheat varieties carried out a phytopathological and structural analysis, 6 resistant varieties were identified by the artificial infection, this is LINE-C-19SB, LUTESTSENS7-04-4, CARBERRY, URALOSYBIRSKAYA, ERITROSPERMUM 85-08, LYUTESTSENS 6-04-4, 25 varieties of medium-resistant to stem rust and 23 varieties of medium susceptible, 34 varieties susceptible, (RS reaction type) possess 2 varieties LYUTESTSENS 186-04-61 and SERI.

The republic is characterized by a wide spread of rust, yellow rust in the mountainous areas of the southern, eastern and south-eastern regions, stem rust in the forest and believable regions of the northern regions, as well as in the west. Kinds of rusty grains are distributed approximately on 65% of territory of Kazakhstan.

And also in the article are given the data of biological peculiarities and harmfulness of stem rust (Puccinia graminis Pers) in the Southeast of Kazakhstan. The most harmful stalk rust in the Far East, the North Caucasus, in some regions of Ukraine and Kazakhstan.



UDC 636.1.082

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LLP «Kazakh Scientific Research Institute of Animal Breeding and Fodder Production», Almaty, Republic of Kazakhstan

MEAT PRODUCTIVITY OF KUSHUM BREED'S ZHANGALY TYPE HORSES

Abstract

The article presents the results of the study of meat qualities of the new Jangaly intrafactory type of Kushum breed horses in the three basic farms of the West Kazakhstan region. Slaughtering qualities, varietal cut, morphological composition of carcasses and food safety were carried out according to the general accepted methods and present state meat standard. It was established that the linear sturdy and the body index of the experimental stallions are characterized as massive animals (133,2-135,6 units). The carcass yield of foals from 2,5 years old foals was 52,9-54,4%.

The maximum weight of carcass in young animals from the line of Laskovoy was 266,1 kg, the smallest was in foals of the main type from the Baikal line, 252,3 kg., respectively. Carcasses of young animals from the line of Hitrets occupy an average of 259,4 kg, which corresponds to the index of the intrafactory type of Jangaly (259,3 kg). The difference is highly reliable ($td = 5,14$, $td = 5,50$). The sort (class) composition of carcasses in relative terms did not have any noticeable differences. The yield of slaughter products varies within the limits of: kazy (handmade sausage) 9,7-10,0%, zhal (withers) 1,1-1,2, I-class 50,5-50,9%, Class II – 32,9-33,5 and III – 5,1 – 5,2%. According to the morphological composition of the carcass, 2,5 year old foals in relative figures for the content of pulp and fat are in the range of 78,6-79,4%, bones – 17,3-17,8% and tendons – 3,3-3,6%.

In productive horse breeding of the West Kazakhstan region, with pasture maintenance, it is more expedient to keep horses of Kushumian breed of massive and basic or Jangaly intrafactory type.

Keywords: *type, line, breed, index, carcass, class, morphological composition, food safety.*

Introduction. An important role in providing nutrition in the world is played by gene pools of local breeds [1-3]. The presence in the Republic of Kazakhstan of various natural and economic zones with diverse opportunities, the management of livestock makes it necessary to differentiate the development of industries, rational use of natural fodder land and biological characteristics of traditional species of farm animals. Manufacture of ecological and inexpensive meat in the country is horse herding. Increasing the number of productive horses will contribute to the increase in the number of breeds, which will allow it to be preserved as a unit of the domestic gene pool of horse breeding.

In West Kazakhstan region, for a long time work on creation factory type of Kushum breed of horses on the basis of thoroughbred breeding using homogeneous and heterogeneous selection, as well as a cross of factory lines and genealogical groups was carried out.

The horses of Kushum breed highly differ from a number of other breeds with such economically useful qualities as precocity, fertility, high meat and dairy productivity, well adapted.

In terms of meat production, Kushum horses surpass local Kazakh horses by 100 kilograms and more. At slaughter of adults of the cull mares of Kushum breed the mass of carcass reaches 285-300 kg, and 2,5 years old stallions 255-270 kg. Kushum horses have some differences in the physique of separate groups of animals, as a result of which in the breed there are three types: basic, massive and riding, which is associated with the method of selection the breed.

Scientific research work on the production of a new highly productive Zhangalinsky factory type of Kushum breed horses was carried out in three basic farms of the West Kazakhstan region on the basis of the factory lines of Laskovyi, Khitretz and Baikal. The head of the newly created Zhangalin factory type of Kushum horses is made up of 31 heads of stallions and 476 heads of mares. All stallions are elite producers, and the proportion of elite mares in the mother family is 81,9% (Patent No. 600 of 2016).

At the present stage of the breeding process, selection of animals is made by origin and typicality, proportions and live weight, exterior and adaptability to year-round pasture and herd keeping. In connection with this, to study the meat quality of Zhangalin factory type is actual.

Novelty. Herd horse breeding develops on the basis of the use of natural fodder land and gives relatively cheap products. The novelty of the study is providing western regions of Kazakhstan by horse meat of Zhangaly type of Kushum breed horses. In connection with this, to study the meat qualities of the intrafactory Zhangaly type is actual.

The aim of the work is to study the meat efficiency of Zhangaly intra-breed plant type of Kushum breed horses to determine the further way of breed development and providing western regions of Kazakhstan with horse meat products. The purpose of the study is to identify potential opportunities for production of horse meat as a reserve for the food safety of the region using productive resources of Zhangalinsky intrafactory type of Kushum breed horses.

Materials and methods. Control slaughter of stallions of a new Zhangaly factory type was carried out at 30 months of age, after autumn feeding, according to the AUIAB method, 3 heads from each line, while adhering to the Law of the Republic of Kazakhstan «On Food Safety» dated July 21, 2007 No. 301-III.

The meat production was studied according to the method of the All-Union Research Institute of Horse Breeding (1974). In this case, taken into account: pre-slaughter weight, the mass of the paired carcass, slaughter yield. We studied the morphological composition (mass of carcass, weight of meat, bones and tendons of three stallions carcasses from each line). The following standards were used: GOST 32 226-2013 Meat. Cutting horse and foals meat (Interstate Standard); PCT 725-72 Kazakh scheme for the cutting of horse carcasses; GOST 55 335-2012 Meat. Horse meat for baby food. Technical conditions. The digital material was processed biometrically according to N.A. Plokhinsky using the computer program Excel.

Own results. To study the meat qualities of Zhangaly intrafactory type horses-youngsters, stallions from different lines at the age of 2,5 years after the autumn feeding were monitored. Before slaughtering animals were examined by veterinarians. With the commission evaluation at the slaughterhouse of LTD «Kushum», the fatness of all experimental animals is recognized as the highest.

Experimental stallions of Zhangaly intrafactory type had an average live weight of 483,1 kg, which by 6,2 kg more than that of the same from Baikal line, but concede on this indicator to young animals from the line of Laskovyi by 6,1 kg. The difference is statistically significant ($t_d = 2,83$; $t_d = 2,54$). The difference in the live weight of stallions is due to their origin, since the stallions from the line of Laskovyi and Khitretz are of a massive type, and the young from Baikal line to the main type (Table 1).

Table 1 - The measurements and the index of body of Zhangaly type experimental foals

Lines, type	n	Measurements, cm				Live weight, kg	Indices, %			
		height at withers	body length	chest girth	girth of pastern		format	density	bony	Massiveness, kg / m ³
Laskovyi	3	153,4	155,9	185,3	19,4	489,2	101,6	120,8	12,6	135,6
Khitretz	3	152,5	154,7	184,2	19,0	483,1	101,4	120,8	12,5	136,2
Baikal	3	153,0	154,4	180,8	18,8	476,9	100,9	118,2	12,3	133,2
Zhangaly type	9	153,0	155,0	183,4	19,1	483,1	101,3	119,9	12,5	134,9

Data in Table 1 shows that all the foals of factory lines have the highest growth (152,5-153,4 cm), a good broad chest girth (index 118,2-120,8%) and a rather massive (large) (133,2 -136,2 units). According lineal measurements of experimental foal's body there were no noticeable differences. According to the index build foals characterized as a massive animal and are typical representatives of their lines and fully complied with the requirements of Kushum breed standard.

To study the meat qualities of the youngsters of the horses of the Jangaly intrafactory type, stallions from different lines at the age of 2,5 years after the autumn feeding were monitored. Before slaughtering animals were examined by veterinarians. With the commission evaluation at the slaughterhouse of Kushum

LLP, the fatness of all experimental animals is recognized as the highest. All carcasses have passed obligatory veterinary-sanitary inspection. From foals of different lines received heavy, well-muscled carcasses, which, in accordance with state standards classified in the first category. As can be seen from Table 2, for slaughter qualities foals there are significant differences depending on the linear supplies. Young animals at the age of 2,5, differences were both pre-slaughter live weight and carcass weight at section lines.

Table 2 - Meat production of 2,5 age stallions of the Zhangaly factory type in the context of different lines

Lines, type	n	Slaughter live weight, kg		Carcass weight, kg		Carcass yield,%
		M±m	C _v	M±m	C _v	
Laskovyi	3	489,2±1,83	0,44	266,1±0,98	0,55	54,4
Khitrez	3	483,1±1,25	0,51	259,4±0,84	0,68	53,7
Baikal	3	476,9±1,56	0,58	252,3±0,91	0,47	52,9
Zhangalin type	9	483,1±1,54	0,61	259,3±0,89	0,58	53,7

The maximum weight of carcass was in young animals from the line of Laskovyi (266,1 kg), they significantly exceeded their peers by 6,7-13,8 kg (td = 5,19-7,72). The least weight of the carcass was from the main type of foals from the Baikal line of 252,3 kg, respectively, 252,3 kg or inferior to their peers at 2,58-5,47%. The yield of carcass from foals 2,5 years old was 52,9-54,4%.

The carcasses of young animals of Khitrez lines occupy an intermediate position of 259,4 kg, which correspond to the type indicator Zhangalinsky intrafactory (259,3 kg). The difference is highly reliable (td = 5,14, td = 5,50). This can be seen due to the influence of the genotype of outstanding stallions-manufacturers of approved factory lines (a distinctive feature of the factory lines).

Sort cut was performed in accordance with GOST (state standard) and RSt. Varietal composition of carcass from Laskovyi line foals showed that the absolute yield of meat outside the variety, I, II and III sorts are greater than that of peers compared. Especially this difference is noticeable for Class I, where it was 134,8 kg or by 2,8-7,5 kg more than of young animals from other lines. Especially this difference is noticeable in the 1st grade, where it was 134,8 kg or 2,8-7,5 kg more than in young animals from other lines. But they are almost the same in relative terms and fluctuate within the limits of the output of kazy (handmade sausage) 9,7-10,0%, zhal (withers) 1,1-1,2, I-class 50,5-50,9%, Class II – 32,9-33,5 and III – 5,1 – 5,2% (Table 3).

Table 3 - Varietal composition of carcasses of linear stallions of the Zhangaly type

Lines, type	Weight of carcass, kg	Varietal composition of the carcass									
		kazy		zhal		I sort		II sort		III sort	
		Kg	%	kg	%	kg	%	kg	%	kg	%
Laskovyi	266,1	26,5	10,0	3,3	1,2	134,8	50,6	87,7	32,9	13,8	5,1
Khitrez	259,4	25,3	9,7	3,0	1,2	132,0	50,9	85,7	33,0	13,4	5,2
Baikal	252,3	24,4	9,7	2,9	1,1	127,3	50,5	84,5	33,5	13,2	5,2
Zhangaly type	259,3	25,4	9,8	3,1	1,2	131,3	50,6	86,0	33,2	13,5	5,2

One of the important indicators of meat productivity of animals is the morphological composition of the carcass. Table 4 gives data on the morphological composition of carcasses of 2,5 year old foals. In relative figures, the content of meat and fat is within 78,6-79,4%, bone 17,3-17,8% and tendon is about 3,3-3,6%.

Table 4 - Morphological composition of the carcass

Lines, type	n	Weight of carcass, kg	including						Meat coefficient
			meat and fat		bones		tendons		
			kg	%	kg	%	kg	%	
Laskovyi	3	266,1	211,3	79,4	45,9	17,3	8,9	3,3	4,60
Khitrez	3	259,4	204,9	79,0	45,3	17,5	9,2	3,5	4,52
Baikal	3	252,3	198,4	78,6	44,8	17,8	9,1	3,6	4,43
Zhangaly type	9	259,3	204,9	79,0	45,3	17,5	9,1	3,5	4,52

In terms of absolute content, the morphological composition of young animals carcasses from Laskovyi line for the yield of meat and fat much higher than its comparable peers by 6,4-12,9 kg 3,1-6,5% more. The meat coefficient of foals from Laskovy line was 4,60 units, which is more than for the young animals from other groups.

Conclusion. Thus, in productive horse breeding with pastoral maintenance it is more expedient to keep horses of Kushumian breed of massive and basic or Zhangaly intrafactory type. The development of herd horse breeding in the region will allow preserving the breeding base of Kushum horse breeding - gene pool and pedigree farms: CF «Sergaziev I.S.», LTD «Kushum» and «Sabit». Strengthen material-technical base of existing farms. Create new farms (different forms of ownership) for breeding of herd horses. Replenish local budgets. Supply of dietary meat in the markets of the Western region of the republic.

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2,5

(133,2 - 135,6).

52,9-54,4%.

2,5

(133,2 - 135,6).

52,9-54,4%.

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2
3

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« - - » , . ,
« - » , ,

I () II III
- 1,8% 3,97%, - 0,92 %
1,23% - 0,87% 2,73% .
II III I 1
496 (5,50%) 1273 (14,11%). 1

75,34 (9,63%) 179,3 (22,93%). II III
2,01% 5,9%.

II III , I ()
0,56% 0,90%, - 0,14% 0,41%.
II III 151 (3,21%) 314 (6,69%). I
28,04 (8,50%) 51,59 (15,64%). II III
I () III
0,18 (2,98%) 0,36 (5,96%).
II 0,18 (2,89%).

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[1-3].

[4-6].

3 3- I () 15 3,5 1 7,0 II () 18 (1977) (1986)

1 : 0,65-0,75.

(1).

1 - 18 .(±Sx)

I	65,86±1,84	34,14±1,84	18,02±1,24	15,21±1,14	0,91±0,03
II	64,06±1,92	35,94±1,92	18,94±1,41	16,08±1,38	0,92±0,01
III	61,89±2,00	38,11±2,10	19,25±1,38	17,94±1,44	0,92±0,02

I () 1,8% 3,97%, 0,87% 2,73% 0,92% 1,23% 2,17%, 0,31% 1,86%.

(2).

I ()
 II III
 9,2 (5,10%) 12,3 (6,82%), - 8,7 (5,71%)
 27,3 (17,94%). III
 3,1 (1,63%) 18,6 (11,56%). II

2 -

18 .

	I	II	III
: 1 ,	180,2	189,4	192,5
,	15,62	17,06	17,98
: 1 ,	152,1	160,8	179,4
,	13,19	14,49	167,6
: 1 ,	9016	9512	10289
,	781,69	857,03	960,99
() ,%	23,09	25,10	28,99

II III I 1 1
 496 (5,50%) 1273 (14,11%).

II III
 75,34 (9,63%) 179,3 (22,93%).
 2,01% 5,9%.

(3).

3 -

18 ., % (±Sx)

I	75,10±0,94	24,90±0,94	21,02±1,04	2,78±0,21	1,10±0,02
II	74,42±0,98	25,58±0,98	21,58±1,21	2,92±0,23	1,08±0,03
III	73,82±1,06	26,1 8±1,06	21,92±1,18	3,19±0,18	1,07±0,03

II III
 0,56% 0,90%, - 0,14% 0,41%.
 III
 0,34 0,27% III II

I ()
 (12,99%), - 0,21 (10,76%) 0,48 (24,61%)
 (4).
 4-
 18 .

	I	II	III
: 1 ,	210,2	215,8	219,2
,	14,78	15,95	16,70
: 1 ,	27,8	29,2	31,9
,	1,95	2,16	2,43
1 ,	4690	4841	5004
,	329,71	357,75	381,30

II III , 151 (3,21%) 314 (6,69%). I
 28,04 (8,50%) 51,59 (15,64%). II III
 III
 7,0 1 , II
 0,75 (4,70%), - 0,27 (12,5%),
 1 - 23,55 (6,58%), 163 (3,36%),
 ,
)
 14%.
 (5).
 5 - 18 .
 (±Sx)

	, %					
					()	
	±Sx	Cv	±Sx	Cv	±Sx	Cv
I	375,11±3,40	3,91	62,1±2,24	3,22	6,04±0,38	1,94
II	381,31±2,28	4,02	61,3±2,30	3,81	6,22±0,88	2,43
III	386,61±4,36	3,88	60,4±2,29	3,10	6,40±0,99	2,88

II III I
 III 6,2 % 11,5 % II 5,3
 %.
 60,4-62,1%.
 I () 0,18 . (2,98%)

0,36 . (5,96%).
0,18 . (2,89%).

III

II

5,46-5,48,

I 1,8 2,0 . (0,52% 0,58%).

I II III 1,6 3,4%.

7,0 1

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Simmental

I ()

- 1,8% 3,97%, 0,87% 2,73% 0,92% 1,23%,

1

496 (5,50%) 1 1273 (14,11%)

(9,63%) 179,3 (22,93%)

75,34

2,01% - 5,9% -

II III

0,41%	I ()	0,56%	0,90%	0,14%
			1	
	151 (3,21%)	314 (6,69%)		
(15,64%)		28,04	(8,50%)	51,59
	I ()	0,18		
	(2,98%)	0,36 (5,96%)		
		0,18	(2,89%)	

RESUME

The results of the chemical analysis of meat products are presented with the use of the probiotic supplement Biodarin in the feeding of heifers of Simmental breed.

The calves I (control) group were inferior to the youngsters of the II and III experimental groups by the mass fraction of dry matter in the average sample of minced meat by 1,8% and 3,97%, the protein concentration by 0,92% and 1,23% and the content the extractable fat - by 0,87% and 2,73%, respectively.

Due to the higher mass fraction of protein and fat in the average sample of minced meat, the heifers of the II and III experimental groups outperformed the first group's young in terms of energy concentration per 1 kg of meat products. So the difference in their favor for the energy value of 1 kg of pulp was 496 kJ (5,50%) and 1273 kJ (14,11%), respectively.

An analogous regularity was also observed in the energy concentration in the flesh of the carcass of animals of the experimental groups. The advantage of the heifers of the II and III experimental groups was 75,34 MJ (9,63%) and 179,3 MJ (22,93%), respectively.

On ripeness of meat, the animals of the experimental groups had an advantage over the analogues from the control group by 2,01% and 5,9%.

A more favorable ratio of nutrients in the longest muscle of the back was characterized by animals of II and III experimental groups, which received a feed additive Biodarin in the diet. Heifers of these groups exceeded the analogues of I (control) group by protein content by 0,56% and 0,90%, fat by 0,14% and 0,41%, respectively.

It was found that the I-group calves were inferior to the analogs of the II and III experimental groups by 151 kJ (3,21%) and 314 kJ (6,69%) in terms of energy concentration in 1 kg of muscle tissue. A similar regularity was observed in the gross energy of the whole in the muscle tissue of the carcass. The advantage of the heifers of the II and III test groups was 28,04 MJ (8,50%) and 51,59 MJ (15,64%), respectively.

Owing to the higher concentration of tryptophan in the longest muscle, the spines of the second and third experimental groups surpassed the young I (control) group in terms of the protein quality score by 0,18 units. (2,98%) and 0,36 units (5,96%). Moreover, the heifers of Group III outperformed the analogues of Group II in this indicator by 0,18 units. (2,89%).

(71,4%), - (85,7%) - (14,3%), -
 (14,3%) (14,3%).
 (, 1,2).

1 -
 , %

							:
	$\bar{X} \pm S_x$	lim	Cv	$\bar{X} \pm S_x$	lim	Cv	
	16,24±2,26	8,1-24,4	36,88	8,48±0,56	6,4-10,2	17,56	1,91:1
	17,20±1,10	13,2-21,2	16,97	8,56±0,61	6,2-10,5	18,95	2,01:1
	20,46±3,8	8,9-32,1	50,37	7,18±0,98	4,4-10,1	36,07	2,85:1
	12,08±1,72	4,9-20,1	37,67	8,43±0,61	6,4-10,3	19,29	1,43:1

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8,38% (<0,001), 4,16% (<0,05), 5,12% (<0,01)
 4,64% (<0,05), 5,73% (P<0,001) 8,53% (P<0,001).

2 -
 , %

							:
	$\bar{X} \pm S_x$	lim	Cv	$\bar{X} \pm S_x$	lim	Cv	
	15,38±2,22	8,0-23,4	38,28	7,90±0,56	6,1-9,4	8,73	1,95:1
	16,47 ± 1,60	11,9-19,6	16,99	7,98 ± 0,50	6,1-9,5	16,67	2,06:1
	19,27±3,66	8,0-30,9	50,25	6,74 ± 0,88	4,0-9,1	34,48	2,86:1
	10,74±1,62	4,4-18,8	39,96	7,73±0,51	6,0-9,4	17,35	1,39:1

3,26-4,22% (<0,05)

2,80-3,89% (<0,05)

- 1,19%,

- 1,34%.

0,86%,

- 0,73%,

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(4,4-8,9%),

(24,4-32,1%).

1,24%

(1,25-1,38%

0,99-

(3).

0,96-1,19

1,56-1,80

2,03-2,17

3 -

($\bar{X} \pm S\bar{x}$)

	()							
		%		%		%		%
	1,84±0,16	18,9	2,34±0,19	28,5	3,51±1,21	36,1	3,50±1,84	42,6
	1,70±0,20	16,3	2,32±0,24	26,0	3,49±1,28	33,5	3,56±2,04	39,9
	1,61±0,12	14,2	2,10±0,18	21,3	3,37±1,31	29,9	3,42±1,92	34,8
-	2,80±0,24	18,7	3,90±0,42	28,7	5,54±2,01	36,9	5,62±2,14	41,4

(4).

5 -

$$(\bar{X} \pm S\bar{x})$$

, %	18,30±1,96	26,86±1,53	17,99±2,17	28,56±2,04	17,96±1,76	28,56±1,82	17,74±1,82	28,50±2,27
,	26,41±1,92	36,69±2,02	24,96±1,79	36,54±2,23	25,30±1,70	34,28±1,76	25,99±1,52	34,06±1,46
,	126,63±2,67	107,36±2,83	128,40±3,77	109,46±3,37	129,47±2,76	113,31±2,30	127,69±1,55	108,17±1,75
,	96,36±2,87	79,14±3,32	105,16±3,22	80,94±3,98	103,94±1,71	80,90±1,32	108,73±1,76	79,66±1,45
, %	3,03±0,41	4,07±0,56	2,67±0,42	3,24±0,40	2,79±0,25	3,27±0,20	3,01±0,28	3,39±0,29
°	38,71±1,02	37,28±0,84	38,57±1,21	37,00±1,07	38,28±1,27	37,14±1,26	38,29±0,75	37,57±0,65
°	37,43±0,84	37,00±0,84	37,14±1,30	5,71±1,13	36,86±1,40	36,00±1,33	37,00±0,69	36,57±0,68

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RESUME

In the article results of studying of features of formation of muscles of the basic departments of an ink with the age at young sheep of Tsigai, South Ural and Stavropol breeds are resulted. The article presents data and analysis of the absolute and relative mass, the average monthly increment and the coefficient of increase in the absolute mass of the muscles in the parts and the entire carcass of the young sheep of the main breeds in the Southern Urals. At the same time, the established dynamics of accumulation of muscle tissue in the carcass of the experimental young fully corresponds to the

[5-10].

(I), (II), (III), (IV).

(1984).

(1971, 1981)

(1991)

(1,2).

1.-
 $(\bar{X} \pm S\bar{x})$

		%				, %		
14	8,30 ±0,88	55,54	4,61 ±0,21	66,81	10,09 ±0,21	51,93	5,24 ±0,10	73,08
$\frac{2}{2}$	10,84 ±0,75	59,32	6,43 ±0,47	76,55	10,13 ±0,44	52,42	5,31 ±0,24	55,72
$\frac{3}{2}$	8,33 ±0,96	60,26	5,02 ±0,64	52,13	10,36 ±0,34	53,76	5,57 ±0,18	56,84
$\frac{4}{2}$	11,94 ±1,70	60,30	7,20 ±0,65	73,17	10,11 ±0,74	59,15	5,98 ±0,42	60,83
$\frac{5}{2}$	12,00 ±0,63	54,75	6,57 ±0,43	64,35	11,71 ±0,30	55,85	6,54 ±0,24	62,23
$\frac{6}{2}$	9,23 ±0,56	57,31	5,29 ±0,30	51,16	9,50 ±0,73	58,21	5,53 ±0,37	52,21
$\frac{7}{2}$	9,09 ±0,21	53,13	4,83 ±0,11	45,82	8,13 ±0,24	55,84	4,54 ±0,14	42,87

, 14-

0,5-3,12 (5,2-44,8%, <0,05-0,01).

() 5-
 - 12,0±0,63; - 11,71±0,30; -
 10,36±0,28) 4-
 (11,10±0,45).

0,64-1,06 (7,9-13,0, <0,05).

14- IV 3,04-13,66%, 7 2 -
 3,22-7,81%.

2 -
 - ($\bar{X} \pm S\bar{x}$)

		%				, %		
14	6,97 ±0,24	62,55	4,36 ±0,10	75,04	9,58 ±0,43	65,59	6,29 ±0,26	87,24
$\frac{2}{2}$	11,49 ±0,36	60,14	6,91 ±0,22	88,25	10,33±0,47	63,21	6,53 ±0,35	69,76
$\frac{3}{2}$	9,36 ±0,33	59,61	5,58 ±0,20	65,96	10,40±0,51	63,85	6,64 ±0,29	69,89
$\frac{4}{2}$	10,26 ±0,17	59,45	6,10 ±0,11	65,52	10,10±0,45	61,53	6,83 ±0,13	67,42
$\frac{5}{2}$	10,36 ±0,28	52,22	5,41 ±0,03	55,72	10,06±0,41	67,59	6,80 ±0,25	65,76
$\frac{6}{2}$	9,87 ±0,39	56,74	5,60 ±0,18	56,79	9,14 ±0,18	67,83	6,20 ±0,12	51,67
$\frac{7}{2}$	9,19 ±0,31	51,25	4,71 ±0,20	47,05	8,77 ±0,27	59,06	5,18 ±0,15	42,45

(3).

28,9%, 28,3%, 112,9% (<0,01).

3- , / ²

	$\bar{X} \pm S\bar{x}$	Cv	$\bar{X} \pm S\bar{x}$	Cv	$\bar{X} \pm S\bar{x}$	Cv
	5082,29±85,46	4,45	5105,43±84,20	4,36	5083±86,89	4,52
	5107,28±111,32	5,77	5109,28±114,59	5,93	5124,86±114,14	5,89
	6551,86±91,30	3,69	6529,71±107,09	4,34	6531,37±102,96	4,17
-	3076,71±88,31	7,59	3083,85±86,11	7,39	3061,71±93,75	8,10

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(4).

4-

($\bar{X} \pm S\bar{x}$)

	9,71±0,34	12,47±0,52	8,21±0,39	11,24±0,36	8,36±0,46	11,43±0,35
	10,43±0,17	14,16±0,09	8,93±0,20	12,24±0,13	9,00±0,27	12,53±0,14
	11,25±0,21	14,88±0,36	9,83±0,17	14,44±0,24	9,92±0,20	14,66±0,25
-	15,00±0,22	17,67±0,15	13,57±0,28	16,70±0,26	13,71±0,21	16,9±0,23

19,7%) - 1,00-1,56 (11,1-18,7%). 0,82-1,54 (7,9-15,8%), - 0,90-1,62 (10,1-

- 1,43 (15,9 %), - 2,25 (25,0%). 0,71 (7,9%), 3,0 (25,0%).

1002-422-87

(1 5).

I II
5,6-13,1%, - 11,4-11,7%, - 9,2-12,1%,
23,9%, 26,1% 24,7%

5 - , %

I		128,6	137,0	136,0
II		136,2	137,5	138,9
III		141,7	148,9	148,1
IV	-	117,8	122,8	123,4

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3,6 – 3,7%. 3,7–4,2
- 550-650
850-950 , 1100 -
32-40 . - - 800-1000
15-16 420-480 -
5500-6700 , 3,8-4,0%.
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[3].

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16-18

70%

-75%

- 85% [3]. « »

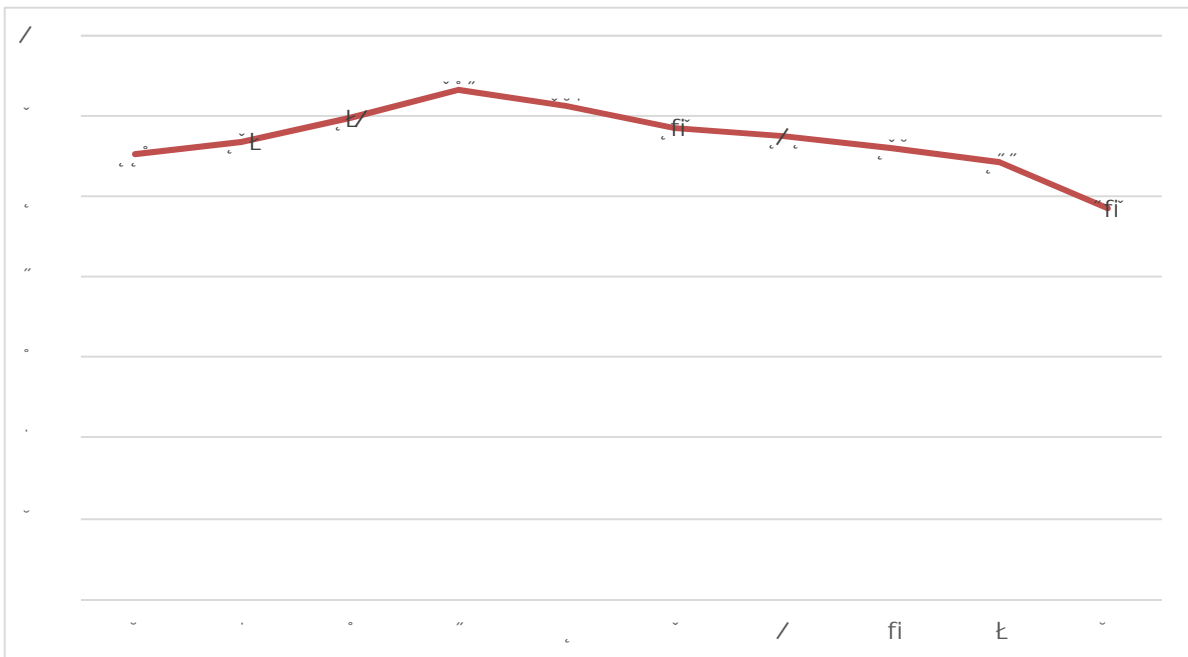
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	1	2	3	4	5	6	7	8	9	10	
	553	569	597	634	612	586	575	561	544	486	5717

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	1	2	3	4	5	6	7	8	9	10	
, %	3,67	3,79	3,83	3,87	3,76	3,65	3,6	3,7	3,68	3,6	3,72

3,60%-3,87%
3,72%-

98 % -

3

100% -

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	1	2	3	4	5	6	7	8	9	10	
, %	3,2	3,33	3,47	3,3	3,26	3,19	3,23	3,2	3,27	3,2	3,27

3,2% - 3,47% -
3,27%

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	1	2	3	4	5	6	7	8	9	10	
	95	113	126	154	137	143	158	179	205	143	145

3,27% - 205 / 3, -126 / 3

95-205 / 3

3,27%

5717

3,72 %, 145 / 3

1. - : , 2004. – 145 .
2. // – 2002. – 3. – . 180-184.
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RESUME

Determined by the milk yield during the lactation period of black-motley breed of cows. The results of the research showed that cows of black and motley breed give high milk yield for lactation. The qualitative composition of milk of cows of black and motley breed is also determined and the possibility of reducing the content of somatic cells is shown. The indices of protein, fat content and somatic cells do not exceed the norm.

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EPIZEOLOGOLOGY AND IMMUNOENZYME METHOD IN DIAGNOSIS OF LARGE CATEGORY LEUKOSIS

Abstract

The main reason for this is incomplete coverage of animals for serological studies and the absence of a domestic test system for immuno-enzyme analysis. In modern conditions, the basis for laboratory early in vivo diagnosis of leukemia of cattle, on which the system of preventive measures relies, is the serological method of research - the reaction of immunodiffusion in the agar gel and the method of enzyme immunoassay, which determine the infection of herds with the leukemia virus. Immunoenzymatic analysis is based on the immunological response of the antigen-antibody response and the use of monoclonal antibodies or antigens marked with enzymes as an indicator of this reaction. For this purpose, we immunized mice with a concentrated antigen of the leukemia virus of bovine animals obtained lymphocytes producing specific antibodies and fusing them with myeloma lines of cells X63-Ag8.6.5.3, clones of hybrid cells, from them one strain stably producing enzymes of monoclonal antibodies with molecular mass of 51 and 24 kDa to the leukemia virus of bovine animals and from 2×10^7 M⁻¹ to 4×10^8 M⁻¹.

Keywords: *the enzyme-linked immunosorbent assay, enzootic leukemia, serological tests, immunoenzyme method.*

Leukemia (enzootic leukemia, hemoblastosis) is one of the most common chronic viral diseases of cattle (cattle). In the absence of a planned struggle, there is a tendency to further increase [1].

As a result of many years successful implementation of a number of national programs to eliminate the disease and prevent its spread in the EU countries, leukemia of cattle has virtually been eliminated [2]. Our sulphur epidemiological monitoring and analysis of the leukemia situation as a whole in the RK and in the context of the regions based on the data of the republican and regional veterinary laboratories of the Ministry of Agriculture of the Republic of Kazakhstan (RK) for the period 2002-2015 showed the epizootic unevenness tension of the infection, but wide spread in various farms of the country (Tables 1 and 2).

Table 1 - The main indicators reflecting the degree of infection of cattle with leukemia in the Republic of Kazakhstan (2002-2015)

Years	Livestock number	Total investigated	Studied to the number in %	Number of Infected	%
2002	4 559 500	338 240	7,42	15 057	4,5
2003	4 871 000	719 130	14,8	23 884	3,3
2004	5 203 900	120 453	2,3	9 372	7,8
2005	5 457 400	300 537	5,5	33 072	11,0
2006	5 660 400	325 973	5,8	19 218	5,9
2007	5 840 900	1 000 010	17,1	33 288	3,3
2008	5 991 600	1 011 270	15,9	38 341	3,8
2009	6 095 200	2 526 382	42,5	55 514	2,2
2010	6 117 700	2 673 877	43,7	65 869	2,5
2011	5 700 000	2 934 288	51,5	57 998	1,9
2012	5 702 436	725 285	12,7	21 133	3,0
2013	5 690 041	51 692	0,91	2 528	4,9
2014	5 851 227	61 933	1,06	5 060	8,1
01.09.2015	6 830 400	37 626	0,55	1 750	4,6
Total in the RK	79 571 704	12 826 695	16,12	382 080	3,0

As it can be seen from the data in the table from 2002 to 2015, a total of 12,8267 thousand heads of animals were submitted to the total serological (RID) research in Kazakhstan, with the number of cattle numbering 79,5717 thousand. The total number of studied animals is 16,12%, with 382,080 animals infected with leukemia virus of cattle, an average in the RK is 3,0%. The infected animal with the leukemia virus in different years was not the same: in 2002, the infection rate of livestock in the republic was 4,5%; in 2003 was 3,3%; in 2004 was 7,8%; in 2005 was 11,0%; 2006 - 5,9; 2007 - 3,3; 2008 - 3,8; 2009 - 2,2; 2010 - 2,5; 2011 - 1,9; 2012 - 3; 2013 - 4,9; 2014- 8,1, in 01/09/2015 - 4,6%.

Table 2 - Results of the epizootic situation analysis of cattle leukemia in the context of regions (in 2002-2015)

The name of regions	All researched cattle in		
	RIA	RIA positive	%
Akmola	794 851	33801	4,25
Aktobe	720 723	1074	0,15
Almaty	324343	18366	1,39
Atyrau	305 318	1	0,0003
East Kazakhstan	1403259	43408	3,1
Zhambyl	563 179	14870	2,6
West Kazakhstan	1112 836	34773	3,12
Karaganda	847 026	9204	1,09
Kyzylorda	907 515	4	0,0004
Kostanai	1830965	109118	6,0
Mangistau	861 849	0	0,0
Pavlodar	866 989	30847	3,56
North Kazakhstan	1 250 459	85007	5,15
South Kazakhstan	1 037 383	1437	0,12
Total for the RK	12 826 695	382080	2,98

The given data of the table shows that in the farms of Kostanay, Akmola, East-Kazakhstan, West- Kazakhstan, Pavlodar and North-Kazakhstan regions, despite the relatively low level of the surveyed livestock, the highest infection of livestock with the leukemia virus was revealed.

In modern conditions, the basis of laboratory early lifetime diagnosis of cattle leukosis on which the system of preventive measures is based is the serological method of research - the immunodiffusion reaction in the agar gel (RID) and the enzyme immunoassay (ELISA) method, which determine the herd infection by the leukemia virus. RID is simple in the formulation, but it is significantly inferior in sensitivity to a more modern ELISA method [3]. And also it allows to automate the process, that is, to evade the subjective evaluation of the reaction results. In addition, ELISA can detect antibodies to cattle leukosis in milk and urine. Therefore, ICA abroad is actively used for the design and production of highly specific, standard and technology test systems for ELISA, which are widely used in the national programs to combat leukemia of cattle in many countries of Western Europe, America and the CIS countries.

The work was carried out on the basis of LLP «Scientific and Production Enterprise Antigen» on the topic: The technology of manufacturing and organization of production of a highly sensitive test system for the diagnosis of leukemia cattle by the method of enzyme immunoassay. To immunize BALB / c mice, an antigen derived from a virus-containing culture liquid using a transplantable FLK cell line chronically producing bovine leukemia virus was used. Concentrated antigen from the culture liquid was obtained using an ultrafiltration cassette system of Polikan with an ultrafiltration membrane «Biomax» from polyethersulfone Biomax 300.

Immunization of linear mice according to a two-week scheme ensured the production of sufficiently stimulated lymphocytes. Titres of antibodies in serum immunized with purified leukemia virus in ELISA were 1: 25,000. Lymphocytes of mice producing specific antibodies to the virus in the highest titers were used for hybridization with the myeloma line of cells X63 Ag8 6.5.3 by the method of Oi V., Herzenberg L. As a result of fusion of lymphocytes stimulated with the antigen of the bovine leukemia virus and the myeloma cell line X63, 10 (3,4%) clones of hybrid cells were obtained. The optimal ratio of myeloma cell lines of X63 Ag8 6.5.3 and immune lymphocytes during hybridization was 1:5. When testing the resulting hybrid cells for the ability to produce antibodies, it was found that of the 10 clones obtained, leukemia virus, three clones were positive. The titer of antibodies in the serum of immunized mice was from 1: 2560 to 1: 20480. For cell fusion, cells were first incubated with gentle agitation in 50% polyethylene glycol, with a mass of 4000 (PEG) for 1 min, then the cells were incubated for 5-7 minutes. After a slow, but with increasing tempo and with careful mixing, the cell suspension was further diluted with medium, then centrifuged and plated on culture plates [4,5]. A comparative analysis of the effect of different pH levels of polyethylene glycol on cloning is presented in Table 3. In the experiment, 50% PEG concentration was used in all experiments. The concentration of myeloma and lymphocyte cells was 4×10^6 and 20×10^6 , respectively (Table 3).

Table 3- Effect of the pH of PEG-4000 on cell fusion efficiency

Concentration- PEG,%	pH value	myeloma cell numbers	Number of lymphocytes	The yield of formed clones
50	7,5	4×10^6	20×10^6	92
50	7,8	4×10^6	20×10^6	124
50	8,0	4×10^6	20×10^6	178
50	8,5	4×10^6	20×10^6	196
50	9,0	4×10^6	20×10^6	20

The data of the table show that the use of PEG with pH-7,5 led to the formation of 92 clones of hybrid cells. An increase in pH to 7,8 increased the number of clones to 124. At a pH of 8,0 and 8,5, the number of clones reached 178 and 196, respectively. However, at pH 9,0 the number of formed clones of hybrid cells decreased sharply to 20.

In the experiments on studying the effect of the time interval for culturing cells in a serum-free medium after exposure to PEG, the following results were obtained (Table 4).

Table 4 - Data on the effect of the duration of cell culture in a serum-free medium after PEG exposure to cloning

Duration of cell culture, (h)	PEG	Myeloma cell numbers	Number of lymphocytes	The yield of formed clones
2	8,5	4×10^6	20×10^6	196
4	8,5	4×10^6	20×10^6	180
6	8,5	4×10^6	20×10^6	156
8	8,5	4×10^6	20×10^6	132
10	8,5	4×10^6	20×10^6	97
12	8,5	4×10^6	20×10^6	51
14	8,5	4×10^6	20×10^6	45

From the table, it can be seen that cells incubated in a serum-free medium for 2 hours after treatment with PEG are approximately 4 times more likely to form clones than cells in which the incubation period lasted 12-14 hours. A comparison of the yield of the formed clones shows that for short periods of time (2-4 hours) the cells are incubated in a serum free medium after treatment with PEG, more clones (196-180 clones) are formed than with longer incubation. In cells subjected to fusion after 12 or 14 hours of incubation, there were no significant differences in the clone formation.

When testing the obtained hybrid cells for the ability to produce antibodies, it was revealed that eight clones (5B, 7F, 8E, 10E, 6A, 3E, 11E, 2C) were positive from the obtained clones to the leukemia virus. Hybrid cells producing antibodies to the leukemia virus were cloned three times, using a limiting dilution method. After the first cloning, the percentage of antibody-producing subclones of the hybrid cells was 16%, with the second and third cloning 50%. The cloned strains of hybrid cells did not change their properties for 16 passages. As a result of the studies, 4 strains of hybrid cells 5B, 7F, 8E, 10E, stably producing MCA to the protein of the bovine leukemia virus were selected. The hybridoma productivity was determined within 8 days. Hybrid cells were plated in 8 wells of a 24-well plate at 2×10^5 cells / well. Cultured cells in complete growth medium RPMI-1640. From day 1 to day 8, a culture medium was selected from each well to determine the antibody production of the hybridoma. The activity was tested by the enzyme immunoassay. For this well, the plate was immobilized with rabbit antibodies to mouse immunoglobulins at a concentration of $10 \mu\text{g} / \text{ml}$ in 0,05 M bicarbonate buffer pH 9,5 and the plate was incubated at 4°C for 24 hours. After washing the plate, the free surface of the wells was clogged with a 1% solution of bovine serum albumin. Then, the washing procedure was repeated and two-fold dilution of the culture medium with the hybridomas was introduced. As a positive control, mouse immunoglobulins, high in ammonium sulfate, were used. The hybridoma culture medium was incubated at 37°C for 60 minutes. Subsequently, rabbit immunoglobulins were introduced to mouse antibodies conjugated to peroxidase. The reaction was exhibited by the addition of a substrate and the result was taken into account with a spectrophotometer with a vertical beam of rays. The hybridoma productivity was determined by comparing the intensity of the color in the test series of wells with a positive control, in which the known concentration of mouse immunoglobulins. The dynamics of accumulation in the culture medium of the hybridoma strains was different. Thus, in strain 7F, three peaks of antibody production are observed on days 3, 5, 7. At strain 5B the peak of productivity comes on day 6. The dynamics of antibody production in strains 8E and 10E is somewhat different. Reaching on the 5th-6th days of its peak, the synthesis of antibodies in the future does not change much.

To produce the preparative amount of MCA, syngenic mice were injected with a hybridoma strain 7F in an amount of 2×10^5 cells. 14 days before the introduction of the hybridoma, mice were injected intraperitoneally with 2,6,10,14-tetramethylpentadecane at a dose of 0,5 ml per head. The productivity of hybrid cells under in vivo conditions was significantly higher from 8 to 16 mg. The comparative characteristics of hybrid cells that synthesize MCA to the leukosis virus of cattle are presented in Table 5.

Table 5 - Productivity of hybridoma strains under conditions in vitro and in vivo

Name of strains	Productivity of strains in culture (mg / ml)	The productivity of strains in vivo (mg / ml)
5B	0,05	8
7F	0,05	16
8E	0,025	8
10E	0,025	8

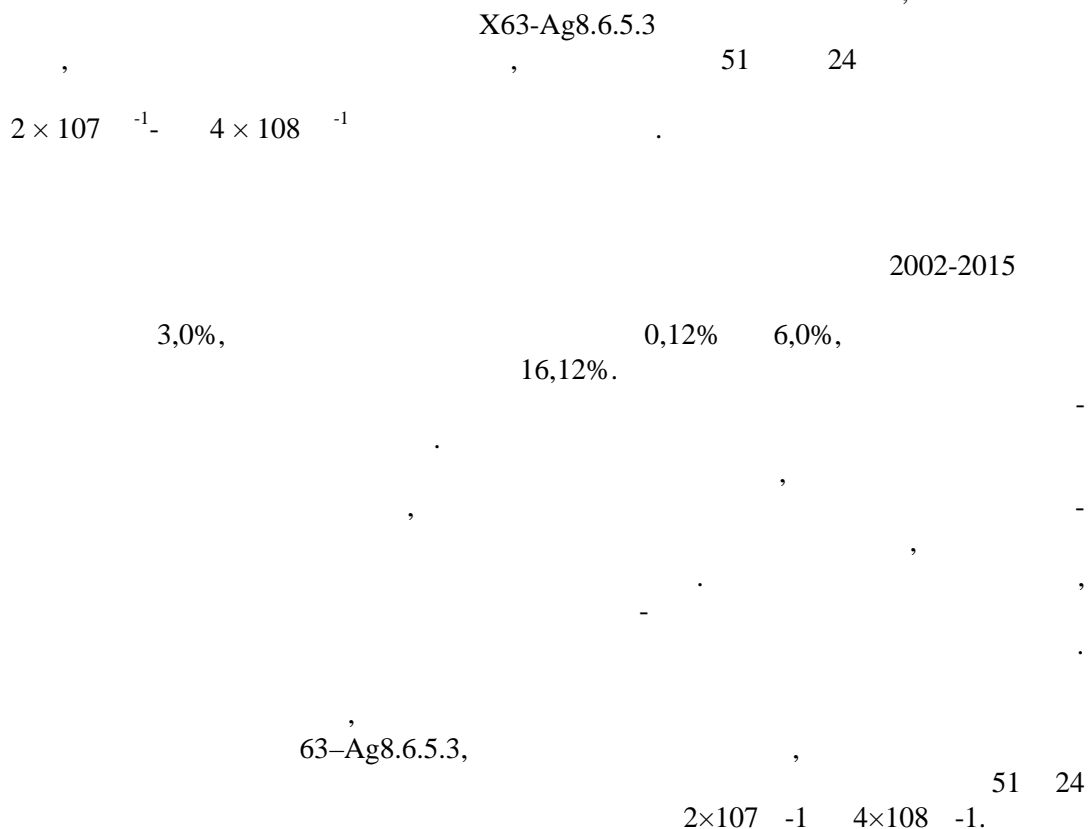
It can be seen from the table that strains of hybrid cells 7F and 5B have rather high productive properties, and that accumulation of preparative amounts of MCA is most effective in the production of them in vivo as ascites fluid. So the concentration of MCA in ascites fluid was 160-320 times greater than in the supernatant of the culture medium.

Thus, the resulting hybrid cells producing MCA have high productivity, in vivo up to 16 mg / ml, in vitro to 0,05 mg / ml.

The analysis shows that the virus leukosis virus of cattle has uneven but widespread distribution in the republic. In connection with the wide spread of leukemia, hybridoma technology has produced a hybridoma strain, which stably produces antibodies to the antigen of the virus leukosis virus of cattle. Titers of the MCA strain against the original antigen were in the culture liquid 1:32. The specificity and positive immunochemical characteristics of the obtained MCA allow using them in the development of effective diagnostic preparations for the indication and differentiation of antibodies of the leukemia virus.

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EXTRACTION OF PASTEURELLA MULTOCIDA gDNA FROM ORGANS AND TISSUES OF ANIMALS USING VARIOUS METHODS

Abstract

To date, researchers have a fairly large set of methods for extracting and purifying DNA, and these methods continue to be improved and modified with reference to new research objects. In connection with the variety of living objects, there are no universal methods of DNA isolation. The use of this or that method of DNA isolation is dictated, firstly, by the specificity of the material being studied, and secondly, by what purpose is pursued: the production of total, nuclear, chloroplast DNA or other of its preparations. The DNA isolation method should be relatively simple, well reproducible and allow for the rapid production of sufficient quantities of satisfactorily purified DNA preparations. The yield of DNA depends on the nature of the starting material and is due to the content of DNA in this tissue, as well as the presence and nature of impurities that interfere with DNA purification.

In the article, based on literature sources and own research, the results of studies on the selection of the optimal method for isolation of *Pasteurella multocida* DNA from biological material are presented.

As a result of the selection of the optimal methods for isolation of *Pasteurella multocida* DNA from biological material, it was determined that all methods of DNA extraction used in the work are quite acceptable for the extraction of *Pasteurella multocida* genomic DNA.

Keywords: DNA, sorbent, *Pasteurella multocida*, polymerase chain reaction.

The appearance of the polymerase chain reaction (PCR) method was due to certain achievements of molecular genetics, primarily the decoding of the nucleotide sequence of the genomes of a number of microorganisms. Simplicity of performance and unsurpassed indicators of sensitivity and specificity brought unprecedented popularity to the new method. With the speed of lightning, the method spread throughout the world. PCR is used for scientific and practical research. But first of all the method has found wide application in the field of microbiological diagnostics. Currently, the PCR method is automated, fairly simple in execution and available to any molecular biology laboratory [1].

When diagnosing pasteurellosis of animals using PCR, the main working material is *Pasteurella multocida* [2].

Deoxyribonucleic acids (DNA) are a universal source of information on all genetic traits of any kind.

In the modern world, it seems possible to extract DNA from absolutely any available biological material, consisting of cells that have, among other things, a decorated core in their structure. These are the so-called eukaryotic cells. These include cells of animals, plants, viruses or microorganisms [3].

The main criterion in the methods of DNA isolation is a high degree of purification of the nucleic acid from the impurities of cellular DNA and proteins. The isolated genomic DNA must be unfragmented, since it serves as a template for the synthesis of a specific product [4].

Treatment of clinical material and isolation of nucleic acids is the first and most important stage of molecular biological research. The main task of this stage is to obtain a purified DNA preparation for the subsequent amplification reaction.

Materials and methods. The research was carried out on the basis of the biotechnology laboratory of the Research Institute of Biotechnology and Nature Management of the NPJSC «Zhangir Khan West Kazakhstan agrarian-technical university». Several methods of DNA isolation were used to select the optimal variant.

DNA extraction was carried out using commercial DNA sorb complexes B, and for this purpose an automatic Thermo Scientific King Fisher and a hot lysis method were used.

Isolation of DNA with the help of sorbents. A 1,5 cm³ daily culture was added to the tubes and centrifuged 8,000 rpm for 5 minutes. The supernatant was drained and washed with a buffer solution. A TES buffer solution was added to the tube with a precipitate of 1 cm³ - the precipitate was vortexed. Again precipitated by centrifugation 8,000 rpm - 5 minutes. Then, the supernatant was discarded and 1cm³ of 2-[[1,3-dihydroxy-2-(hydroxymethyl)propan-2-yl]amino]ethanesulfonic acid (TES) buffer added again, vortexed and 300 µl of lysing solution (iazamidine-i-thiotinad) was added and vortexed and allowed to stand for 5 minutes in a thermostat at 65 °C. Turbidity indicates a lysis. Then the sorbent - 25 µl was added, pre-shaken, after addition also mixed on a vortex and left at 37 °C for 2 minutes. Then they were shaken for a few seconds on the vortex and again put for 5 minutes at room temperature. Centrifuged 5 thousand/rpm, 30 seconds. Then, the supernatant was removed, leaving the pellets on the bottom. Then, wash solution No.1 was added with 300 µl (heated to 60-65 °C). Then centrifuged for 30 seconds at 5 thousand / revolution per minute.

The supernatant was removed and 500 µl of buffer 2 was added. Vortexed. Then centrifuged for 30 seconds, the supernatant was removed. Then it was dried in a thermostat with an open lid for 5 minutes at 65°C. Then add 50 µl TE for elution and shake vortex and leave in the thermostat for 5 minutes at 65°C. It was then centrifuged at 12,000 rpm for 1 minute. Then they transferred the DNA into a test tube.

Isolation of DNA from the daily *Pasteurella* culture using an automatic nucleic acid extraction station – Thermo Scientific King Fisher. The «Thermo Scientific King Fisher Cell and Tissue DNA Kit» was prepared according to the dialing protocol. The basis of the set is paramagnetic quartz particles, which bind the nucleic acid in the presence of chaotropic salts. After the binding step, the DNA / magnetic particle complex was thoroughly washed in washing buffers to remove all remaining contaminants and then the purified DNA was immersed in an eluent buffer.

The culture cell suspension in the Phosphate Buffered Saline (PBS) buffer was washed, then treated with a lysis buffer (containing 10 µl of -IU per 1000 µl of buffer), so that the final concentration was $1 \cdot 10^6$ cells / 100 µl. Then went to the protocol set.

The isolation of DNA from the bacterial culture *Pasteurella multocida* was carried out by hot lysis method. Two ml of 18 h of the pasterelle broth culture was precipitated by centrifugation at 10,000 rpm for 10 minutes. The precipitate was washed with a sterile PBS buffer solution (10mM Tris Hcl, 10mM KCl, 10mM MgCl₂.2mM Ethylene Diamine Tetraacetic Acid (EDTA)) twice and resuspended with 30 µL deionized water and boiled for 10 minutes. After boiling, the samples were placed in a layer of ice for 30 minutes. The samples were then centrifuged at 3000 rpm for 10 minutes to precipitate. The supernatant was stored at -20 °C until use.

Phage DNA, treated with Hind III (DNA Molecular Weight marker II (0,12-23,1 kbp)) was used as a control. Documented the results through a transglyuilluminator, using the computer program «LabWorks 4.0», determined the molecular weights of the restriction, the sum of all the restriction fragments.

The development of specific DNA sections was carried out in a thermocycler with a gradient of temperatures Mastercycler gradient, Eppendorf.

Electrophoresis of DNA amplification products of *Pasteurella multocida* was carried out in a horizontal electrophoresis apparatus «G-100», firm «Pharmacia», at a voltage of 8 V/cm. Electrophoresis in 2,0% agarose gel was used to record the results.

Preparation of working electrophoresis buffer. 25 cm³ of concentrated Tris-borate buffer (TBE) were poured into a graduated cylinder, brought to 500 cm³ with distilled water, the cylinder was closed with parafilm and mixed.

Agarose from one bottle was poured into a glass flask made of heat-resistant glass for 250 cm³. 100 cm³ of the working buffer was poured, stirred by rotating the flask and melted in a microwave oven until the agarose was completely dissolved, (1,5 minutes at 800 W), agarose was brought to a boil for another 1,5 minutes. The flask was removed from the microwave oven and agarose cooled, rotating the flask, to 65-70 °C.

The molten gel was poured into the mold of the chamber. Set the combs at a distance of at least 3 cm from each other. The thickness of the gel is about 6 cm.

After the gel completely solidified, the combs were gently removed. Place the substrate with the finished gel in the chamber. The chamber was filled with a ready buffer so that it covered the gel by 5 mm.

Documentation of the obtained results was carried out through a transgelilluminator. Subsequent analysis of the results was carried out using the Digi-Doc-It program.

The «DNA Wide Range marker» and «DNA Ladder 1kb» from «Sigma» were used as a marker of molecular weights.

Results of the study and discussion. The first method is based on the dissolution of DNA in the presence of a sorbent. As a result of treatment with a lysing solution, the destruction of cell membranes and the release of DNA occur. Dissolved DNA binds to the sorbent particles, and other components of the lysed clinical material remain in solution and are removed by sorbent precipitation by centrifugation followed by washing.

A second method of extracting DNA from bacteria involves the use of paramagnetic quartz particles that bind the nucleic acid in the presence of chaotropic salts. After the binding step, the DNA/magnetic particle complex is thoroughly washed in the wash buffer to remove all remaining contaminants and then the purified DNA is immersed in the eluent buffer.

We tested a method for the isolation of DNA by the hot lysis method of a *Pasteurella* agar culture on a water bath, described by W.L. Araujo, D.A. de Angellis, J.L. Azevedo «Direct RAPD

Evaluation of Bacteria without Conventional DNA Extraction» [5]. This method is very simple in execution and can be used for routine diagnostic work. The yield of genomic DNA in this method was 60-80%.

The main criteria for the development of optimal methods were the concentration and purity of the drug.

After isolation of *Pasteurella multocida* DNA by the above methods, a qualitative and quantitative analysis of the sample was carried out. Electrophoresis was performed in a 0,8% agarose gel in TAE buffer. The ratio between the optical densities at 260 and 280 nm was spectrophotometrically measured. The maximum absorption for nucleic acids is recorded at a wavelength of 260 nm. The preparation of DNA is considered free of impurities at a ratio of E_{260}/E_{280} equal to 1,8 and higher. The preparation of DNA is considered free from impurities at a ratio of E_{260}/E_{280} equal to 1,8 and higher. If this is below this, the sample is contaminated with proteins or phenol.

Conclusion. Samples of *Pasteurella multocida* DNA, using sorbents, proved to be of low quality. The relationship between the optical density at wavelengths of 260 and 280 nm averaged 1,65-1,7, which indicated contamination of DNA with protein and other impurities. Thus, the obtained results showed ineffectiveness of these methods.

Good results were obtained by fixing DNA on a magnetic particle and a silica base in a centrifuge tube.

The ratio of the optical density (E_{260}/E_{280}) of the obtained *Pasteurella multocida* DNA preparations had an average value of $1,81 \pm 0,04$ ($n=4$).

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THE CONTENT OF VITAMINS AND MINERALS IN MEAT OF HEALTHY AND SICK PIGS WITH CIRCOVIRUS INFECTION

Abstract

This article compares the contents of vitamins and minerals in meat of healthy and sick pigs with circovirus infection. The nutritional value of meat depends on the quantitative ratio of water, protein, fat, the content of essential amino acids, polyunsaturated fatty acids, vitamins, micro- and macroelements, and organoleptic indices of meat. Vitamin B₁ in the body is very necessary for proper metabolism. Vitamin B₁ in the meat of a sick animal was 0,68 mg, and in the control group – 0,81 mg. Vitamin E improves the function of muscles and gonads. It is present in the composition of vegetable oil, in seeds of walnut, legumes and corn, and vegetables. Vitamin B₂, like other vitamins is necessary for normal growth, it is involved in biological processes. Vitamin B₂ is 0,23 mg in the control group, 0,14 mg in the experimental group. Vitamin E in the meat of a healthy animal was 0,52 mg, and in the meat of a sick animal, 0,39 mg. Vitamin PP is necessary for carrying out the processes of biological oxidation in the body. In sufficient quantities in the liver and kidneys, yeast, meat and milk, as well as in peas, large beans, in the composition of grain flour. Vitamin PP was 3,86 mg in the control group, 3,11 mg in the experimental group.

Keywords: *ig, vitamins, minerals, microelements, nutritional value, circovirus infection.*

In recent years, in connection with the active development of pig production, diseases that had not previously been registered in Kazakhstan are of great importance. A particularly significant problem in industrial pig farms was circovirus infection of pigs [1].

With circovirus infections, known clinical symptoms, such as:

- depletion (multisystem exhaustion syndrome after weaning piglets from the sow);
- dysfunction of the kidneys and skin (dermatitis and nephropathy piglets syndrome (SDPP));
- a violation of the function of the respiratory tract (depending on the meaning) (proliferative and necrotic pneumonia (PNP) [2].

The nutritional value of meat depends on the quantitative ratio of water, protein, fat, the content of essential amino acids, polyunsaturated fatty acids, vitamins, micro- and macroelements, and organoleptic indices of meat.

Microelements constitute a very small part of the rations of animals. However, they play an extremely important role in the metabolism of animals, while having a significant impact on their health and productivity. Being associated with enzymes, hormones and vitamins, they affect the basic vital processes of the body, and also support the permeability of cell membranes, tissue respiration and intracellular metabolism. Therefore, the development of a rational system for feeding mineral substances and vitamins to animals is possible only taking into account the latest achievements in the field of the theory of mineral and vitamin metabolism [3].

The aim of our scientific work is with equal indices the content of vitamins and minerals in the meat of healthy and sick pigs with circovirus infection.

The research was carried out in the laboratory of the RSE «Scientific Research Institute for Biological Safety». From both groups (experimental, control group of 10 heads) from 100 g of pork samples were taken using the generally accepted methods of veterinary and sanitary examination, the composition of pork vitamins determined the device and m and HPLC and a spectrometer.

Micro-macro elements were determined with the help of the device «Atomic Adsorption Analyzer» (AAA-339).

The investigation was carried out according to the requirements of GOST 10846-91, GOST 23042-86, Ref. Skurikhina.1987, GOST 9793-74, GOST 15113.8-77 [4].

These are vital and necessary biologically active organic compounds in small doses necessary for human and animal nutrition and are of great importance for the normal metabolism and vital functions of the body. Most vitamins are an integral part of enzymes. The chemical reactions that take place in the body, for example, the digestion of consumed food, feed depends on the activity of the enzymes. If the composition of food is not enough vitamins, a person falls ill with various diseases. And the adoption of vitamins in excess of measures leads to poisoning/intoxication (hypervitaminosis) of the body. Now all the vitamins are divided: for vitamin soluble in water, oil-soluble and vitamin-homogeneous substances. Vitamins and cattle are very important/of great importance. If there is not enough vitamins in livestock feed, the productivity of livestock is reduced, they are depleted, and they become ill with various diseases. In the cattle feed should be enough vitamins A, D, E and K. For example, the lack of vitamin A in pigs leads to eye diseases and miscarriage.

The chemical composition of pork is unstable/unstable. Because, it depends directly on the age, sex, fatness, feeding livestock/animals. Meat/muscle is a significant part of the nutritional value of meat, it includes water, protein, nitrogen and non-nitrogen substances, lipids, minerals, enzymes, hormones and vitamins. The lack of vitamins in the body of pigs leads to a disruption in the metabolism process, a deterioration in its ability to withstand infectious diseases. For example, vitamin A influences/affects growth, development of the body, increases the ability to resist various diseases. Better to see in the evening twilight, at night. Vitamin A affects the growth and growth of skin cells. If it is not enough / lacks, the skin is dried / the cracks dry, the color will fade. The composition of the sebaceous glands changes, the rawhide shell is broken. Indicators of Vitamin A in our studies in the experimental and in the control group, only traces were visible [5].

Vitamin B₁ in the body is very necessary for proper metabolism. Lack of vitamin leads to disruption of digestion. Vitamin B₁ in the meat of a sick animal was 0,68 mg, and in the control group – 0,81 mg.

Vitamin B₂, like other vitamins is necessary for normal growth, it is involved in biological processes. Allows quick healing of wounds, eyes retains the ability to see well. In case of lack of this vitamin, the lips dry up, bluish, the wound on the body heals slowly. Vitamin B₂ is present in the control group 0,23 mg, 0,14 mg in the test group.

Vitamin E improves the function of muscles and gonads. It is present in the composition of vegetable oil, in seeds of walnut, legumes and corn, and vegetable. Vitamin E in a healthy animal meat was 0,52 mg and sick animal meat 0,39 mg.

Vitamin PP is necessary for carrying out the processes of biological oxidation in the body. In sufficient quantities in the liver and kidneys, yeast, meat and milk, as well as in peas, large beans, in the composition of grain flour. Vitamin PP was 3,86 mg in the control group, 3,11 mg in the experimental group [6] (Table 1).

Table 1 – Content of vitamins in the meat of the rear of the pig of the patient and pork

Vitamins, mg / 100g	A	E	B ₁	B ₂	PP
Control group (a healthy animal)	Footprints	0,52 ± 0,05	0,81 ± 0,08	0,23 ± 0,02	3,86 ± 0,38
Experienced group (sick animal)	Footprints	0,39 ± 0,05	0,68 ± 0,08	0,14 ± 0,02	3,11 ± 0,39

Based on our research, we came to the conclusion that the indicators of vitamins in meat of a healthy animal are higher than in the meat of a sick animal.

Macro-elements are present in the body in large quantities, and also enter the body from the outside, like vitamins. The lack or overabundance of all the basic elements can lead to serious illnesses.

Microelements are also very important. Lack of iodine and selenium can lead to thyroid disorders. While iron is responsible for the oxygen tolerance, and zinc and manganese are parts of the enzymes. All trace elements should be consumed in a comprehensive manner, while a lot of macronutrients are required and most of them need to be covered from food. Microelements are best obtained from dietary supplements. At the same time it is extremely important to comply with the necessary doses, overdoses are also terrible, as are the shortcomings of all important elements [7].

The indicators of our scientific research on the content of microelements in pork meat are given in Table 2.

Table 2 - Micronutrient content in pork meat

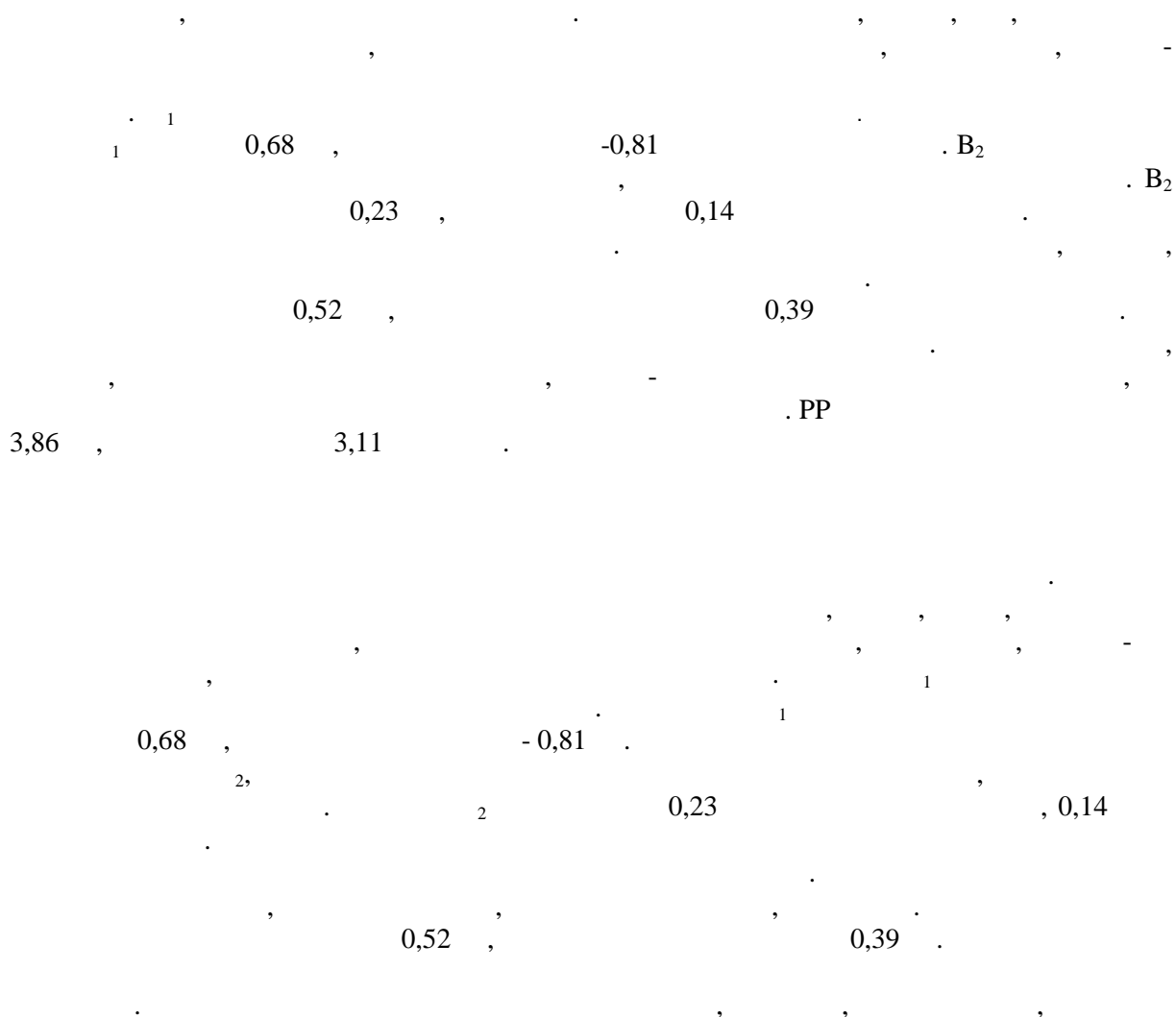
The microelements mg / 100g	Ca	Mg	Fe	I	Zn	Cu
Control group (a healthy animal)	190 ± 38	20 ± 4	6,21 ± 1,24	Do not update	2,88 ± 0,43	0,24 ± 0,0036
Experienced group (sick animal)	131 ± 26,2	14 ± 2,8	3,57 ± 0,71	Do not update	1,25 ± 0,18	0,15 ± 0,02

As it can be seen from the table that the calcium indicator in the meat of the control group was 190 mg, and in the experimental group - 131 mg Magnesium in pork meat is about 20 mg. in the control group, and in the experimental group - 14 mg. Parameters iron in the control group – 6,21 mg, and in the experimental group, 3,57 mg, iodine is not detected in the meat of pork of both groups. Zinc values in the control group were 2,88 mg, and in the experimental group, 1,25 mg, and copper in the meat of the control group was 0,24 mg, and in the experimental group 0,15 mg.

Conclusion. Based on our scientific research, we came to the conclusion that indicators of vitamins and macro elements in the meat of a healthy animal are higher than in pork meat of a patient with circovirus infection.

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SELECTION OF A BREEDING STRAIN FOR THE PRODUCTION OF AN ATTENUATED STRAIN OF SALMONELLA

Abstract

The data on the selection of a breeding strain are given for the purpose of obtaining an attenuated strain of salmonella. Our studies showed that the strains studied preserved the typical morphological, tinctorial, cultural, antigenic and pathogenic properties characteristic of the corresponding salmonella serovars. The studied *S. dublin* 76 strain was selected as the initial strain for use in the development and design of a live vaccine (using the attenuation method) against bovine salmonellosis. The task of our further research was to obtain an attenuated strain of salmonella, to study its biological properties, to use it as a vaccine strain for the production of a live vaccine against bovine salmonella. The strain *Salmonella dublin* 31, obtained by the genetic method. The *Salmonella dublin* 31 strain is deposited in the Collection of Microorganisms of the Republican State Enterprise «Scientific Research Institute of Biological Safety Problems» of the Ministry of Education and Science of the Republic of Kazakhstan (RSE NIIPBB KN MES RK). Collection number M-42-15 / D.

Key words: *serovars, strains, industrial, attenuated, Salmonella dublin*

Relevance of the topic. The issues of prevention of salmonellosis most often come down to vaccination, as the most traditional and universal method.

In case of animal salmonellosis, various variants of killed vaccines are studied. Some of them are used now. Long-term studies have shown that inactivated vaccines used form immunity of insufficient voltage and duration. In this connection, the search for improvements in various areas has been constantly conducted and is being carried out: improving the methods of preparation of corpuscular vaccines (broth and agar vaccines, inactivated by washing with various physical and chemical agents); the selection for vaccines of full-bodied wiggins against strains; use of adjuvants that increase the immunogenic properties of vaccines [1].

Salmonella is an important zoonotic pathogen and causes significant morbidity and mortality in food-producing animals. In cattle industries, introduction of modern intensive production and large-scale trading systems have resulted in an increased risk of animals being exposed to a wide range of *Salmonella* serovars, some of which have developed resistance to multiple antimicrobial agents [2].

Salmonella dublin is a hostadapted bacterium which mainly colonises cattle and often causes systemic infection in calves. Compared with this, *Salmonella typhimurium* is one of the most common *Salmonella* serovars isolated from both animals and humans, and often produces enteric salmonellosis. Calves younger than six weeks old are most susceptible to *Salmonella* infection, peaking at 2–3 weeks for *Salmonella typhimurium* and 4–5 weeks for *Salmonella dublin* [3].

In recent years, live vaccines based on attenuated strains have been used successfully in our country and abroad to prevent salmonellosis in farm animals and birds [4].

Specific prophylaxis of infectious diseases with live vaccines has accumulated considerable theoretical and experimental material [5].

In salmonellosis, cellular immune responses are crucial, since salmonellae are capable of intracellular parasitization. The level of antibodies does not reflect the intensity of immunity. In this regard, the most promising for the prevention of salmonella in farm animals are live vaccines [6].

Materials and methods of research. The study was subjected to 179 cultures of Salmonella, isolated from patients, from the fallen and from healthy calves. The cultures studied morphological, cultural, biochemical properties according to the generally accepted schemes.

The identification of the isolated cultures was carried out according to Berdzhii's determinant.

In experiments on laboratory animals and calves, the pathogenicity of the isolated cultures was studied.

Results of the research. The purpose of our research was to determine the pathogenicity of Salmonella isolated from calves for the selection of production strains of enteroinfectives that will be used to obtain attenuated strains of salmonella.

Previously, the pathogenicity of all the isolated cultures was checked on white mice injected intraperitoneally at doses of 10^3 , 10^4 , 10^5 , 10^6 and 10^9 colony-forming units.

The results of the experiment indicated that the experimental animals died completely when infected with a dose of 10^5 cfu or higher.

As a result, strains of salmonella isolated from fallen calves: S.dublin, S.typhimurium, S.enteritidis (3 strains from each salmonella serovar) were selected based on the study of morphological, biochemical and antigenic properties and the degree of pathogenicity of the isolated cultures. The virulence of S. dublin, S. typhimurium, S.enteritidis cultures was studied in experiments on white mice. White mice were infected intraperitoneally with salmonella strains at various doses of colony forming units (CFU). The results were evaluated by the survival of the experimental animals (Tables 1,2,3).

Table 1 - Virulence of strains of S.dublin isolated from calves in experiments on white mice

	Culture name	No of animals	Infection dose (CFU)	Inoculation method	Result		
					Died	Alive	% of staying alive
1	S.dublin -14	20	10^3	I/p	14	6	30
	-/-	20	10^4	-/-	19	1	5
	-/-	20	10^5	-/-	20	-	-
	-/-	20	10^6	-/-	20	-	-
2	S.dublin -76	20	10^3	I/p	18	2	10
	-/-	20	10^4	-/-	20	-	-
	-/-	20	10^5	-/-	20	-	-
	-/-	20	10^6	-/-	20	-	-
3	S.dublin -66	20	10^3	I/p	-	20	100
	-/-	20	10^4	-/-	-	20	100
	-/-	20	10^5	-/-	4	16	80
	-/-	20	10^6	-/-	9	11	55

Note: Observation period 15 days

Table 2 - Virulence of S. typhimurium strains isolated from calves in experiments on white mice

	Culture name	No of animals	Infection dose (CFU)	Inoculation method	Result		
					Died	Alive	% of staying alive
1	2	3	4	5	6	7	8
1	S. typhimurium -9	20	10^3	I/p	16	4	20
	-/-	20	10^4	-/-	18	2	10
	-/-	20	10^5	-/-	20	-	-
	-/-	20	10^6	-/-	20	-	-

continuation of table 2

1	2	3	4	5	6	7	8
2	S. typhimurium -86	20	10 ³	-/-	1	19	95
	-/-	20	10 ⁴	-/-	3	17	85
	-/-	20	10 ⁵	-/-	5	15	75
	-/-	20	10 ⁶	-/-	9	11	55
3	S. typhimurium -69	20	10 ³	-/-	10	10	50
	-/-	20	10 ⁴	-/-	20	-	-
	-/-	20	10 ⁵	-/-	20	-	-
	-/-	20	10 ⁶	-/-	20	-	-

Note: Observation period 15 days

Table 3 - Virulence of strains of S.enteritidis isolated from calves in experiments on white mice

	Culture name	No of animals	Infection dose (CFU)	Inoculation method	Result		
					Died	Alive	% of staying alive
1	S. enteritidis -36	20	10 ³	I/p	2	18	90
	-/-	20	10 ⁴	-/-	2	18	90
	-/-	20	10 ⁵	-/-	7	13	65
	-/-	20	10 ⁶	-/-	12	8	40
2	S. enteritidis -91	20	10 ³	-/-	-	20	100
	-/-	20	10 ⁴	-/-	-	20	100
	-/-	20	10 ⁵	-/-	-	20	100
	-/-	20	10 ⁶	-/-	3	17	85
3	S. enteritidis -54	20	10 ³	-/-	10	10	50
	-/-	20	10 ⁴	-/-	15	5	25
	-/-	20	10 ⁵	-/-	18	2	20
	-/-	20	10 ⁶	-/-	20	-	-

Note: Observation period 15 days

The results of the experiment showed that the cultures tested had a sufficiently high virulence, especially strains: S.dublin 76 and S. typhimurium 69, isolated from the fallen calves, causing 100% death of experimental animals at a dose of 10⁴ cfu and above.

In all experiments a bacteriological study of the patch material from the dead animals was carried out. Infectious cultures were constantly allocated.

On calves, we tested the virulence of strains of S.dublin 76, S. typhimurium 69, S.enteritidis 54. All the animals were months old. As a control, we used in the experiment reference virulent strains of S. typhimurium 371, S. dublin 315/52, S.enteritidis 51, taken from VGNKI (Moscow).

The experimental calves were infected with intraperitoneally daily agar culture in appropriate doses. Experimental animals mostly died on the 6th -12th day after infection with obvious signs of salmonellosis.

The results of the experiment are shown in Table 4.

In all experiments a bacteriological study of the patch materials from the fallen experimental calves was carried out. Contaminating salmonella cultures were constantly evolved.

The results of the conducted studies testify to the etiological role of the studied salmonella in the disease of calves.

Our studies showed that the strains studied preserved the typical morphological, tinctorial, cultural, biochemical, antigenic and pathogenic properties characteristic of the corresponding salmonella serovars.

A strain of *S.dublin* 76, as the starting strain, was selected to produce an attenuated strain of *Salmonella dublin* 31.

The strain *Salmonella dublin* 31, obtained by the genetic method. The *Salmonella dublin* 31 strain is deposited in the Collection of Microorganisms of the Republican State Enterprise «Scientific Research Institute of Biological Safety Problems» of the Ministry of Education and Science of the Republic of Kazakhstan (RSE NIIPBB KN MES RK). Collection number M-42-15 / D.

Table 4 - Test of the virulence of strains of *S.dublin* 76, *S. typhimurium* 69, *S. enteritidis* 54 in a calf test

Culture name	No of animals	Infection dose (CFU)	Inoculation method	Result		
				Died	Alive	% of staying alive
<i>S.dublin</i> 76	10	10^9	I/p	10	-	-
	10	$2*10^9$	-/-	10	-	-
	10	$4*10^9$	-/-	10	-	-
	10	$6*10^9$	-/-	10	-	Died on day 7 -10
<i>S.dublin</i> 315/52 (control strain)	10	10^9	I/p -/-	9	1	10
	10	$2*10^9$	-/-	10	-	-
	10	$4*10^9$	-/-	10	-	-
	10	$6*10^9$	-/-	10	-	Died on day 8-12
<i>S. typhimurium</i> 69	10	10^9	I/p	10	-	-
	10	$2*10^9$	-/-	10	-	-
	10	$4*10^9$	-/-	10	-	-
	10	$6*10^9$	-/-	10	-	Died on day 6-9
<i>S.typhimurium</i> 371 (control strain)	10	10^9	I/p	9	1	10
	10	$2*10^9$	-/-	10	-	-
	10	$4*10^9$	-/-	10	-	-
	10	$6*10^9$	-/-	10	-	Died on day 7-9
<i>S. enteritidis</i> 54	10	10^9	I/p	4	6	60
	10	$2*10^9$	-/-	6	4	40
	10	$4*10^9$	-/-	10	-	-
	10	$6*10^9$	-/-	10	-	Died on day 9-10
<i>S. enteritidis</i> 51 (control strain)	10	10^9	I/p	9	1	10
	10	$2*10^9$	-/-	10	-	-
	10	$4*10^9$	-/-	10	-	-
	10	$6*10^9$	-/-	10	-	Died on day 8-10

Note. Observation period 20 days

Conclusion. Our studies showed that the strains studied preserved the typical morphological, tinctorial, cultural, biochemical, antigenic and pathogenic properties characteristic of the corresponding salmonella serovars.

A strain of *S.dublin* 76, as the starting strain, was selected to produce an attenuated strain of *Salmonella dublin* 31.

The strain *Salmonella dublin* 31, obtained by the genetic method. The *Salmonella dublin* 31 strain is deposited in the Collection of Microorganisms of the Republican State Enterprise «Scientific Research Institute of Biological Safety Problems» of the Ministry of Education and Science of the Republic of Kazakhstan (RSE NIIPBB KN MES RK). Collection number M-42-15 / D.

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S.dublin, S.typhimurium, S.enteritidis
S.dublin, S.typhimurium, S.enteritidis
()
100 %
S.dublin 76 Salmonella dublin 31
Salmonella dublin 31 . Salmonella dublin 31
«
»
-42-15/D.
,
,
,
,
: S.dublin, S.typhimurium, S.enteritidis (3
)
S.dublin, S.typhimurium, S.enteritidis
().
S.dublin 76,
Salmonella dublin 31. Salmonella
Salmonella dublin 31
« -
»
(). -42-15/D.

« » « »
 , ,
 , - , 2
 , 1 , 2
 (1).

1 -

	0	0	-	
	0,5	1	1	
	0,6-1,0	2	-	2
	1,1-2,0	3	-	
	2,0	4	-	

, « »
 0,5 - , 1
 0,8 - , 2
 2 , « »
 , ,

2 -

	()		()	
, ⁰	38±2,5	38±4,2	38±2,4	
,	139±2,8	143±3,6	141±3,4	
,	288±3,0	292±3,8	290±4,8	

3 , « »
 , 500 / 6
 , 700 / 6
 1- , 16 %- , 900 / 6
 3- , 50 %- .« »
 (50) - 900 /

3 - « »

	, /	, /100				%
500		0,05	6	0	6	0
700		0,07	6	1	5	16
900		0,09	6	3	3	50
1100		0,11	6	5	1	84
1300		0,13	6	6	0	100

4 , « »
 600 / 6 1- ,
 16 %- , 800 / 6 3- ,
 50 %- . 1200 / .
 « » (50) - 800 / .

4 - « »

	, /	, /100				%
400		0,04	6	0	6	0
600		0,06	6	1	5	16
800		0,08	6	3	3	50
1000		0,10	6	5	1	84
1200		0,12	6	6	0	100

24±4 .
 50 0,1 4
 1,5 1,5 4
 (50) ,
 (20-) ,
 :
 $1/3 \times 50() = 900/3=300$
 $= (300 - 20) / 900 = 6,7$ (1)
 « »

« »
 :
 $1/3 \times 50() = 800/3=266$
 $= (266 - 20) / 800 = 6,6$ (2)
 1 2 « » « »
 6,7- , « »
 6,6 .

. « »
 0,5 - , 1
 « » , 0,8 - , 2
 50 , 900 / , « »
 (50) - 800 / .
 « » « » 3-
 4- 6,7-
 , « » 6,6 .
 1. 2005. - 66 .
 2. - . - ,
 2000. - 273. - 276 .
 3. -
 // . - 1999. - 2. - . 3.
 4.
 . - : , 1997. - 33 .
 5.
 // . - 2011. -
 3. - . 35-36

RESUME

The article presents the results of the work, toxicity and danger of disinfectants, local irritant effect is revealed, allergic effects are determined and cumulative properties are studied. In the course of the study toxicological properties of the preparations «Penodez» and «Neomaskan» based on surfactants were determined.

619.614.31/636

. .¹, PhD
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. .², PhD
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. .²,

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Campylobacter jejuni.

[1].
Campylobacter jejuni

[2].
Campylobacter jejuni

[3].

5].

[4,

[6].

[7].

(n=20)

31470-2012 «

9793-74 «

53597 2009 «

25011 -81 2. «

23042-86 «

: 100%

» 26226-95 « , , .
 (20) - ,
 , 5% , ,
 () . 1 , .
 1 - -
 (n=20)

	6,5±0,3	5,6±0,5
	+	-
5%	-	-
cs	-	-
100	0,415±0,002	0,445±0,006

P 0,05

: «->» -

«+>» -

-
 -
 (0,445) , (5,6) , ,
 , , , 20 , 10
 , 10
 2

2 -
 (n=20)

, %	73,7±0,3	74,6±0,1	+0,9
, %	21,5±0,2	22,9±0,3	+1,4
, %	20,6±0,7	19,4±0,2	-1,2
, %	12,1±0,3	11,3±0,6	-0,8
, %	2,1±0,3	1,7±0,5	-0,4
, %	0,95±0,08	0,91±0,06	-0,04

73,7 %
74,6% 0,9%

21,5 % - 22,9 % 1,4%

12,1%
0,8%
1,2%

0,4% 2,1% - 0,95 %

0,04% 0,91 %

(5,7)

76,3 %
77,2 %

1. :
: 03.00.07 /
- , 1992. - 21 .

2. //

.,1994. - .134-135.

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RESUME

In this article, the analysis of bird carcasses contaminated with campylobacteriosis by physical and chemical methods was carried out. As a result of physico-chemical studies of the pH of poultry infected with *Campylobacter* moved to the acid side, atakzhe observed a significant increase in the amount of volatile fatty acids, and the reaction to peroxidase gave a negative result.

In our country, no studies have been carried out to study the physical and chemical composition of poultry meat, as well as no data on changes in bird carcasses of patients with campylobacteriosis and the results of physical and chemical studies and on changes in the chemical composition of poultry with infection with campylobacteriosis. Therefore, the purpose of our research was to study the physical and chemical parameters of poultry meat, as well as the chemical composition of poultry meat of patients with campylobacteriosis and veterinary and sanitary assessment of poultry carcasses on the basis of the obtained comparative data.

The following results were obtained in studies of the chemical composition of poultry meat. In the meat of sick poultry, the water content increased compared to the chemical composition of healthy poultry meat, respectively. In addition, we observed a decrease in the amount of protein, fat and extractives in poultry meat contaminated with campylobacteriosis compared to healthy poultry meat.

105⁰

(), « » 1 2 « »
 « » , 1988

1-

1 -

(n=6)

		8 20	-		
	I	0	73,8±0,03	18,3±0,03	1,2±0,03
		1-2	71,4±0,05	17,6±0,05	1,6±0,05
		2-3	70,9±0,12	17,4±0,03	1,9±0,03
	II	0	72,6±0,05	18,0±0,03	1,3±0,03
		2-3	70,9±0,12	17,4±0,05	1,8±0,05
		2-5	70,1±0,05	17,0±0,03	2,0±0,03

2

2 -
 %)

(100 ,

			1	2	
0-1	0,60±0,006	0,62±0,005	0,65±0,007	0,18±0,006	4,77±0,012
1-3	0,05±0,004	0,61±0,005	0,65±0,007	0,17±0,005	4,75±0,007
3-5	0,04±0,003	0,60±0,003	0,61±0,005	0,15±0,003	4,73±0,005
5-8	0,03±0,003	0,59±0,003	0,60±0,003	0,13±0,002	4,73±0,005

I- 73,8±0,03 II 1-2
 71,4±0,05 3
 2-3 70,9±0,12
 II- 72,6±0,05, 2-3 70,9±0,12, 2-5
 17,0±0,03 I - 1,6±0,05, 2-3
 1,2±0,03 ; 1-2 1,9 ± 0,03
 II- 1,3±0,03, 2-
 3 1,8±0,05, 2-5 2,0±0,03
 1,3%, 37% , 0,8%

- 16,7 %- 50,0 %- , -1,7 % - 4,84 %-
 , 1-6,2 %- 7,7 %- , 2-5,6 %- 27,8 % , -4,9
 %- 18,23 %- .

1. . . . - , 1991. - .431
2. . . .
- // . - 1987. - 4
3. . . . : , 1990. - .285.
4. . . . - , - 2005. - 696 .

RESUME

High rates of infection of cattle with sarcocysts, the complexity of the period of development of parasites, incomplete determination of the connection of parasites with macroorganisms requires a thorough thorough investigation of the invasion.

Invasive diseases delay the growth of cattle heads, as well as the receipt of quality products from them in the Republic.

Among them, in our country is widespread, and the economic and socially important for the growth of cattle - a disease of sarcocystosis. High indications of infection of cattle with sarcocystosis give information that parasites develop very secretly, it is difficult, therefore it requires a full investigation.

Therefore, the development of sarcocystosis in cattle, a danger to human health and to protect against disease, biological to identify the quality of meat products; sanitation is an urgent task in veterinary science.

The result of the research gives grounds to give a full assessment of the quality of products and will help create a special indication and rule for determining the quality of products.

The article deals with the chemical composition, quality and nutritional value of meat infected with sarcocysts. The quality of meat is determined by the levels of infection with sarcocysts.

619:615.284:616.995.132

”
• ”
« - - », . ,

« »
-

« »
Nematodirus, Ostertagia, Cooperia, Haemonchus, Trichostrongylus.

				Nematodirus	50,2%,
	16,7	/	;	Ostertagia	10,4%,
	91,2	/	;	Cooperia	8,5%,
	82,4	/	;	Haemonchus	5,3%,
Trichostrongylus	79,2	/	;		
	11,4%	31,4	/		
		90%,		98%,	
	80%,		95%,		
	100%.				

Trichostrongylus, Haemonchus.

[1].

Ostertagia, Nematodirus,

: 1%, 2,5% 7,5%.

« »

[2].

() « ».

40 « », 40

[3].

[4]. 4

10 7,5 / . 10

0,02 / .

14 « »

Nematodirus, Ostertagia, Cooperia, Haemonchus, Trichostrongylus.

Nematodirus 50,2%,
 16,7 ./ .; Ostertagia 10,4%,
 91,2 ./ .; Cooperia 8,5%,
 82,4 ./ .; Haemonchus 5,3%,
 79,2 ./ .; Trichostrongylus 11,4% 31,4 ./ ., (1).

1 - : « »

		, %	1 . , .
1	Nematodirus	50,2	16,7
2	Ostertagia	10,4	91,2
3	Cooperia	8,5	82,4
4	Haemonchus	5,3	79,2
5	Trichostrongylus	11,4	31,4
		17,6	60,18

« »

Nematodirus, Ostertagia, Cooperia, Haemonchus, Trichostrongylus - .
 Nematodirus - 50,2 % - ,
 16,7 ; Ostertagia
 - 10,4%, 91,2 ; Cooperia - 8,5 %, -82,4 ; Haemonchus - 5,3%, 72,2 .
 Trichostrongylus - 11,4%,
 31,4 .
 90% - , 98% - ,
 80%, 95%,
 100% .

RESUME

To improve the productivity of cattle, it is necessary to eliminate nematodes, which are widespread in the territory of the Republic of Kazakhstan and cause great economic damage. Implementation of measures to combat helminths is possible only with knowledge of the marginal features of biology and epizootology of diseases, diagnosis and the correct choice of anti-hypermintics.

Animals in Syrymsky district of the West Kazakhstan region, in particular, in the peasant farm «Serik» are invaded by strongylus digestive tract from the genera Nematodirus, Ostertagia, Cooperia, Haemonchus, Trichostrongylus. The extent of infestation of young cattle with strongomyllites from the genus Nematodirus was 50,2%, and the intensity of invasion was 16,7 specimens / g; genus Ostertagia, the extent of invasion is 10,4%, the intensity of invasion is 91,2 specimens / g; genus Cooperia, the extent of invasion is 8,5%, the intensity of invasion is 82,4 specimens / g; genus Haemonchus, the extent of invasion is 5,3%, the intensity of infestation is 79,2 specimens / g; Extensity and intensity of invasion by strongylites from the genus Trichostrongylus were 11,4% and 31,4 specimens / g, respectively.

The most effective showed aversect and alvet. The lowest is levomizol. Alveth showed an efficacy of 90%, and an intensity of 98%, the efficacy of levomizol was 80%, and an efficacy of 95%, in the case of an overextension the effectiveness and intensity were 100%.

616-02:636.083.37

Ph.D

Ph.D,

« »,

179

121(68,0%), S.typhimurium - 38 (21,0%) , Salmonell dublin –
 , Salmonell enteritidis – 20 (11,0%).

, *Salmonella dublin*.

[1].

[2]

15-45 %.

2,2

[3]

11,8%, : 72,3% - S.typhimurium

27,7% S.enteritidis.

[4].

2015 2017

« ».

[5].

« - » (), « » () ,

10 60
(40-42⁰),

5-10

16-18

S- 24

10

12% 37⁰ (. . , 1952).

6,8-7,5. 37-39⁰ , 37⁰ .

4.

.// .- , 1999. - . 38 -40.

5. . - .: , 1980. -

http://livbook.ru/book/estesstv_nauki/29041-opredelitel-bakteriy-berdzh-v-2-h-t-tom-2.html

,
 ,
 .

10 60
 (40-42⁰), (

), (),
 (),

5-10

179
 45 (25,1%) – , 116 (64,9%) – 18
 (10,0%) –

RESUME

In farm conditions, we studied the clinical picture of diseased calves, and also noted some signs of salmonellosis in adult cattle. Studies on the morphological, tinctorial, cultural and biochemical properties of 179 cultures isolated from diseased and fallen calves, as well as from faeces healthy calves were typical of the Salmonella genus. As a result of the carried out studies of organs from diseased and fallen calves, as well as from faeces of healthy calves, 179 Salmonella cultures were isolated and identified, including 45 (25,1%) from sick calves, 116 (64,9%) from dead ones, and from healthy calves - 18 (10,0%). In identifying 179 Salmonella cultures, calf diseases and also from faeces of healthy calves, it was found that 121 (68,0%), *S. typhimurium*-38 (21,0%) of the culture, *Salmonella enteritidis* - 20 (11,0%). In the farm, the disease of calves with salmonellosis was observed at the age of 10 to 60 days. Typical clinical signs were: high fever (40-42⁰), diarrhea (mucus, blood in the stool), respiratory tract infection (discharge from the nose, cough, frequent, painful), arthritis (swelling, lameness), impaired coordination of movements, sluggish reacts to the environment. In the absence of treatment for 5-10 days, calves' diseases mostly died.

()

[2].

30

3-5

[3,4].

[5].

()

: 1,0 () 1,0

()

() E. coli 25922, S.aureus

6538, - S. pyogenes ATCC 19615, C.albicans ATCC 710231 -

28-37⁰ 18-20

(18) - 0,9%

E.coli, S. aureus, C.albicans S. pyogenes

(0,5McFarland). 0,5 - 1,0 0,5 1,5 10⁸

10,0 / - 90,0 0,9%

. 5,0 0,2

()

0,1 -

() 28-37⁰ -

24-48 ()

15 300

(1-4).

(RF) 1

$$\text{LogRF} = \log(\text{D}) - \log(\text{D}) \quad (1)$$

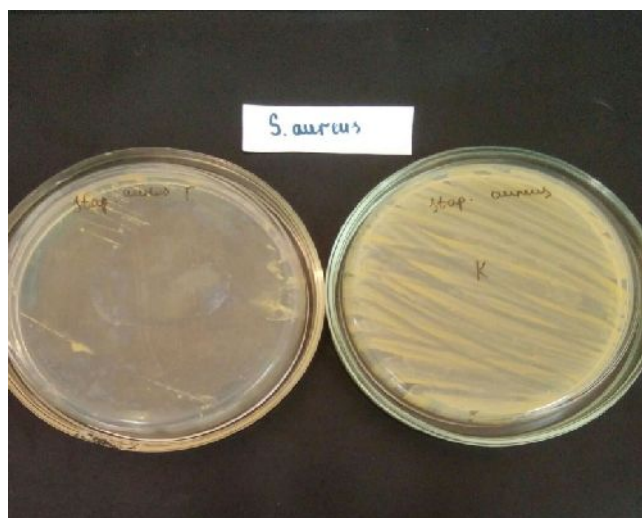
D - (1).

1 -

			log		log D		log RF	(%)
				log		log		
	S.aureus	1	$2,6 \cdot 10^2$	2,4	$1,2 \cdot 10^1$	1,0	1,4	95,3
	E. coli		$2,6 \cdot 10^2$	2,4	$1,4 \cdot 10^1$	1,1	1,3	94,6
	Candida albicans		$2,6 \cdot 10^2$	2,4	$6,0 \cdot 10^1$	1,7	0,7	76,9
	S.pyogenes		$2,8 \cdot 10^2$	0,3	$4,2 \cdot 10^1$	1,6	1,3	85,0

D - 1

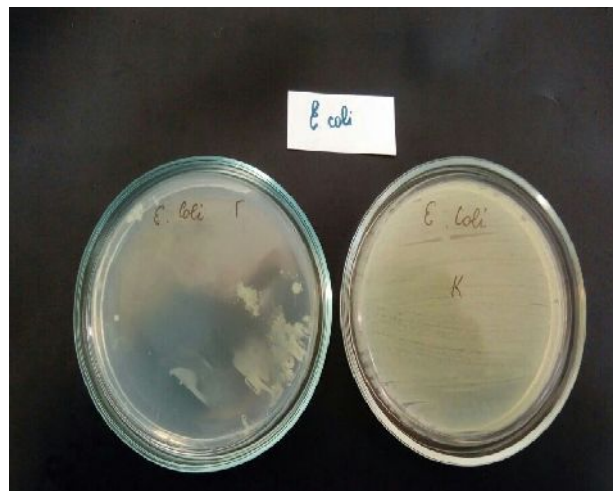
oli - 94,6%, Candida albicans, S.aureus 95,3%, E. coli - 85,0%, S.pyogenes - 76,9



1 - S.aureus -

2 -

C.albicans -



3 -

E. coli -

4 - S. yogenes -

1. . . // . - 2009. - 3. -
. 8-11.
 2.
. - , 2012. - .87.
 3. A. . . -
: . - 1978. - . 62-63.
A. . .
- (Microbiology with the technique of microbiological research), Moscow, Medicine, - p. 62-63.
4. . . : // . -
2006. - 8. - .34.
 5. . . -
: : 06.02.05. - - , 2010. - .3. -1

RESUME

This article presents the results of a laboratory study of the antimicrobial activity of a new domestic preparation that forms a film after milking on the udder surface and is used to prevent subclinical mastitis.

**БАЛЫҚ ШАРУАШЫЛЫҒЫ ЖӘНЕ
ӨНЕРКӘСІПТІК БАЛЫҚ АУЛАУ**

639.2.053.7(28) (574.1)

«	»	«	»	2018	2017	2017
22,3%						
2,17,	- 1,98,	()		2016		

[1].

[2,3,4].

2017
20 50

25

2

[5,6].

[7].

(*Leuciscus rutilus*),

() - (.);

2017

22,3%

1.

2,17,

- 1,98,

, 2016

1 - , 2017 .

	(.- .)	$\bar{x} \pm Sx,$	(.-)	$\bar{x} \pm Sx,$,	%
2+	11,7-16,2	14,0±0,18	31-96	60±0,62	13	56,6
3+	17,3-20,7	19,1±0,02	116-201	160±0,38	7	30,4
4+	22,2-24,4	23,4±0,10	250-336	299±0,15	3	13,0
N	11,7-24,4	16,8±0,20	31-336	122±0,14	23	100

16,8±0,20 , 31
 11,7 24,4 . 122±0,14 .
 336 , 2+ 3+, 56,6%
 30,4% (1).

2.
 - 16,8±0,20 - 122±0,14 , 2017
 . 2015 2016 -
 -17,7 , 123 .
 2 -
 2015-2017 .

	,	,	
2017	16,8±0,20	122±0,14	23
2016	17,7±0,10	123±0,02	4
2015	17,7±0,05	123±0,05	9

2017

: , ,
 .
 (3).

3 -

2018

, 2017 .

102

		v	l	K	t	C	S	Q	P	N	b	B	%	2018 .	
	50	0,05	40	0,5	1440	35,92	1927	8	0,0255	33,7	0,425	14,3	32,6	31,1	10,1
	60	0,05	40		1440	35,92		8		33,7	0,471	15,9			
	70	0,05	40		1440	35,92		1		8,4	0,58	2,4			
	40	0,05	22		1440	20,36		1		7,4	0,287	2,1	3,5	31,1	1,1
	50	0,05	40		1440	35,92		1		4,2	0,351	1,4			
	40	0,05	22		1440	20,36		1		7,4	0,228	1,7	31,1	0,5	
	70	0,04	40		1440	28,73		1		5,3	0,563	3	31,1	0,9	
	50	0,04	40		1440	28,73		1		5,3	0,484	2,5	31,1	0,8	
	70	0,06	40		1440	43,1		1		3,5	1,184	4,2	26,6	1,1	
	40	0,05	22		1440	20,36		2		14,8	0,297	4,4	31,1	1,4	
	40	0,04	22		1440	16,29		1		9,3	0,201	1,9	31,1	0,6	
	50	0,1	40		1440	71,83		1		2,1	0,442	0,9	31,1	0,3	
	40	0,04	22		1440	16,29		2		18,6	0,248	2,1	31,1	0,7	
	50	0,13	40		1440	52,95		1		2,9	1,434	4,1	26,6	1,1	
:														18,6	

: V - , S - , B - , Q - , l - , P - , b - , K - , N - , t - , C - , g -

2017 .

- -

() 2018
3.

2018

1,4

-40 ,

- 31,1%.

18,6

1.

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: . 6.04.2010. - 233.

2.

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2018

: , 2017. - 58 .

3.

()

2017

. - : , 2016. - 28 .

4.

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2016

. - : , 2015. - 25 .

5.

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, 1934. - . 15-63.

6.

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, 1934. - . 16-54.

7.

. - ., 1998. - . 2-18.

2017
, 2018

. 2017

-
22,3%

- 2,17,

()
- 1,98

2016

RESUME

The article gives an assessment of the state of the natural reproduction of the commercial herd in the ranges of roach size classes and its size-age structure of the catch at the Saryshakanak reservoir in the West Kazakhstan region for 2018 on the basis of a morphometric analysis for an Ichthyological study for 2017. In the case of ichthyological research, the share of roach in the scientific research catches in 2017 was 22,3% of the total number of fish caught. The investigated part of the roach population on Lake Saryshakanak was represented mainly by females, that is, the main group of reproduction of this species of fish. In the sample were mainly two-four-year-old roach. The fatness of caught fish (roach) by Fulton averaged 2,17, according to Clark – 1,98, which was slightly lower than in 2016. According to the data presented in the study when assessing the catch, depending on the size and age, the population of roach as a semi-commercial fish species on Lake Saryshakanak is in a satisfactory condition. The most important biological indicators of roach, as a common species on Lake Saryshakanak, remained at the level of mid-annual data. This makes it possible to assess the status of roach populations on Lake Saryshakanak, which is stable for amateur fishing.

639.3

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[1,2,3].
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		6,4	7,0
	/ ³	38,3	21,5
	/ ³	3,52	4,60
	/ ³	0,06	0,04
	/ ³	0,008	0,005
	/ ³	1,76	1,93
	/ ³	0,004	0,006
	/ ³	0,02	0,02
	/ ³	5,40	3,80
	- / ³	0,88	0,84
	/ ³	86,6	92,3
	/ ³	9,6	21,3
	/ ³	10,6	10,8
	/ ³	12,0	11,6
	/ ³	2,7	3,0
	/ ³	28,1	25,6
	/ ³	1,2	1,7
	/ ³	151	166

- 6,40-7,00

3,52-4,60 / ³,
[6,7,8].

151-166 / ³;

[9,10].

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, (±m)	333,8±9,2	379,04±8,4
()	1,8±0,17	1,83±0,15
()	1,91±0,35	1,92±0,31
,	185,6	229,04
,	1,54	1,9
, %	125,2	152,7
, %	100	100
, / ³	30,93	38,17
, / ³	55,63	63,17

379,04
(2). 45 -



2 -
1,9, 23,3% 21,9% -
[4].
23,4% 13,5% -

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 . - . : , 1990. - 156 .

2.
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4. - , 2010 - . 195-199.
 // . - 1988. - . 275. - . 38-45.

5. : , 1999. - 20 .

6. :
 , 1997. - 541 .

7. - . . -
 : , 2003. - 541 .

8. - . , 1970. - 444 .

9.
 : « » , 2002.-264 .

10. - . : , 1991. -

237 .

RESUME

The article shows the results of the experiment on commodity cultivation of rainbow trout in swimming pools with a direct and circular current of water. The estimation of the efficiency of trout farming according to the fish-biological parameters is given. It is shown that the best indicators were obtained when growing commercial trout in swimming pools with a circular water current.

**АГРАРЛЫҚ ТЕХНИКА ЖӘНЕ
ТЕХНОЛОГИЯ**

631.348

1. «...»

2. «...»

5,64 9,83, - 4,98 5,5-10 7,47

1,2 2,72⁻¹

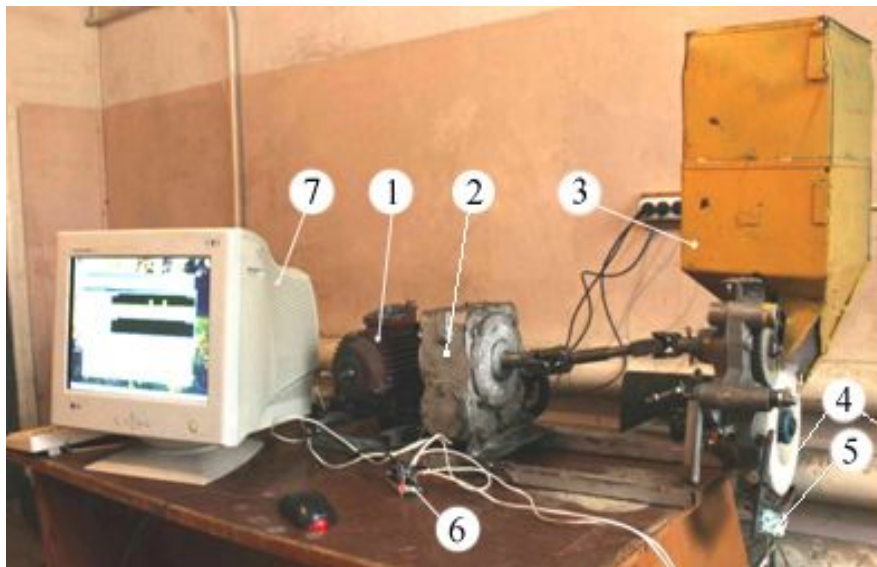
0,03 0,09, 10 - 3,4 8%. 2,5

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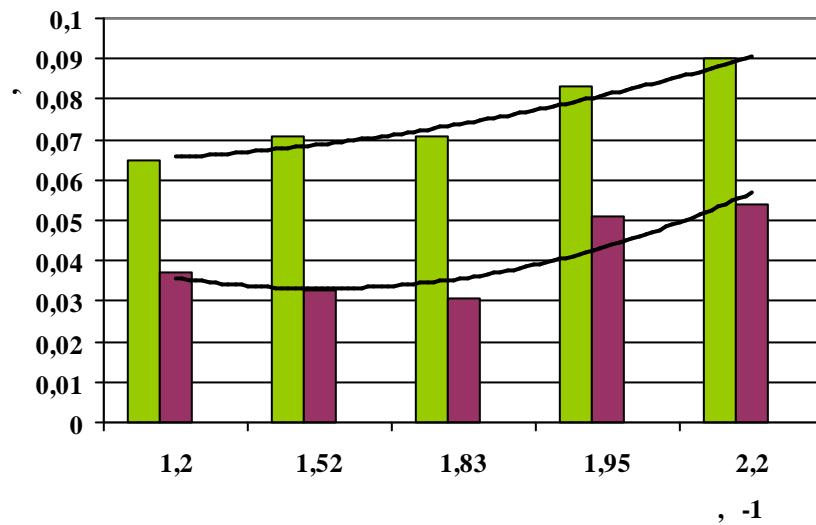
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0,066 0,09, - 0,0307 0,054, 2 [5]. 1,2 2,72⁻¹

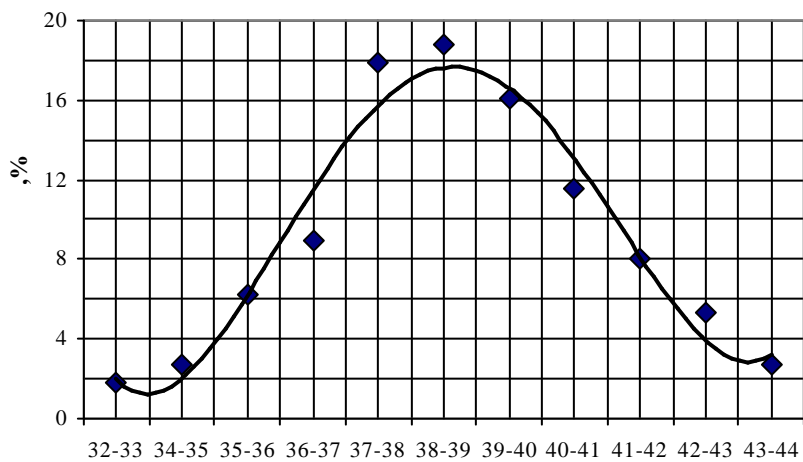


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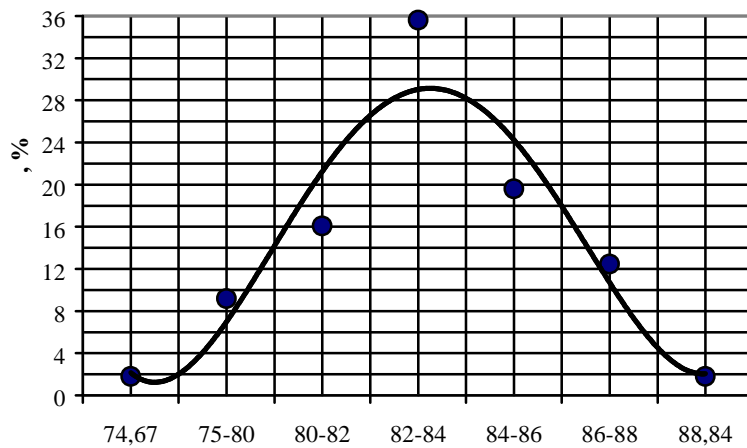
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RESUME

The dimensional characteristics of seeds of soybean varieties Pripyat, Merlin, Lancet and Lisbon were developed according to the developed method using a specially made device. The dimensional characteristics of the seeds of the investigated varieties and fractions of 5,5-10 mm vary within a wide range: the length of the seeds is from 5,64 to 9,83, the width is from 4,98 to 7,47, and the thickness is from 3,77 to 6,41 mm. Laboratory studies of the quality of dosing of soybean seeds by an experimental seeder were carried out on a specially manufactured plant. The quality of the sowing machine was evaluated using a capacitive seed sowing sensor and a specially designed computer attachment. As a result of the laboratory tests, the uniformity of seed distribution in the nest and between the nests was determined by measuring the time intervals between the ejections of seeds from the cells of the sowing disk. With the rotation frequency of the sowing disk from 1,2 to 2,72 s⁻¹, the coefficient of variation of the time intervals between the emissions of seeds varies within the range of 0,03 to 0,09, deviations of the calculated distances between seeds in the nests vary from 2,5 to 10 and between nests - from 3,4 to 8%. The calculated schedules of interval placement of seeds in the nest and between the nests are presented.

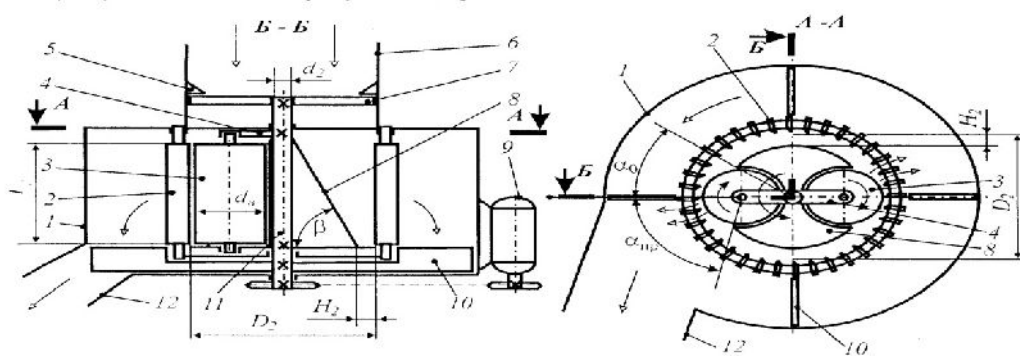
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[1-3].

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- 1- ; 2- ; 3- ; 4- ; 5- ; 6-
 ; 7- ; 8- ; 9- ; 10- ; 11-
 ; 12-

1

:

$$Q_2 = \pi D_2 L_2 H_2 n_2 p_{2k} k_1 k_2 z_\beta \quad (1)$$

D_2 - , ;
 L_2 - , ;
 H_2 - , ;
 n_2 - , c^{-1} ;
 p_{2k} - ,
 z_β - , .

$$D_2 \geq D_1 \quad (2)$$

D_1 , :
 4
 1

$$f = \text{tg} \varphi \leq \text{tg} \quad (3)$$

f - ;
 φ - , ;
 - , .

$$\text{tg} = \frac{2L_2}{D_k - d_2} \quad (4)$$

L_2 - , ;
 d_2 - , ;
 D_2 - , .
 5 :

$$= \text{arctg} \frac{2L_2}{D_k - d_k} \quad (5)$$

5 :

$$L_2 \geq \frac{D_k - d_k}{2 \text{tg}} \quad (6)$$

:

$$D_2 = 2H_2 + D_k \quad (7)$$

H_2 - , .

7 (D_2) :

$$D_k = D_2 - 2H_2 \quad (8)$$

1

3

H_2

[4,5]:

$$H_2 = \frac{D_2}{2} - \sqrt{\left(\frac{d_B}{2}\right)^2 + \left(\frac{D_2 - d_B}{2}\right)^2 + d_B \left(\frac{D_2 - d_B}{2}\right) \cos \varphi} \quad (9)$$

d_B - , ;

[6-8];

$$\leq \frac{\varphi}{\left(1 - \frac{d_B}{D_2}\right)} \quad (10)$$

(10)

(9)

H_2 -

:

$$H_2 = \frac{D_2}{2} - \sqrt{\left(\frac{d_B}{2}\right)^2 + \left(\frac{D_2 - d_B}{2}\right)^2 + d_B \left(\frac{D_2 - d_B}{2}\right) \cos \left(\frac{\varphi}{1 - \frac{d_B}{D_2}}\right)} \quad (11)$$

(11)

1-

:

$$h_{z1} \leq H_2 \quad (12)$$

:

$$h_{z1} = \frac{h_1}{z_1} \quad (13)$$

: z_1 -

,

;

h_1 -

,

(13)

h_1

$$h_1 = h_{1z} z_1 \quad (14)$$

h_1

(12)

:

$$z_1 \geq \frac{4Q}{(D_1^2 - d_1^2) p_{k1} k_2 H_2 n_1} \quad (15)$$

(2.11) (2.8) :

$$D_k = D_2 - 2 \left[\frac{D_2}{2} - \sqrt{\left(\frac{d_B}{2}\right)^2 + \left(\frac{D_2 - d_B}{2}\right)^2} + d_B \left(\frac{D_2 - d_2}{2}\right) \cos\left(\frac{\varphi}{1 - \frac{d_B}{D_2}}\right) \right] \quad (16)$$

(15) (6) :

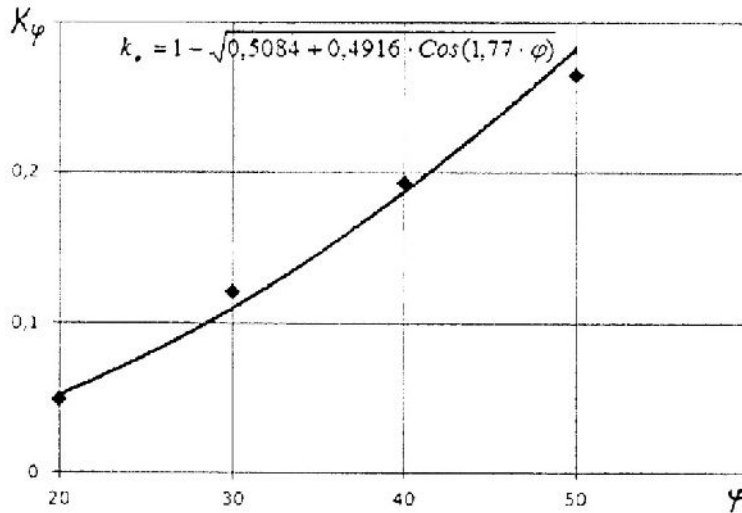
$$L_2 \geq \frac{\left(D_2 - 2 \left(\frac{D_2}{2} - \sqrt{\left(\frac{d_B}{2}\right)^2 + \left(\frac{D_2 - d_B}{2}\right)^2} + d_B \left(\frac{D_2 - d_2}{2}\right) \cos\left(\frac{\varphi D_2}{D_2 - d_B}\right) \right) \right)}{2 \operatorname{tg}} - d_2 \quad (17)$$

. (11)

H₂-

(2-)

$$d_B \leq \frac{D_2 - d_2}{2} \quad (18)$$



2 () -

()

:

$$d_B = (0.42...0.45)D_2 \quad (19)$$

(18)

(19)

(9)

;

$$H_2 = \frac{D_2}{2} \cdot K_\varphi \quad (20)$$

$$D_k = D_2 \cdot (1 - K_\varphi) \quad (21)$$

$$L_2 \geq \frac{D_2 \cdot (1 - K_\varphi) - d_2}{2 \operatorname{tg} \psi} \quad (22)$$

K_φ -
 K_φ (11)

(18)

ψ

, d_B D_2 -

K_φ - :

$$K_\varphi = 1 - \sqrt{0,5084 + 0,4916 \cdot \cos(1,77 \cdot \varphi)} \quad (23)$$

K_φ -

- 20- 50°C

(1)
 $K_\varphi = f(\varphi)$

$$K_\varphi = 0,0072\varphi - 0,095 \quad (24)$$

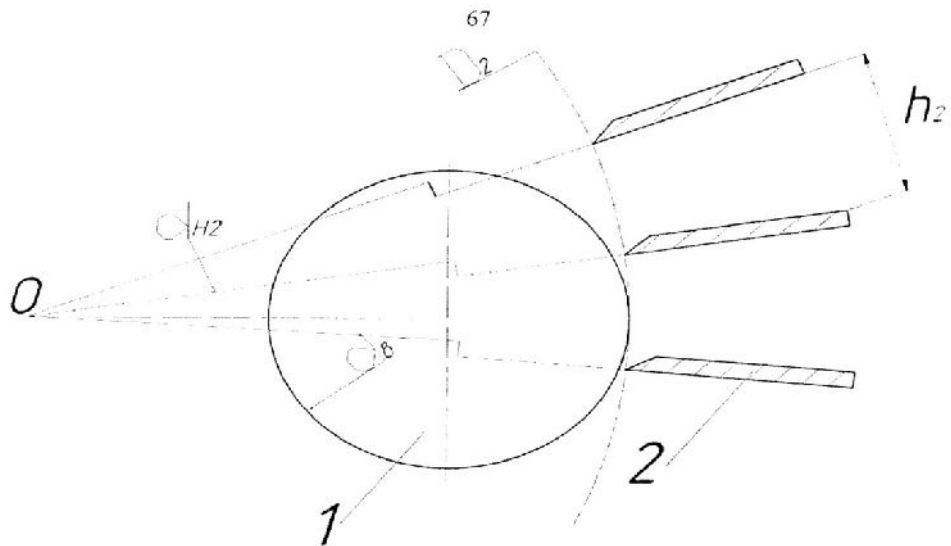
20- 50 °C

5 °C-

10-15

(3-)

h_2
 [9-10].



1- ; 2-

3 -

$$D_2 = \frac{h'_2}{\sin\left(\frac{z'_2}{z_2}\right)} \quad (25)$$

$$z'_2 = \frac{h'_2}{\arcsin\left(\frac{h'_2}{D_2}\right)} \quad (26)$$

h'_2 , ;
 z'_2 - ,
 z'_2 ,
 z'_2 : h_2

$$h_2 = D_2 \sin\left(\frac{z_2}{z'_2}\right) \quad (27)$$

h_2 - s
 , ;
 z_2 - , .

d_{H2} : [10]

$$H2 = \frac{360}{z_2} \quad (28)$$

$H2$ - , .
 .
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1. . . , 1985. – 336 .
 2. . . / . . , 2001. – 920 с.
 3. . . , 2005. - .202
 // - 203.

4. , 2012. - 174 .

5. : , 1998. - 140 .

6. : , 2012. - .110-117.

7. : : , 2008. - 31 .

8. : : , 2017.

9. : « », 1979. - 312 .

10. : , 1999. - 528 .

RESUME

On the basis of the analysis of the existing structure of the cornflower chopper and revealing the advantages and disadvantages of these machines, the article proposes the design of two stepped root crops, which provides the quality of grinding. In this design, the first stage is horizontally knife, and the second stage is vertically knifed along the circumference with a roller padpore.

The article defines the main design parameters of the second stage of crushing root and root crops with roller support: the productivity of the shredder is equal to the second stage; diameter of the chamber; length of knives; thickness of the grinding layer; diameter of the rollers; number of knives; coefficient of friction of the movement of the crushed corn-club to the cone, the central angle determining the installation of knives for the second stage; the previously taken distance between the blades of two adjacent blades.

Despite the variety of designs of the working organs of crumbs of root crops, as well as in general machines for washing and chopping root crops, the problem of qualitative grinding with low specific energy costs is not solved. For the treatment of rootballs, the use of combined machines and

aggregates that perform two or more technological operations is promising. The proposed two-stage construction of the cornflower chopper with roller padpore makes it possible to provide low specific energy costs for the cutting process with the quality of grinding according to modern zootechnical requirements.

621.892: 620.197.7

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 100 , (6 %)
 4 - , 10 %
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 12 [5].
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10 % 08 Z₁ = 94 % ,
 3 % (Z₂ = 97 % .)
 > , 10 % - > 10 % : 6 % >
 , 6 %

1. . . . () :
 : 05.20.03. /
 , 1989. - 224 .

2. // .-2007. – 6. – .30–32.
3. // .-2014. – 6 (12). – .38-48.
4. / ; . – .: « », 2010. –480 .
5. // .-2017. – . 379-381.

13- 18 ,

8-10

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RESUME

This work is devoted to the issues of corrosion protection of automatic spreading machines against atmospheric corrosion during the period of use. The average age of the agricultural equipment and tractor park used in our country reaches 13-18 years, with a standard operating life of 8-10 years.

Operation of extremely worn-out equipment leads to a significant over-expenditure of fuel and lubricants, and the carrying out of multiple repair and restoration works. First of all, this refers to spreaders of mineral fertilizers experiencing a wide range of corrosion-mechanical effects. Reducing the repair cost of machinery contributes to an increase the anticorrosive protection level of fertilizer applicator when they are preserved. However, traditionally used for conservation, gasoline-bitumen formulations have low resistance to corrosive active components of fertilizers and climatic factors. Therefore, the research of the problem of providing fertilizing machines with effective conservation technology, based on the use of available preservative compositions on a fuel oil basis, is relevant.

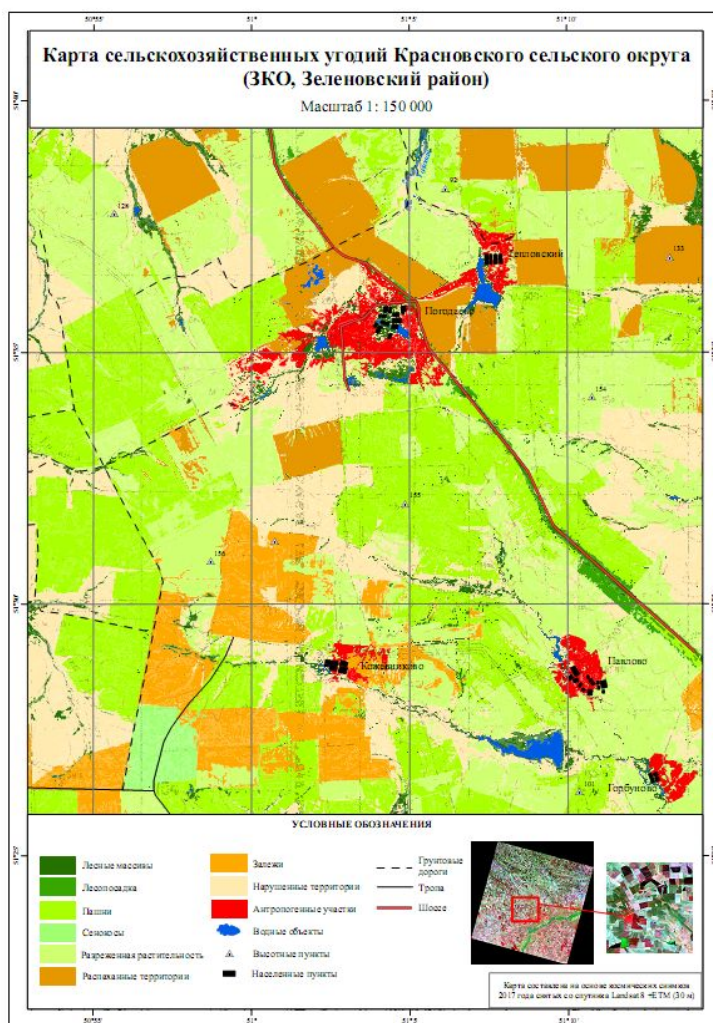
The paper provides a comparative analysis of the protective effectiveness of preservative compounds on a masutrinous basis in aggressive media: in 3% solutions of mineral fertilizers. The possibility of corrosion protection of the steel surface of working parts of machines for introducing mineral fertilizers has been studied. The most effective of the materials studies was black oil inhibited by Emugin (6 wt.%)

0,5%.

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9,9 , 5,8 . U. laevis, S. alba, Salix triandra L. 5,6 . 23 . 50 – 100 . 0,7 – 0,8. 25,2 , Spirea, Amigdalus, Cerasus.

(*Urtica urens* L.), (Cannabis sativa var. ruderalis Janisch. S. Z. Liou).
(*Solanum dulcamara* L.) (*Humulus lupulus* L.).

: (Anemone sylvestris L.), (*Gladiolus imbricatus* L.), (*Melissa officinalis* L., 1753), (*Fragaria vesca* L.), (*Rubus caesius* L., 1753), (*Scrophularia nodosa* L., 1753), (*Geum urbanum* L.), (*Heracleum sibiricum* L.), (*Stachys sylvatica* L.).

: *Linaria cretacea* Fisch. x Spreng. Syst., 1825, *Silene cretacea* Fisch. in Spreng. Syst. Veg. II., 1825, *Anthemis trotziana* Claus ex Bge. Delect. sem. Dorpat. 1847, *Matthiola fragrans* (Fisch.) Bunge, 1839, *Anabasis cretacea* Pall. It. I. 1771.

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[10,11].

(*P. alba* L.)
L.).

(*P. nigra* L., *P. alba* L.)

(*S. lix*
(*Elaeagnus angustifolia*

(*Ribes aureum* L.).

30

50-60

(*P. pumila*), 183-187).

1992

(*Lonicera tatarica* L.)

1959

(*Ulmus*

1. - 2016-2020 /
8-3 «9» « » 2016 . -
, 2016. - .62-63, 82.
2. 01.01.2016 . - /
2. - 206 .
3. . — .: , 2005. — 256 .
4. 56-69-83. ,
1984. 59 .
5. , . . . — , 1984. - 166 .
6. . . . //
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7. . . . //
. † 1960. † . 92. † 2. † . 136 - 144.
8. . . . „ . . . „ . . . „ †
- : , 2001. † 194 .
9. . . .
- // . - 2017. - 2. - . 107 - 116.
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11. . . . //
. † 2002. † 3. † . 268 - 276.

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- 0,66 %,

RESUME

In the article there are considered the current state of the forest fund of West Kazakhstan region. The characteristic of four key areas is given: Pogodayevsky forest, the willow grove near the village of Atameken, the aspen groves near Togayly and on the Bolshaya Ichka Mountain. The natural model of the spontaneous appearance of the forest community was investigated in the naturally overgrown abandoned pond shelter in Akzhayik district of West Kazakhstan region. The recommendations are given for the application of new agro forestry methods of land use.

In historical retrospect, it was revealed that the territory of the West Kazakhstan region was almost treeless, and the forest cover fluctuated within 0,5%. Currently, the percentage of the forest area of the region is - 0,66%, according to the world classification, the region is treeless. It was revealed that in the territory of the key Krasnovskoye rural district there are forest massifs and forest plantations with an area of 2,696 hectares or 4% of the total area of the district. It is noted that forests located on the lands of peasant farms and other agricultural formation are subject to grazing, disorderly felling and pyrogenic effects. Further artificial afforestation in the region should be directed to the reconstruction of lost natural communities or their analogues. The introduction of introductions should be minimized, since it is important, at least in general terms, to preserve the original landscape structure of West Kazakhstan region.

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Landsat

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Landsat (4-5-6-7)

Landsat 8

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ArcGIS 9.3

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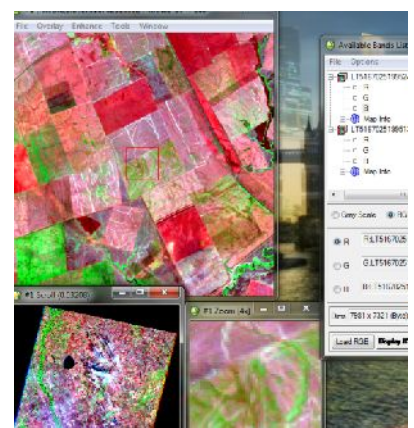
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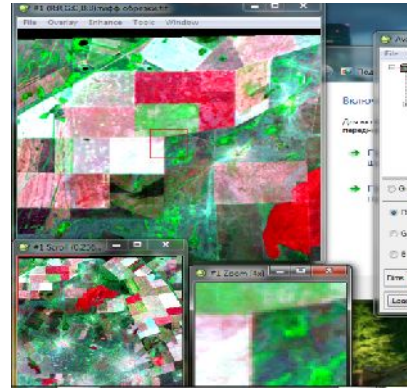
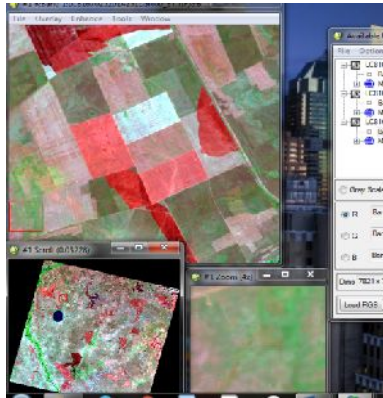
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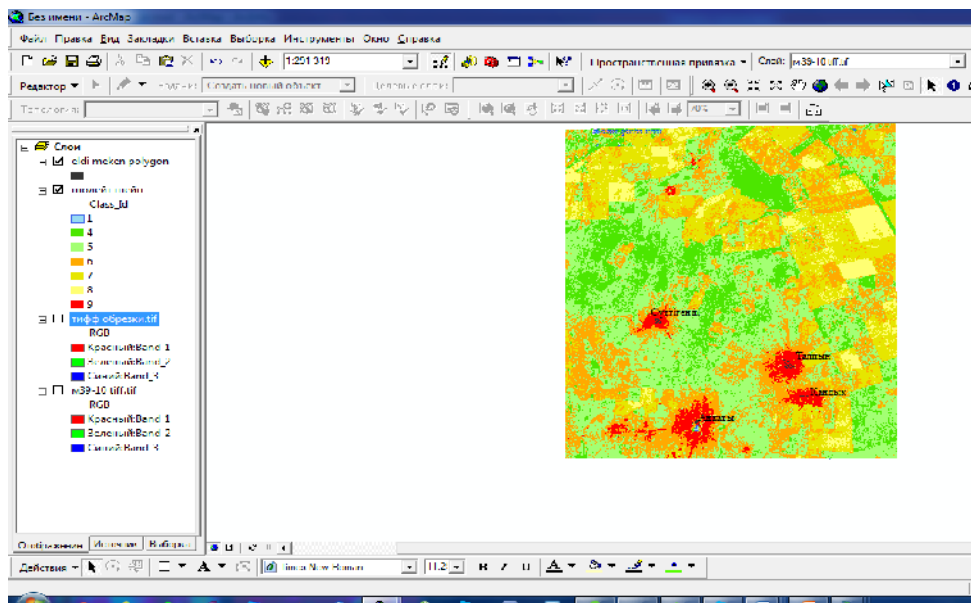
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RESUME

The data of Earth remote sensing are increasingly used to make management decisions in agriculture. Among the most priority and dynamically developing areas of application of RS data are space monitoring, management of agricultural land use.

All over the world, space technologies have become firmly established in the practice of managing agricultural production at different levels of administration. In our country, Earth remote sensing technologies in agriculture are just beginning to occupy the right place.

Cosmic multispectral images obtained in the visible and infrared ranges of the electromagnetic spectrum have a high informative value, which helps to manage agricultural land use. In turn, the

results of automated interpretation of the simultaneous images and their joint spatial analysis are a source of information for monitoring, farmland and adjacent territories, changing the boundaries of acreage.

This research describes the features of geoinformation mapping of agricultural lands by satellite imagery. The reproduction of multispectral images Landsat 5 and Landsat 8 for monitoring changes in land types in the territory of the West Kazakhstan region within local areas is considered. To detect changes in the study area, a controlled classification of images using the maximum likelihood method was applied. Attributive tables are used to calculate the change in the area of different land types.

A conclusion is drawn on the spatial estimation of the distribution of agricultural lands, which is one of the determining factors in the economic development of the territory.

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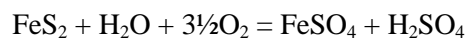
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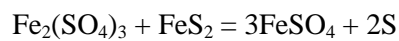
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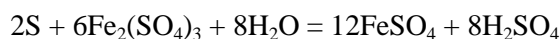
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. T. ferrooxidans

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RESUME

The potential applications of biomining are countless. Some past projects include on-site mining, biodegradation, bioremediation and bioleaching of ores. Research biomining usually lead to the introduction of new technologies to increase the yield of metals. Biomining provides a new solution to complex environmental problems. Additional capabilities include the bioleaching of metals from sulfide ores, phosphate ores and concentrated metals from solution. One of the recent projects is the use of biological methods to reduce sulphur content in coal cleaning. Thanks to the technology of mining and mineral processing, biomining provides innovative and cost-effective industrial solutions.

The first stage is the method of chemical oxidation of pyrite to sulfate, followed by the method of bacterial oxidation of iron sulfate. As the oxidant entering thiobacillus ferrooxidans and thiobacillus thiooxidans.

Thus, acidity contributes to the continuation of the sequence. The role of T. ferrooxidans is to provide a continuous supply of trivalent iron ions, which in turn react with iron disulfide to form iron sulfate. A cycle is established, which has a net effect of increasing the oxidation rate-iron disulfide to iron sulfate. The action of T. thiooxidans is the oxidation of the formed elemental sulfur. It is possible, of course, that some reaction or aspect of the formation of acid is not taken into account. However, this sequence adequately explains the presence of both bacteria without postulating any questionable arrangements. Having conducted a literature review on the subject, analyzed the oxidative effects of some autotrophic organisms in conditions of coal mines.

UDC 62 – 233.2

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PRINCIPLES OF SOLID TURNING INTO A MODERN BEARING PRODUCTION

Abstract

In modern conditions, one of the main tasks in mechanical engineering is to improve the efficiency of the manufacturing process parts. The newest tool materials, technologies and designs of machines allow to introduce this type of processing into production more and more. Hard turning has been developed thanks to the works of such scientists as V. A. Kudinov, A.V. Krioukov, P.P. Grudov,. In the result of research in hard turning, there is a dependence on roughness of the processed surface from wear of the tool material. With the growth of the flank wear of the plate there is an increase in roughness of the processed surface.

With solid turning in the surface layer there are residual stresses and areas with altered hardness and structure. These zones are often the result of high temperatures and rapid cooling of the material near the cutting zone. Some studies have shown that the use of cooling allows to get rid of these zones, although other experiments confirm that the use of coolant does not have an effect, but leads to a deterioration in the quality of the surface of the part and to reduce tool life. New tool materials are more adapted to the formation of undamaged surfaces without zones with altered hardness and structure, but with increasing tool wear this problem appears again.

Keywords: *hard turning, roughness, grinding machine, solid turning, deterioration.*

In modern conditions, one of the main tasks in mechanical engineering is to improve the efficiency of the manufacturing process parts. In mechanical engineering, the quality indicators of products are very closely related to the accuracy of machining.

Among the processing technologies of materials, such a method of processing as solid turning [1] is widely used. A promising, fast-growing type of treatment, which is often a more cost-effective alternative to grinding. The newest tool materials, technologies and designs of machines allow to introduce this type of processing into production more and more.

The purpose of replacing grinding with hard turning is to reduce the complexity of manufacturing the part and, as a consequence, leading to an increase in the efficiency of the processing.

Efficiency gains are determined by the following factors:

1. Machining time for hard turning is several times less than when grinding.
2. Solid turning is the most flexible process – processing of complex-profile parts is possible, while on the grinding machine such processing requires replacement of the tool and the tool holder.
3. Material removal during hard turning is reduced by three times than during grinding.
4. The machining accuracy is the same for both hard turning and grinding.
5. The use of coolant is not provided.

Hard turning has been developed thanks to the works of such scientists as Lianmin Cao, ShunqiangHou, Qingliang Zeng, Jintao Liu, V.A. Kudinov, A.V. Krioukov, P.P. Grudov. In the result of research in hard turning, there is a dependence on roughness of the processed surface from wear of

the tool material. With the growth of the flank wear of the plate there is an increase in roughness of the processed surface [1].

With solid turning in the surface layer there are residual stresses and areas with altered hardness and structure. These zones are often the result of high temperatures and rapid cooling of the material near the cutting zone. Some studies have shown that the use of cooling allows to get rid of these zones, although other experiments confirm that the use of coolant does not have an effect, but leads to a deterioration in the quality of the surface of the part and to reduce tool life. New tool materials are more adapted to the formation of undamaged surfaces without zones with altered hardness and structure, but with increasing tool wear this problem appears again.

The solution to the problem is a hardening rolling. This processing method allows you to create compressive stresses in the surface layer, increase the hardness of the boundary layer and improve the roughness.

The functional principle of the process is a combination of three physical effects:

- occurrence of compressive stresses in the boundary layer;
- the occurrence of work hardening;
- smoothing (elimination of micronutrient deficiencies);

Hydrostatic tool is used for hardening rolling of parts with hardness up to 65 HRC. Microdeformation surface is a ceramic ball with a specially treated surface. The ball is pressed against the workpiece surface by liquid pressure, floating in it and being able to rotate in any direction. As a result of the action of the balls at the vertices of the profile formed compressive stresses that plasticize the surface layer of the part [3].

Solid machining is the machining of hardened materials with geometrically defined cutting edges. On the lathe can process almost any profile, while grinding requires a sufficiently long and complex changeover with the replacement of the circle, with its edit to the desired profile.

The flexibility of the numerical control lathe allows roughing of steel and hard turning on one machine. Two factors are important for the solid turning process: the rigidity of the technological system «Machine – tool – Part» and ensuring a low feed rate of 0,01 – 0,05 mm/Rev. From this point of view, interesting is the equipment of the company Hass Automation [4] (table 1) (Fig.1).

Table 1 - Main technical specifications of Haas ST-40 lathe

Max Ø of processing, mm	648
The maximum length of processing, mm	1118
Maximum Ø of processed of bar, mm	102
Diameter of hydraulic cartridge, mm	380
Maximum spindle power, kW	30(40)
Maximum torque, rpm	1898
Landing spindle under the cartridge	A2-8
Weight of machine, kg	12200



Figure 1 - Haas ST-40 lathe

Modern trends require the creation of machines with a high concentration of operations, with the possibility of obtaining the finished part in one setup, with the possibility of super-precision machining with an accuracy of 0,05 microns and a roughness parameter of less than 0,01 microns. To improve the accuracy of machining designers of machines and tools try to use new technical solutions aimed at increasing the rigidity of the technological system and reduce vibration during cutting. In this regard, the question of surface quality and its relationship with the dynamic characteristics of the lathe - tool - detail system (LTD) is relevant [2].

In the course of the research it was necessary to study the vibrations that occur during hard turning, as well as to determine the changes in the roughness of the resulting surface and the vibrations of the cutting plate having high damping properties.

Turning performed on a ST-40 HASS lathe cutter for finishing containing holders DDJNR2525M15, DDJNL2525M15, PDNNR2525M15, plate DNGA150412S010AWH7015, final bore diameter of the rim and pre-boring roller tracks of the rings 42926.01; pre-bore diameter of the trough of the rings 8320.01; final boring gutter of the rings 8320.02; pre-bore diameter of the trough of the rings 66326.01; 66326.02; 232.01; final bore diameter of the side rings 232.02; final bore diameter of the rim, pre-boring roller tracks and pre-boring of the width of the side rings 42724.01; pre-boring the width of the rim rings 42724.02; final bore diameter of the rim and pre-bore diameter of the trough of the rings 134.01; pre-bore diameter of the trough of the rings 134.02; 46324.02; pre-bore diameter lock and pre-bore diameter of the trough of the rings 46324.01 (table 2).

Measurements in hard-part turning was carried out by the devices UD-2B «SURTRONIK», CD 232, 324, 423.

Table 2 - The results of measurements in hard turning

Type	Surface	Regime		
		The instrument which produces the metering	Speed (S)	Feeding (F)
1	2	3	4	5
42926.01	Finally diameter of board 199 + 0,06 Ra 0,63	Device UD-2V «SURTRONIK»	140	0,1
42926.01	The diameter of the roller track pre 210,93±0,02 The wideness of board pre-16,1+0,05	Device 289	150	0,18
			150	0,14
8320.01	The diameter of the gutter pre	Device CD 232	280	0,12
8320.02	The diameter of the gutter finally		350	0,05
66326.01	The diameter of the raceway pre 249,708-0,05	Device CD 324	120	0,12
66326.02	The diameter of the raceway pre 160,7- 0,04	Device CD 423	120	0,12

Continuation of table 2

1	2	3	4	5
232.01	The diameter of the raceway pre 259,67-0,05	Device CD 324	120	0,1
232.02	Finally diameter of board 246+0,09			
42724.01	Finally diameter of board 199+0,06, Ra 0,63	Device UD-2V "SURTRONIK"	130	0,1
	The diameter of the rollway pre 209,9-0,05	Device 289	160	0,18
	The wideness of board pre 16,1+0,05	Control template	160	0,14
42724.02	The wideness of board pre 15,95+0,06	Control template	180	0,13
134.01	Finally diameter of board 232+0,07	Device UD-2V «SURTRONIK»	140	0,1
	The diameter of the raceway pre 241,78-0,05	Device CD 324	125	0,12
134.02	The diameter of the raceway pre 188,262+0,04	Device CD 423	130	0,11
46324.02	The diameter of the raceway pre 147,04+0,04	Device CD 423	120	0,12

The tool that was used to process these parts on the ST-40 HASS lathe holder DDJNR2525M15, holder DDJNL2525M15, holder PDNNR2525M15, plate DNGA150412S010AWH7015.

The results of measurements in hard-part turning devices UD-2B "SURTRONIK", CD 232, and CD 324, 423 KD, D 234, 485 M when cutting data $S_{min} = 120$ Rev/min; $S_{max} = 350$ Rev/min and $F_{min} = 0,05$ mm/Rev; $F_{max} = 0,18$ mm/Rev were made the following **conclusions**:

- use hard turning for the machining of bearing rings allows to reduce the processing time of the rings compared to the time for finish grinding is almost 4 times;
- a simpler production process, similar to conventional turning;
- flexible use of the machine; allows the use of the same machine for external and internal processing;
- productivity increase;
- the decrease in the unit cost detail;
- complex shapes of parts are processed with one setup.

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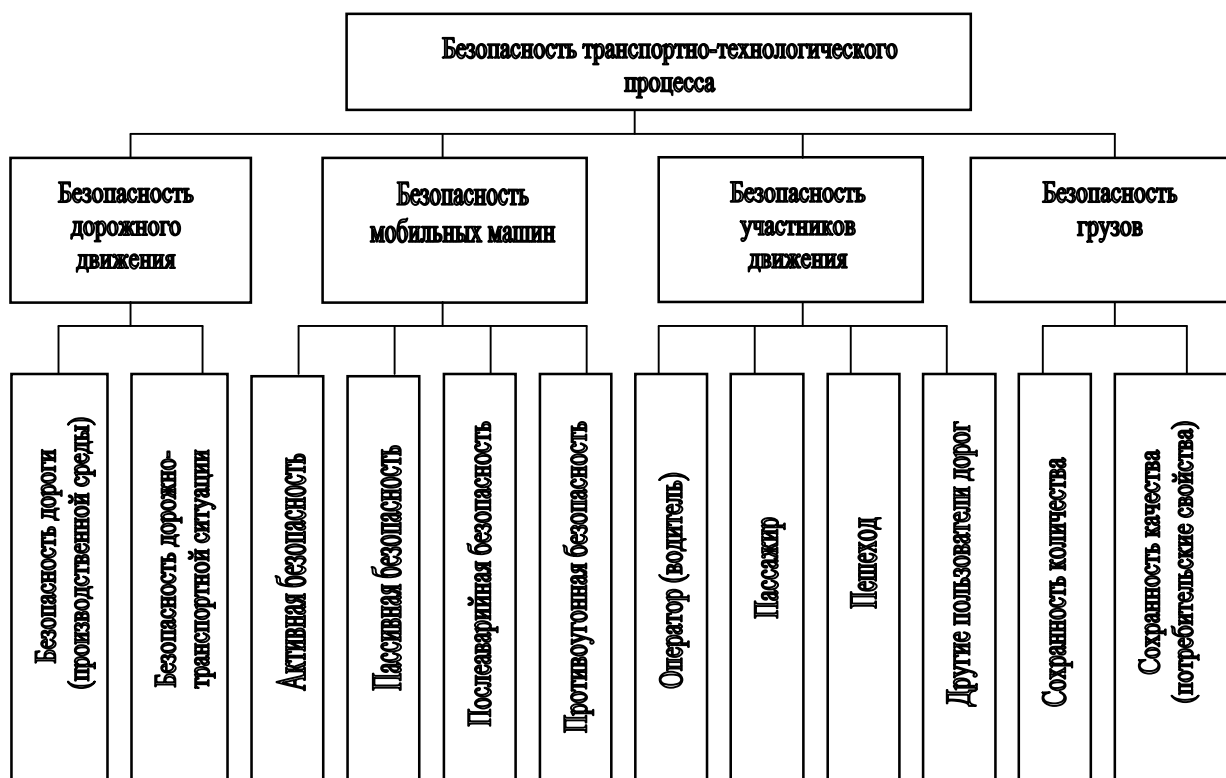
RESUME

In this article, a systematic approach is chosen and briefly considered in the occupational safety and health management. The peculiarity of the system approach is that it does not contain a set of any guidelines, but only shows that the enterprise is an open system that consists of a large number of interconnected subsystems interacting with the surrounding social and production environment. Within the framework of the system approach several basic conceptual directions are highlighted, on the basis of which it is advisable to build occupational safety and health management at enterprises in the near future: improving the organization of work at all stages and stages of labor and production processes; change the strategy of ensuring labor safety through a transition to managing industrial risk. Undoubtedly, it is of interest for specialists to use the technique of identifying and ranking dangerous and harmful production factors in the activities of the organization, the main activity of which is the implementation of technical diagnostics.

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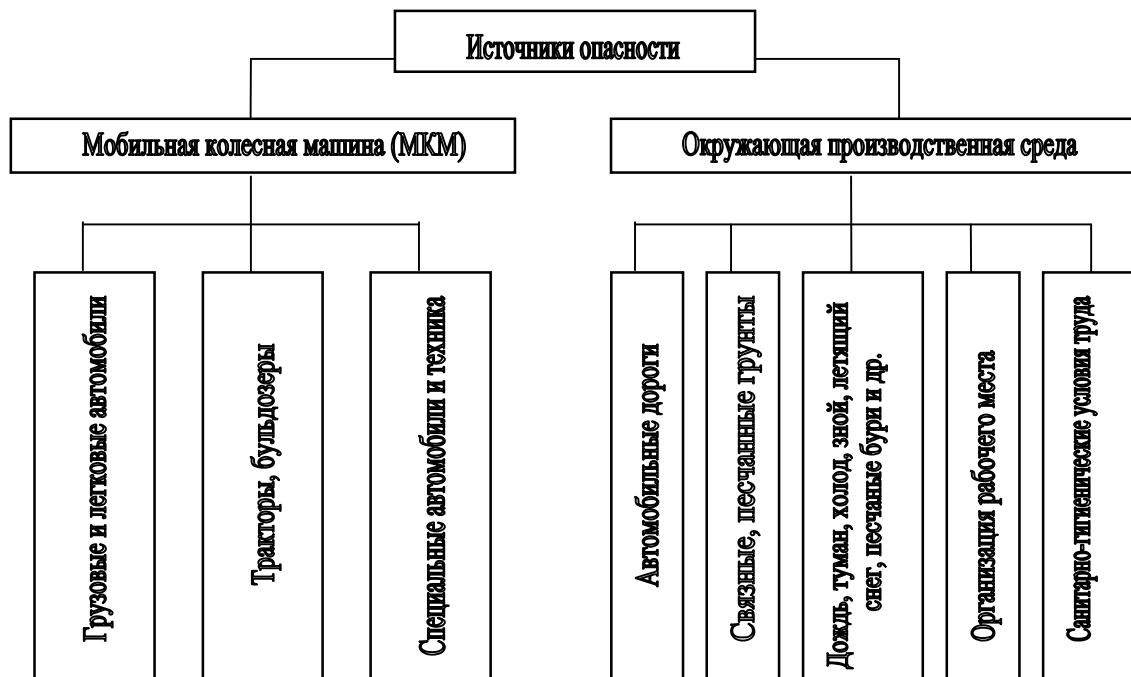


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RESUME

The variety of solved tasks in industrial production requires the use of a large number of mobile wheeled vehicles for various purposes. The increase in the production of products is impossible without the rational use of each unit of mobile equipment, which is directly related to the

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acting as Minister for Investments and Development of the Republic of Kazakhstan and Minister of National Economy of the Republic of Kazakhstan, their main shortcomings are revealed. Based on the results of the analysis and identified shortcomings, ways are proposed to improve this assessment based on various approaches to determining the maximum permissible risk for a particular type of cases.

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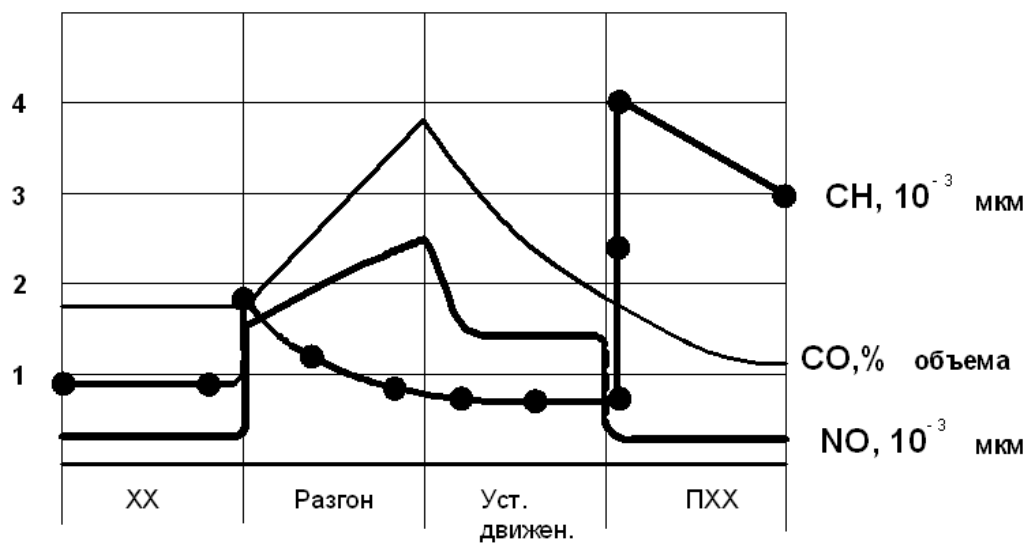
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$$V_t = V_c * (1 - k_i/k_{max}) \quad (1)$$

V_c – ; k_i – ; k_{max} –

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2	47,8	42,5	0	43,1	58,4	44,6	40,5	58,5	11,5	59,4	42,1	34,6	50	57,4
3	46,5	49,2	51,1	49,2	44,9	35,4	31,1	42,1	50	58,4	41,1	48,5	40	42,1

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RESUME

The scientific article deals with the impact of the organization of road traffic on emissions of exhaust gases. The growth in the number of cars, especially in cities, leads to atmospheric pollution by exhaust gases. In large cities up to 80% of atmospheric pollution is caused by the work of vehicles. Pollution of atmospheric air with exhausted gases of motor vehicles not only affects people's health, but also causes direct economic damage. The exhaust gases that occur when the car engine is running are the result of fuel combustion. The conditions of fuel combustion, as well as the number of components in the exhaust gases depend on the type of fuel, the type of engine, the characteristics of the combustion process, its operation modes and the quality of the road network. Analysis of literary sources shows that over 60% of the time the car works on unstable modes, typical for the street and road network and associated with the modes of braking and dispersal. Studies of vehicle movement modes show that there are significant speed fluctuations caused by the presence of various obstacles on the road network. This maneuvering vehicles, the presence of public transport stops, pedestrian crossings and parking lots. Improving the organization of traffic, expressed in reducing delays, increasing the speed of traffic will contribute to improving the environmental situation in cities.

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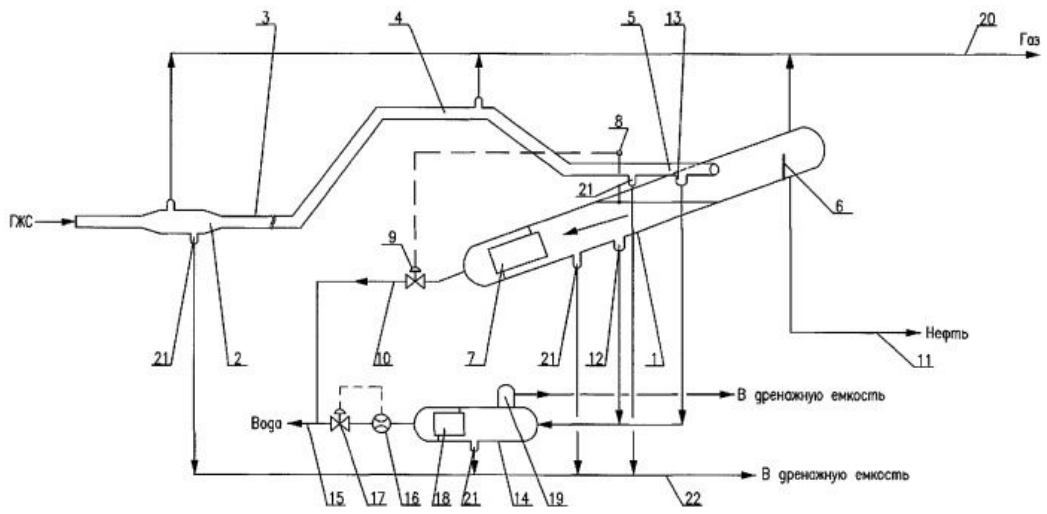
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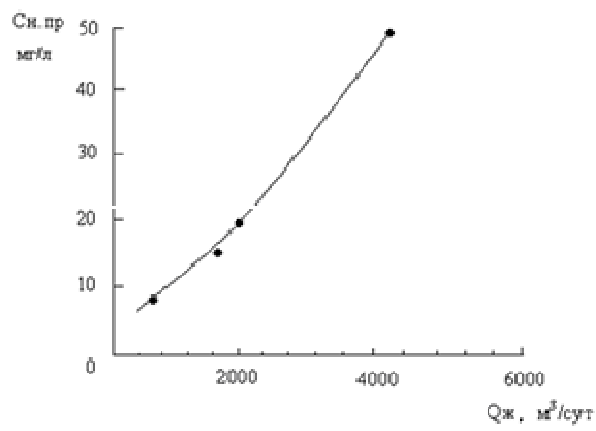
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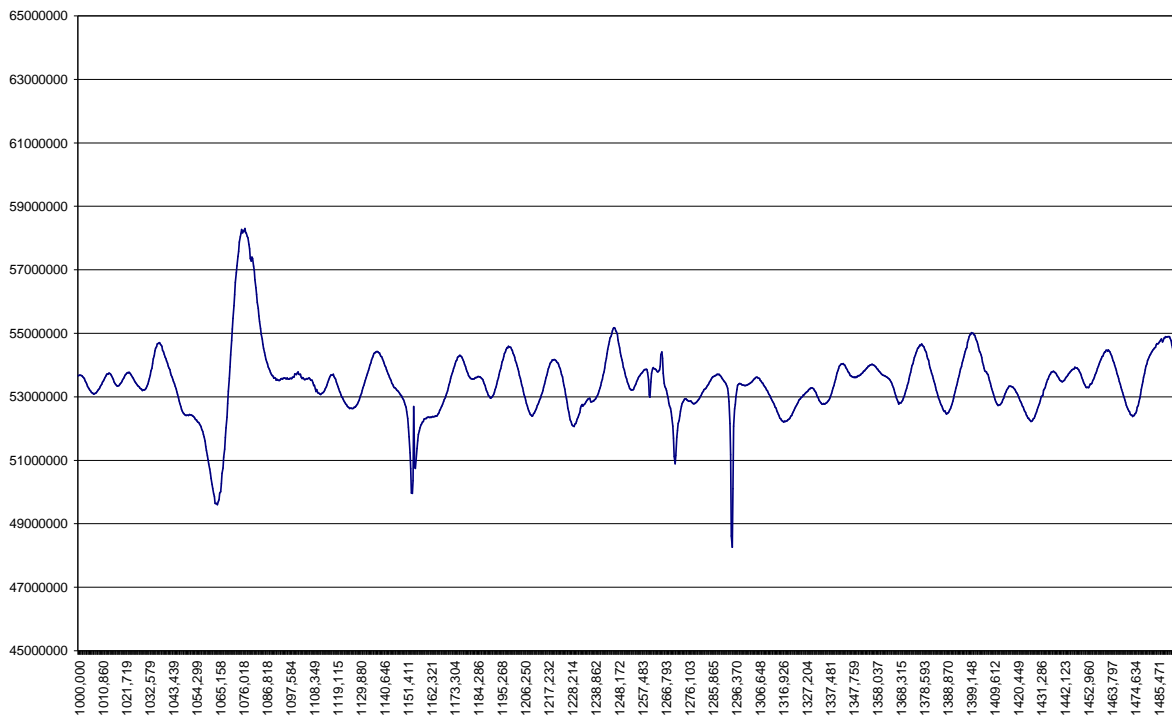
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RESUME

Reverse injection of gas allows to intensify the current extraction of hydrocarbon raw materials, to increase the rate of hydrocarbon recovery by maintaining reservoir pressure. In the article, based on the analysis of the current state of development of the Tengiz field with the application of the cycling process, the method for diagnosing the technical state of gas-conducting pipes for the conditions of high reservoir pressure and an aggressive environment is substantiated. The results of studies to determine the main factors affecting the performance of pipes operating under very high pressure and in an aggressive environment are provided to ensure an uninterrupted reliable supply of gas to the formation. The analysis of hydrodynamic studies of the gas injection network revealing the effect of injection pressure on the strength properties of pipes and pipeline fittings, and also using the existing methods of nondestructive testing and inspection techniques, presents the results of a study on assessing the integrity of a high pressure pipeline. To solve this problem, the author proposes the most acceptable method of magnetic memory of metal in determining reliability and the possibility of further operation of pipelines, which will ensure safe, trouble-free operation of the gas re-injection system. The article presents the results of physical property studies, technical advantages and disadvantages of the method of magnetic memory of metal for pipeline defects, and the selection and optimal technological regime for the operation of high-strength pipes is justified.

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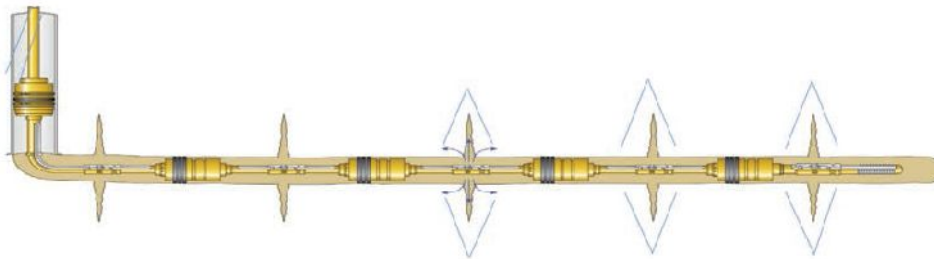
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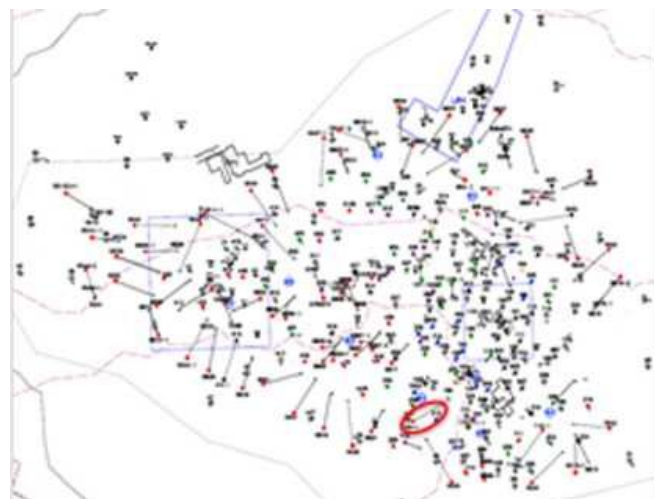
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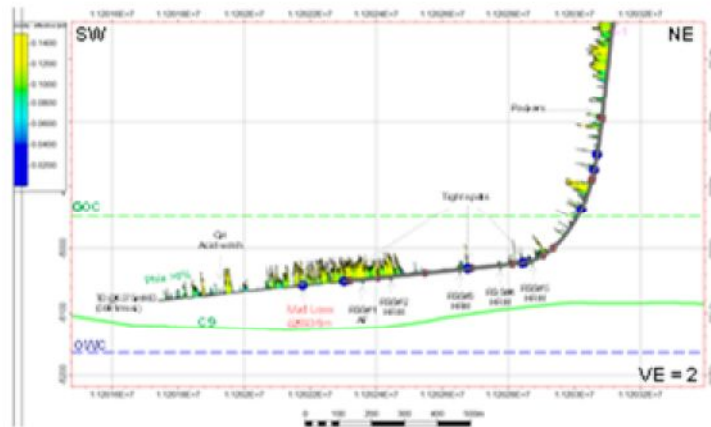


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RESUME

In the article, based on the review of literature sources, the analysis and choice of the optimal variant of the inflow call at the completion of wells is made to ensure maximum oil recovery of the formation. In the well construction cycle, the completion process is one of the main and technologically complex processes. The quality of this stage in exploratory wells largely depends on the prospectivity of the new field, and in the operational - the debit and its reliability as a long-term object. The widespread local hydraulic fracturing of a reservoir (fracturing) in the oil industry is considered as an effective method of influencing the bottomhole well zone and as a technology that increases the flow of oil. The technology is based on the mechanism of occurrence and propagation of cracks in rocks both with single and multiple hydraulic fractures of the formation. The published fracture treatment works are in most cases vertical type of wells, and the information and experience of hydraulic fracturing in horizontal wells (HS), especially with multiple fracturing (MHF), are rather narrow. This is due to the fact that the processes and theoretical studies of the effectiveness of multi-stage hydraulic fracturing in horizontal wells under conditions of an anisotropic inhomogeneous reservoir, as well as the determination of the optimum number of stages of fracturing with an estimate of the distances between the created cracks have been little studied. Widely used in the Karachaganak field, the FracPoint technology, based on the opening of the couplings of the hydraulic fracturing system, by dumping a ball of a certain diameter is the most effective method of well development.

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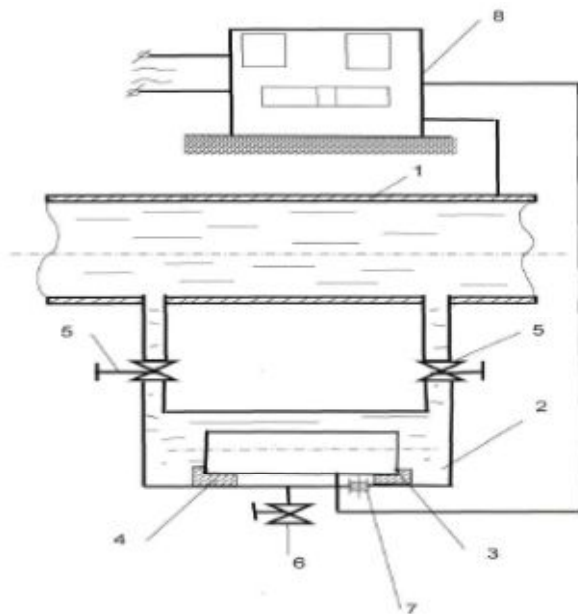
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RESUME

The process of hydrate formation depends on the physico-chemical characteristics of the gas and the probability of hydrate formation increases with increasing pressure and temperature decrease, reduces the flow rate of the well by 18-19% for the initial temperature below the equilibrium temperature by 20 K. At the present time hydrate inhibitors are used to prevent the formation of hydrates, as indicated by the authors. The presence of hydrosulphide (3,82%) and carbon dioxide (6,57%) in the gas field of the Karachaganak field under consideration is facilitated by the formation of hydrates in the Karachaganak field, while mixed hydrates are formed in the extraction of natural gas at the Karachaganak oil and gas field.

The article gives an analysis of methods for cleaning gas production systems in the fishery, proposed a device that prevents the formation of hydrate paraffin deposits in the linear part of field pipelines, the technology provides a heating electrode (sacrificial anode) located outside the protected pipeline section, which reduces the hydraulic resistance of the pipeline, the most creating a non-hydrative mode of operation of the linear part of field pipelines. The work of such a device, highlighted in the article, is based on the protection of the field pipeline due to the action of the heating electrode.

ВЕТЕРИНАРИЯ ҒЫЛЫМДАРЫ

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**БАЛЫҚ ШАРУАШЫЛЫҒЫ ЖӘНЕ
ӨНЕРКӘСІПТІК БАЛЫҚ АУЛАУ**

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