

## THE ROLE OF DIFFERENT IRON PREPARATIONS IN THE PREVENTION OF ANEMIA IN RACING HORSES

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*The hypothesis that a high hematocrit value and high hemoglobin concentration are the most important conditions which have to be fulfilled in order to achieve top racing results has resulted in a massive use of iron preparations in healthy horses. This specially implies in racing horses during intensive training aiming at the prevention of the so-called racing anemia.*

*By studying the effects of the most commonly used iron preparations in Serbia and Montenegro (Fedex<sup>®</sup>, as the representative of dextrane iron preparations; Hippirion<sup>®</sup> as a well known representative of iron complexed to saccharate and Hemo<sup>®</sup> 15 which is a representative of complex iron preparations which contain other hemantics) the expected changes in erythrocyte count, hemoglobin concentration and hematocrit value were recorded. However, the recorded changes in hematological values did differ between used iron preparations. The best effects were exhibited by Hemo<sup>®</sup>15, the application of which resulted in a prompt and significant increase in erythrocyte count, MCH, MCHC and hemoglobin concentration.*

*Key words: horses, racing anemia, ferrous dextran, ferrous saccharate, ferric ammonium citrate*

### INTRODUCTION

The hypothesis that a high hematocrit value and high hemoglobin concentration are the most important conditions which have to be fulfilled in order to achieve top racing results has resulted in a massive use of iron preparations in healthy horses. This specially implies in racing horses during intensive training aiming at the prevention of anemia, which is often considered to be the major cause of poor results during the racing season (Stewart *et al.*, 1977 Trailović *et al.*, 1988; Jovanović *et al.*, 2003).

The increased physical activity in racing horses is associated to their increased iron requirements. Horses, which endure for long periods of time strenuous exercise, can suffer from iron deficiency, especially in cases of inadequate dietary intake.

Iron deficiency develops slowly due to the fact that iron losses are gradual. The magnitude of the consequences of iron deficiency depends on the duration and degree of the negative iron balance, as well as on the available iron pool present in the body depot. Severe iron deficiency with clinical manifestations can occur in cases of massive hemorrhage.

Efficient energy metabolism is possible only in the presence of oxygen, hence the need for a high hemoglobin concentration as a prerequisite for efficient oxygen binding and transport. Today on the market can be found *per os* preparations containing iron in the form of phosphate, gluconate, fumarate and succinate. Iron preparations for parenteral application in horses are commonly available as iron complexes bound to dextrin, sorbitol and ammonium citrate (Kamerling, 1984; Putan, 1986; McLean *et al.*, 1987; Morris, 1989; Lawrence, 1994; Harris *et al.*, 1995).

Preparations containing iron sulphate are most commonly used for *per os* application. Iron supplements for *per os* use are cheap and do not cause allergic reactions like the ones which are often seen after the use of parenteral iron preparations. The major setbacks of peroral iron preparations are: slow absorption, subsequent irritation of the digestive tract, as well as an unpleasant metallic taste. Their slow absorption results in low bioavailability, and high doses can cause acute intoxication and liver damage (Divers *et al.*, 1983; Hershko C, 1989; Edens *et al.*, 1993). To avoid all the possible side-effects caused by peroral iron supplements, the use of parenteral iron preparations is becoming more popular. In racing horses the most commonly used parenteral iron preparations are in the form of dextran, saccharate and ammonium citrate.

Parenteral application, especially intramuscular, of iron dextrane preparations can bring up an anaphylactic reaction with a lethal outcome. Beside a generalized reaction to the preparation a local painful swelling sometimes accompanied by tissue necrosis can develop on the injection site. After an intravenous application of such iron supplements, thrombophlebitis or symptoms of generalized poisoning may develop (Wagenaar, 1975; Arnbjerg J, 1981; Mullaney and Brown, 1988; Edena *et al.*, 1993).

In a follow-up study on the effect of iron preparations on racing horses stationed at Belgrade Hippodrome (Jovanović *et al.*, 1997), 11.18% (n=17) of tested animals showed a painful reaction at the injection site, 2.63 % (n=4) developed skin rash, 0.66% (n=1) anaphylaxis and 0.66 % (n=1) liver disorders.

Fe-saccharate is a complex of Fe<sup>3+</sup> and saccharate. These iron preparations are usually administered to racing horse by intravenous route. They have shown good results in racing horses as they have a fast effect due to efficient iron incorporation into hemoglobin. Such iron supplementation is almost entirely withheld within the body, and only to a small extent is excreted through the kidneys.

Gutschow *et al.*, (1975) have studied the effect of Fe- saccharate (Hippiron®) on the number of erythrocytes, hemoglobin concentration, hematocrit and hematological indices. After treatment the authors registered an increased erythrocyte count by 17.78%, hemoglobin concentration and hematocrit value increased by 10.07% and 10.20% respectively, compared to the initial value. They

have registered as well a decrease in CMV and MCH by 6.67% and MCHC by 0.92%. Gutschow *et al.*, (1975) consider the increased values of erythrocyte count, hemoglobin concentration and decreased MCV, MCH and MCHC values to be one of the crucial factors in the improvement of the performance of racing horses.

Cornelia Detlef (1985) studied the effects of Fe-saccharate (Hippiron®) on hematological parameters and serum iron concentration in pregnant mares and their progeny. In mares to which Hippiron® was administered during pregnancy, there was not a fall in erythrocyte count, common throughout pregnancy due to the increasing needs of the growing fetus. Foals, whose mares have been treated with Fe-saccharate had a significantly ( $p < 0.05$ ) higher erythrocyte count and hemoglobin concentration when compared to their mothers and foals of mares not treated with Fe-saccharate. The author noted as well a significant difference ( $p < 0.01$ ) in the increase of serum iron in foals of mares treated with Fe-saccharate compared to foals of untreated mares.

Jovanović *et al.*, (1997) studied the effects of Fe-saccharate (Hippiron®) in the English Thoroughbred and Yugoslav Trotter, with a special insight into the negative side-effects of this preparation. In 60% of the studied horses there was a sharp increase in erythrocyte count and hemoglobin concentration. This showed a positive effect on the racing performances of the studied horses. About 10% of the studied animals did not show any significant changes, in 31.5% after an initial rise the hemoglobin concentration and erythrocyte count decreased by 30% compared to the initial values, accompanying marked hyperbilirubinemia was recorded.

#### MATERIAL AND METHODS

In the study a total of 18 racing horses (English Thoroughbred) were included in the trial. The animals between three and four years of age, of both sexes, were randomly assigned into three groups ( $n=6$ ).

The first group was treated with Fe- dextrane Fedex-100® (Zdravlje, Leskovac). One milliliter of the preparation contains 100 mg  $Fe^{3+}$ , 200 mg dextrane and 0.50 mg phenol. A dose of 8 mL was applied i.m., three times, every second day.

The second group was treated with Hippiron® (Janssen-Cilag Sa Vifor Inc., St Gallen). A 50 mL vial (used as a single application) contains a  $Fe(OH)_3$  - saccharose complex, i.e. 20 mg  $Fe^{3+}/mL$ . The preparation was applied via intravenous route, combined to 500 mL saline every second day, three times.

The third group was treated with Hemo-15® (Rhone Meriux). One milliliter of this preparation contains ferric ammonium citrate 15mg, vitamin  $B_{12}$  150  $\mu g$ , riboflavine (Na-5-phosphate) 10 mg, pyridoxine hydrochloride 10 mg, niacin amide 100 mg, d-panthenol 15 mg, cobalt gluconate 0.7 mg, copper gluconate 0.2 mg, holin chloride 10 mg and biotin 10  $\mu g$  every second day.

Blood samples were taken five days before the first treatment, as well as on the day respective treatments were carried out, and two days after the last application. In the obtained blood samples the values for erythrocyte count,

hemoglobin concentration, hematocrit, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were determined. For serum iron analysis, the samples were taken five days before the treatment and two days after the last iron preparation application.

Blood samples were taken from the jugular vein in test tubes containing EDTA. Serum samples were taken by withdrawing blood from the same site using sterile vacuum tubes containing SST gel and coagulation activators. All hematological analyses were performed on the automatic analyzer "Tehnicom" H-1 (USA).

The procedure used for the measurement of total serum iron concentration is based on the automatized method by Giovanella *et al.* (1968) and the manual method by Stookey (1970) using a Tehnicom SMAK – System (USA).

Statistical analysis was done after determining the mean values and standard deviations of the studied parameters. The significance of differences between groups was calculated using Analysis of Variance (F-test) and individual LSD-test.

## RESULTS AND DISCUSSION

The results obtained in this study are shown on Figure 1-7.

The effects of the three most commonly used iron preparations: Fedex<sup>®</sup> (Zdravlje Leskovac) as a representative of ferrous dextrane preparations for intramuscular application, Hippiron<sup>®</sup> (Jessen – Cilag<sub>SA</sub> Vifor Inc., St. Galen) the most popular iron preparation in the chemical form of ferrous saccharate and Hemo<sup>®</sup> (Rhone Meriux) containing iron in the form of ferrous ammonium citrate were tested on 18 healthy racing horses.

At the start of the racing season the studied horses, after hematological tests, were diagnosed as preanemic. The erythrocyte count ranged from  $8,2 \times 10^{12}/L$  in the third group (Hemo<sup>®</sup> 15) to  $8.76 \times 10^{12}/L$  and  $8.84 \times 10^{12}/L$  in the second and first group respectively (Figure 1). These values can be considered to be within the physiological level for racing horses, however they are considered to be insufficient for top racing results (Stewart *et al.*, 1977; Carlson, 1996; Christian, 2000; Martin and Nankervis, 2002).

All three tested iron preparations resulted in an increase of hematological parameters such as erythrocyte count, hemoglobin concentration and hematocrit value. Hence, the group of animals treated with Fe-saccharate had an increase of the mean erythrocyte count by 5.7% ( $9.25 \times 10^{12}/L$ ). However, Gustschow *et al.*, (1975) in a similar experiment reported an increase in erythrocyte count up to 17.78%.

Racing horses treated with Fe-dextrane had an increase in erythrocyte count by 4.80% ( $9.27 \times 10^{12}/L$ ). This change is lower than the one reported by Detlef (1985). However, the effect of such supplementation in our trial was followed up for a shorter period of time and a delayed effect of Fedex<sup>®</sup> after the last application cannot be excluded.

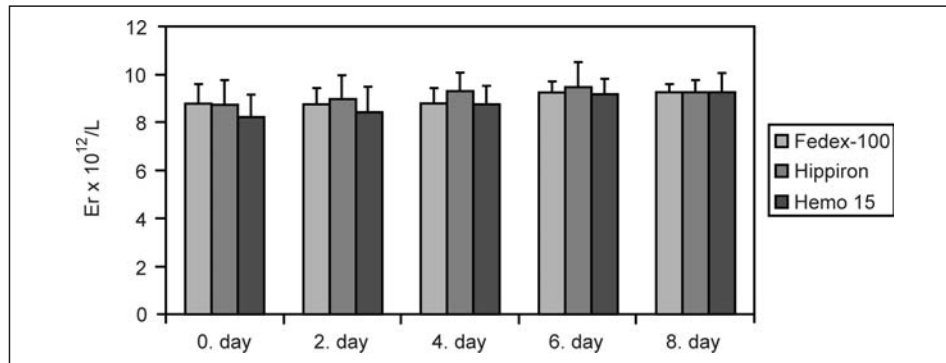


Figure 1. Changes in erythrocyte count  $\times 10^{12}/L$  in the blood of racing horses treated with different iron preparations

The highest increase in erythrocyte count was recorded in horses treated with ferric ammonium citrate. After applying three times Hemo-15 the erythrocyte count increased by 12.8%, i.e. from  $8.2 \times 10^{12}/L$  to  $9.25 \times 10^{12}/L$  by the end of the experiment. We believe that the highest increase in erythrocyte count in this group can be explained by the fact that Hemo<sup>®</sup> 15 has a complex composition, containing other hemantics like vitamin B12 and folic acid. Hemo<sup>®</sup> 15 is applied via an intravenous route, hence has a higher bioavailability when compared to preparations which are applied intramuscularly.

If the effects of these three iron preparations are compared it is evident that there are differences in the resulting erythrocyte count. The highest increase (+12.8%) was recorded in horses treated with ferric ammonium citrate; an intermediate increase (+5.7%) was achieved by ferric saccharate and the lowest (+4.8%) by ferric dextran. However, these differences were not statistically significant ( $p > 0.05$ ).

By increasing the erythrocyte count a respective increase in hemoglobin concentration is to be expected. However, this is not equal between groups, as shown by our results. At the start of the trial the initial hemoglobin concentration ranged from 118.33 g/L in horses treated with ferric dextran to 126.5 g/L in horses treated with ferric ammonium citrate. This can be considered as within the physiological limits for the English Thoroughbred. (Ralston *et al.*, 1988; Lassen and Swardson, 1995; Cuddeford, 2001), however these values are not adequate for the workload a horse endures during a race (Figure 2).

In the group treated with ferric saccharate the increase in hemoglobin concentration, when compared to the initial value, was statistically significant ( $p < 0.01$ ). Compared to the initial values this increase in hemoglobin concentration was 13.63%, which is higher than the value of 10.07% reported by Gutschow *et al.* (1975). In the experimental group of animals supplemented with Fe- saccharate the percental increase in hemoglobin was higher than the percental increase in erythrocyte count. The increase in hemoglobin

concentration in this group was statistically significant ( $p < 0.01$ ) when compared to the group treated with ferrous dextran.

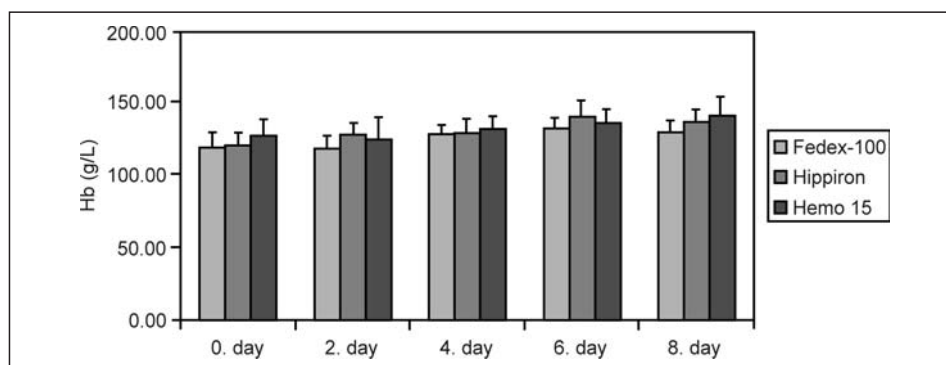


Figure 2. Changes in hemoglobin concentration (g/L) in the blood of racing horses treated with different iron preparations

Horses treated with ferric ammonium citrate had a significant ( $p < 0.05$ ) increase by 10.93% compared to initial values in hemoglobin concentration. Only in this group, when the percent values were compared, the increase in erythrocyte count was higher than the increase in hemoglobin concentration.

On testing the effects on hemoglobin concentration, between the three different iron preparations, there were no significant differences ( $p > 0.05$ ), however by comparing the values when expressed as percentage, the best results were obtained by ferric saccharate (+13.63%).

The third parameter relevant for the estimation of the effects of an iron preparation on hematopoiesis is the hematocrit (packed cell volume, PCV). The hematocrit value increases as the erythrocyte count rises, however it does not do so at the same rate. Before treatment the hematocrit value ranged from 0.35 L/L to 0.37 L/L. The same comment as for hemoglobin and erythrocyte count applies for the hematocrit, i.e. they are within the physiological limits of the tested animals, but these values are far from sufficient to enable optimal racing results, hence these horses are often described as pre-anemic (Ralston *et al.*, 1988; Smith *et al.*, 1989; Lassen and Swardson, 1995; Harris and Krenfeld, 2003). Results for hematocrit values are given in Figure 3.

By statistical analysis of the values obtained for the hematocrit no significant differences ( $p > 0.05$ ) between Fe-saccharate and Fe-ammonium citrate were recorded. However, when the results were expressed as percentage a growing trend in hematocrit value was evident. Horses treated with ferric saccharate and ferric ammonium citrate showed an increase in hematocrit value by 11.04% and 6.62% respectively. The increase in the hematocrit is due to the increase in erythrocyte count and volume. The increase in the experimental group supplemented with ferric saccharate coincides with the value (10.20%) recorded by Gustschow *et al.* (1975).

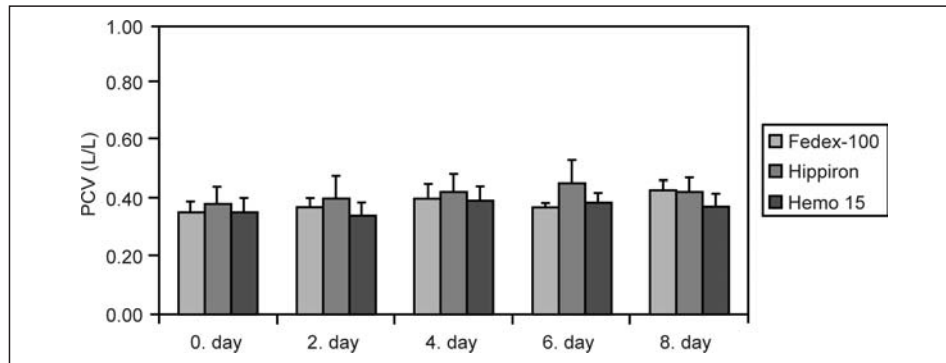


Figure 3. Changes in hematocrit (L/L) in the blood of racing horses treated with different iron preparations

When the results relative to erythrocyte count, hemoglobin concentration and hematocrit value are inconclusive, a good indicator of the efficiency of the tested supplements are the erythrocyte indices, which are more reliable. The mean values of the hematological indices (MCV, MCH, MCHC) at the start of the trial were within physiological limits for racing horses. The mean MCV ranged from 40.55 fl to 42.8 fl; MCH from 12.86 pg to 14.21 pg, and MCHC from 269 g/L to 323.5 g/L (Figures 4, 5, and 6). These values coincide with the values published by (Rose and Hadgson, 1982; Radin *et al.*, 1986; Ralston *et al.*, 1988; Smith *et al.*, 1989).

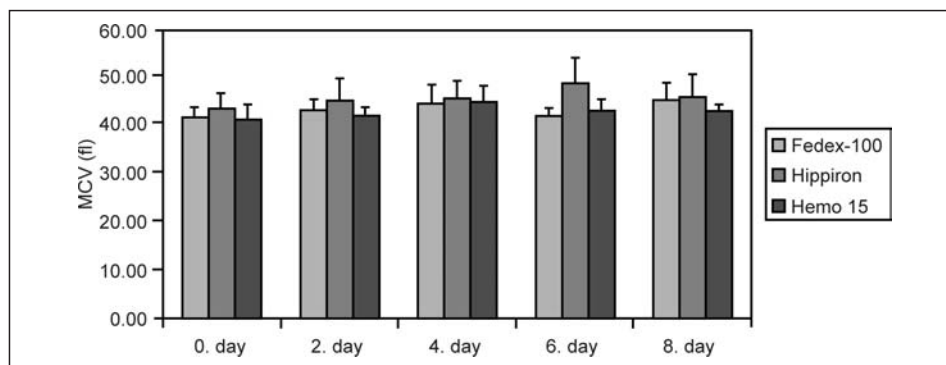


Figure 4. Changes in MCV (fl) in the blood of racing horses treated with different iron preparations



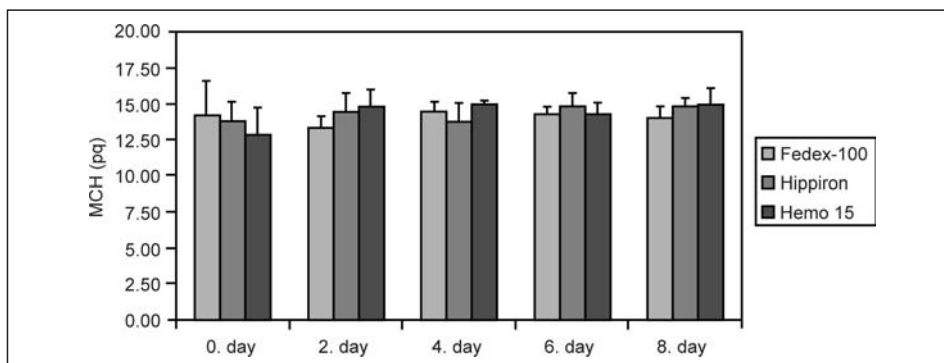


Figure 5. Changes in MCH (pg) in the blood of racing horses treated with different iron preparations

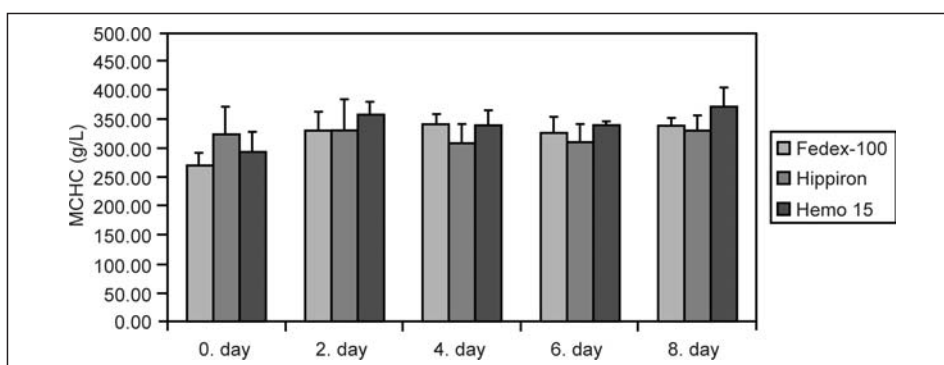


Figure 6. Changes in MCHC (g/L) in the blood of racing horses treated with different iron preparations

A significant increase ( $p < 0.05$ ) in MCV was in the group of animals treated with Fe-dextrane. The increase, when expressed as percentage, was 9.26%. The same preparation resulted in a significant change in MCH, which actually decreased by 1.62%. MCHC significantly increased by 25.77% ( $p < 0.01$ ).

After fortification with ferric saccharate no significant changes ( $p > 0.05$ ) in MCV, MCH and/or MCHC were recorded. However, mean MCH and MCHC increased by 7.34% and 1.64%, respectively. Gustschow *et al.* (1975) reported a decrease in the erythrocyte indices MCV and MCH by 6.67% and MCHC by 0.92%.

Horses treated with ferrous ammonium citrate had an increase in MCV value by 4.19%, however this increase was not significant ( $p > 0.05$ ). MCH and MCHC values significantly increased ( $p < 0.01$ ), MCH increased by 16.64% and MCHC increased by 26.30%.



One of the most relevant biochemical indicators which was followed-up throughout the experiment is serum iron. Before the start of the treatments, serum iron values ranged from 27  $\mu\text{mol/L}$  in the group treated with Hippiron<sup>®</sup>, 28  $\mu\text{mol/L}$  in the group treated with Hemo-15 and 28.5  $\mu\text{mol/L}$  in horses treated with Fedex<sup>®</sup> (Figure 7). These values for serum iron are higher when compared to those published by Tobin (1984) and Stone and Freden (1990), but close to the values reported by Rose and Hadgson (1982) and Johnson (1990).

In the first experimental group of horses treated with a dextrane iron formulation there was no significant increase of the mean values of serum iron at levels of significance 0.01 and 0.05. In this group a decrease of 0.61% in serum iron was recorded.

Values for serum iron in the experimental animals treated with ferri saccharate were higher by 17.25% when compared to initial values. This increase in serum iron has shown to be statistically significant ( $p > 0.05$ ).

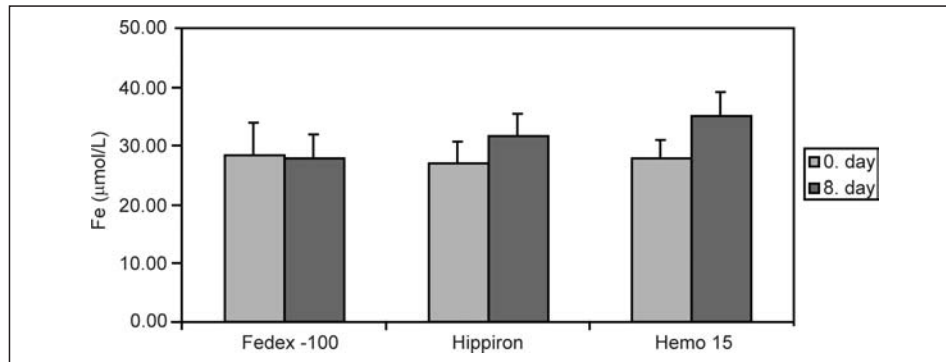


Figure 7. Serum iron concentrations ( $\mu\text{mol/L}$ ) in racing horses treated with different iron preparations

The third group of animals, treated with ferric ammonium citrate the serum iron concentrations differed significantly ( $p < 0.05$ ) between the initial value and at day 8. from the start of fortification. The increase in serum iron concentration in horses treated with ferric ammonium citrate was 27.14%.

By comparison of the effects of different iron preparations on serum iron concentration a statistically significant difference ( $p < 0.01$ ) between the treatment with ferrous ammonium citrate and the treatment with ferrous dextran was reported.

Based on the obtained results it can be concluded that all three preparations have a positive effect on hematological parameters and blood serum iron concentration. The effect of Hemo<sup>®</sup>-15 is more marked because beside  $\text{Fe}^{3+}$  (whose concentration is lower compared to Fedex-100 and Hippiron) contains other hemantics. Other components of this preparation, especially vitamins B2, B6, B12, choline and microelements such as cobalt and copper have a positive

effect on hemoglobin concentration and red blood cell count in treated racing horses. We consider the application of Hemo<sup>®</sup>-15 to be more appropriate, specially bearing in mind that with this preparation the chance for iron hypermedication is lower.

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#### REFERENCES

1. *Arnbjerg J*, 1981, Poisoning in animals due to oral application of iron with description of a case in a horse, *Nord Vet Med*, 33, 71.
2. *Carlson PG*, 1996 Clinical Chemistry Test. In Bradford PS, editors Large Animal Internal Medicine, Second ed. Mosby St. Luis, 441-69.
3. *Christian AJ*, 2000, Red Blood cell Survival and Destruction. In Feldman FB, Zinkle GJ, Jain C Nemi A: Schalm's Veterinary Hematology. 5<sup>th</sup> ed Lippincott Williams & Wilkins, Philadelphia 117-24.
4. *Cuddeford D*, 2001, Starch digestion in the horse. In: Pagan J. and Geor RJ, eds. Advances in Equine Nutrition II. Nottingham: Nottingham Press, 95-104.
5. *Detlef C*, 1985, Untersuchungen über das rote blutbild und der eiserversorgungsanzeigenden parameter bei stuten und deren fohlen im peripartalen abschnitt unter besonderer berucksichtigung einer eisensubstitution. Inaugural-Dissertation zur Erlangung des Doktorgrades bei dem Fachbereich Veterinarmedizin und Tierzucht der Justus-Liebig-Universität zu Gießen.
6. *Divers TJ, Warner A, Valaa WE*, 1983, Toxic hepatic failur in newborn foals, *J Am Vet Med Assoc*, 183, 1407-13.
7. *Edens LM, Robertson JL, Feldman BF*, 1993, Cholestatic hepatopatya, thrombocytopenia and lymphopenia associated with iron toxicity in a thoroughbred gelding, *Equine Vet J*, 25, 81-4.
8. *Giovaniello J, Di Benedett G, Palmer N, Peters T Jr*, 1968, Fully automated method for determination of serum iron and total iron-binding capacity. In Automation in Analytical Chemistry Technicon Symposia 1967, 1. White Plains. NY. Mediad, Inc.
9. *Gutschow K, Raake W, Rákóczy F, Ponce Fernández M, Ponce Vázquez J*, 1975, Zur Diagnostik und Therapie Präanämischer Eisenmangelzustände beim Vollblutpferd Berl Münch, *Tierärztl Wschr*, 88, 261-4.
10. *Harris PA, Kronfeld DK*, 2003, Influence of dietary energy sources on health and performance. In: Robinson N, ed. Current Therapy in Equine Medicine, 5th edition. Philadelphia: W.B. Saunders, 698-704.
11. *Hershko C*, 1989, Mechanism of iron toxicity and its possible role in red cell membrane damage, *Semin Hematol*, 26, 277-80.
12. *Johnson MA*, 1990, Iron: Nutrition, monitoring and nutrition status assesment, *J Nutr*, 120, 1486-91.
13. *Jovanović M, Krstić V, Trailović D*, 2003, Research of the influence of different iron preparations on the racing anemia in horses. The Abstracts of departments of animal science second joint meeting of the Balkan countries "BALNIMALCON-2003" associated with the 32<sup>nd</sup> annual session of scientific communications of the Bucharest faculty of animal science, 59.
14. *Jovanović SM, Trailović D, Đurđević D, Andrić N*, 1997, Osvrt na neka neželjena dejstva gvožđa kod trkačkih konja. *Zbornik radova III savetovanja o lekovima za upotrebu u veterini*, Igalo, 153-6.
15. *Jovanović, M, Trailović D, Ilić V, Mirilović M*, 2001, Research of the influence of some hematinics on the racing anaemia oh horses. (Section: Diseases of horses), *Medzinardnej vedeckej*

- konferencija- Európska integrácia veterinárnych lekárov v problematike chorob malých zvierat, hydiny, koni a histórie veterinárnej medicíny, Košice Slovenska republika, 136-9.
16. Lassen ED, Swardson CJ, 1995, Hematology and hemostasis in the horse normal functions and common abnormalities. *Vet Clin North Am Equine Pract*, 11, 351-89.
  17. Marlin D, Nankervis K, 2002, Equine exercise physiology, Blackwell Science. London.
  18. Moris DD, 1996, Alterations in the Erythron, In Bradford PS, editors Large Animal Internal Medicine, Second ed. Mosby St. Luis.
  19. Mullaney TP, Brown CM, 1988, Iron toxicity in neonatal foals, *Equine Vet J*, 20, 2, 119-24.
  20. Mc Lean LM, Hall ME, Bell JE, 1987, Evaluation of serum iron, total iron binding capacity, unbound iron binding capacity, percent saturation and serum ferritin in the equine. *Proc Equine Nutr Physiol Soc Symp*, 443-6.
  21. Putnam EM, 1986, The role of vitamins in nutrition of performance horses. *Mod Vet Pract*, 121-4.
  22. Radin MJ, Eubank MC, Weiser MG, 1986, Electronic measurement of erythrocyte volume and volume heterogeneity in horse during erythrocyte regeneration associated with experimental anemias, *Vet Patol*, 23, 656-60.
  23. Ralston SL, Nockels CF, Squires EL, 1988, Differences in diagnostic test results and hematologic data between aged and young horses, *Am J Vet Res*, 46, 1451-6.
  24. Rose JR, Hadgson RD, 1982, Haematological and plasma biochemical parameters in endurance horses during training, *Equine Vet J*, 14, 2, 144-8.
  25. Smith JE, Erickson HH, Debowes RM, 1989, Changes in circulating equine erythrocytes induced by brief, high-speed exercise, *Equine Vet J*, 21, 444-7.
  26. Smith JE, Moore K, Cipriano JE, 1984, Serum ferritin as a measure of stored iron in horses, *J Nutr*, 114, 677-81.
  27. Stewart GA, Ridle CA, Salman PW, 1977, Haematology of the racehorse. A recent study of Thoroughbreds in Victoria, *Aust Vet J*, 53, 8, 353-9.
  28. Stookey LL, 1970, Ferrozine - A new spectrophotometric reagent for iron. *Anal Chem* 42,7, 779-81.
  29. Stone MS, Freden GO, 1990, Differentiation of anemia of inflammatory disease from anemia of iron deficiency, *Compendium Continuing Educ Equine Pract*, 12, 963-6.
  30. Tobin T, Kamerling SG, 1984, Iron: Its functions and metabolism in the horse, *Eq Sports Med News* 4, 2, 1-3.
  31. Trailović D, 1988, Vrednosti nekih hematoloških parametra u sportskih grla Engleskog punokrvnjaka tokom sezone trka na beogradskom hipodromu. *Veterinarski glasnik*, 42, 9, 599-606.
  32. Wagenaar G, 1975, Iron dextran administration in horse, *Tydschr Diergeneeskd*, 100, 562-3.

## ULOGA RAZLIČITIH PREPARATA GVOŽĐA U SPREČAVANJU TRKAČKE ANEMIJE KONJA

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### SADRŽAJ

Hipoteza da je za postizanje vrhunskih rezultata na trkama najvažniji preduslov visoka koncentracija hemoglobina i vrednost hematokrita, dovela je do masovne primene različitih preparata za podsticanje hematopoeze kod zdravih konja. Ovo se pre svega odnosi na konje u treningu, u cilju preveniranja takozvanih trkačkih anemija.

U ovom radu su spitivanjem uticaja tri najčešće korišćena preparata gvožđa kod trkačkih konja u našoj zemlji (Fedex kao predstavnik dekstranskih preparata gvožđa, Hippiron kao najpoznatiji predstavnik gvožđa u kompleksu sa saharatom i Hemo 15 koji je predstavnik kompleksnih preparata koji uz gvožđe sadrže i druge hematinike) utvrđene očekivane promene u broju eritrocita, koncentraciji hemoglobina i hematokritskoj vrednosti. Primena sva tri preparata gvožđa dovela je do povećanja vrednosti svih ispitivanih hematoloških parametara kod trkačkih konja. Najbolji efekat ispoljio je preparat Hemo 15 čija je primena dovela do najvećeg povećanja broja eritrocita, MCH, MCHC i koncentracije hemoglobina, a i sam efekat je nastajao najbrže.