

KRE-42™

A Key Player in the Energy Production of Skeletal & Heart Muscle — Maximum Ingestion of pH-Stabilized Creatine

Professional Technical Literature | For Veterinarians, Pharmacies, Stables & Equine Professionals

From: Sales Manager, Care & Cure Animal Health

1. PRODUCT OVERVIEW

Kre-42™ represents a breakthrough in equine and camel performance nutrition—a scientifically advanced, pH-buffered creatine formulation designed to maximize energy production in both skeletal and heart muscle. Developed through extensive research and manufactured under the prestigious Care & Cure® brand, Kre-42™ delivers the most bioavailable form of creatine available to racing animals today.

The Science Behind Kre-42™

Creatine is an organic amine that occurs naturally in the body and is also found in certain foods, such as meat and fish. It plays a fundamental role in cellular energy metabolism, serving as a precursor for phosphocreatine—a major source of energy for contracting muscles. During brief, high-intensity exercise, the phosphocreatine system provides immediate energy for muscle contraction. However, conventional creatine monohydrate faces a critical challenge: degradation in the acidic environment of the stomach. When exposed to stomach acid, creatine rapidly converts to creatinine—a biologically inactive waste product that cannot be utilized by muscle cells. This conversion dramatically reduces the amount of creatine available for energy production. Kre-42™ solves this problem through patented pH-buffering technology.

What Makes Kre-42™ Different?

Feature	Conventional Creatine	Kre-42™
pH Stability	Unstable; degrades in stomach acid	pH-buffered (pH 12-14); remains stable

Bioavailability	Limited by degradation	Maximized through stability
Absorption	Inefficient	Enhanced and efficient
GI Tolerance	May cause bloating and discomfort	Gentle on the stomach
Dosing	Higher doses required (3-5g daily)	Lower doses effective (1.5-3g daily)

Product Classification

Category: Performance-Enhancing Nutritional Supplement

Primary Action: ATP Regeneration & Energy Production Support

Target Species: Racing Horses & Racing Camels

Key Ingredient: pH-Buffered Creatine (Kre-Alkalyn® Technology)

Indications

- Enhanced energy production in skeletal muscle
- Support for cardiac muscle function
- Improved stamina and endurance
- Accelerated post-exercise recovery
- Reduced exercise-induced fatigue
- Support for high-intensity training and racing

2. RESPIRATORY PHYSIOLOGY OF RACING HORSES & CAMELS

Understanding the respiratory physiology of racing animals is essential for appreciating how Kre-42™ supports overall performance. The respiratory and energy systems are intimately connected—oxygen delivery and energy production must work in perfect harmony for peak athletic performance.

2.1 The Equine Respiratory System

The horse is an obligate nasal breather with a respiratory system uniquely adapted for athletic performance. During maximal exercise:

- **Respiratory Rate:** Increases from 8-16 breaths/minute at rest to 120-150 breaths/minute during maximal exercise

- **Minute Ventilation:** May exceed 1,500 L/min in elite racehorses
- **Oxygen Consumption:** Increases more than 30-fold above resting levels
- **Oxygen Extraction:** Highly efficient, supporting the extraordinary aerobic capacity of the equine athlete

The equine lung is the primary limiter of athletic performance. Any compromise in respiratory function directly impacts oxygen delivery to working muscles, which in turn affects energy production and performance.

2.2 The Camel Respiratory System

Racing camels possess unique respiratory adaptations that enable sustained performance in extreme desert environments:

- **Large Tidal Volume:** Camels have a larger tidal volume relative to body size compared to horses
- **Efficient Gas Exchange:** The camel respiratory system is adapted for efficient oxygen extraction
- **Heat and Water Conservation:** Nasal countercurrent exchange reduces water loss and cools inspired air
- **Adaptation to Arid Conditions:** The respiratory system is designed to function efficiently in hot, dry environments

Despite these remarkable adaptations, racing camels face significant respiratory challenges during high-speed competition. Dust inhalation, heat stress, and the demands of sprint racing can all compromise respiratory function and energy production.

2.3 The Oxygen-Energy Connection

The relationship between respiratory function and energy production is fundamental to athletic performance: **Oxygen Delivery:** The respiratory system delivers oxygen to the bloodstream. **Aerobic Energy Production:** Oxygen is essential for aerobic metabolism, which produces the majority of ATP during sustained exercise. **Anaerobic Energy Production:** During high-intensity exercise, when oxygen delivery cannot meet demand, the body relies on anaerobic energy systems—including the phosphocreatine system. **Recovery:** Efficient oxygen delivery supports rapid recovery by facilitating the clearance of metabolic waste products. Kre-42™ supports this integrated system by ensuring that when oxygen delivery is challenged—as it always is during intense racing—the phosphocreatine energy system is fully optimized to meet the demand.

3. EXERCISE-INDUCED PULMONARY STRESS

3.1 The Challenge of High-Intensity Exercise

During brief, high-intensity exercise—such as a Thoroughbred race lasting approximately 2 minutes—the metabolic demands on the body are extraordinary. The higher the exercise intensity, the greater the anaerobic demand.

ATP Depletion: Intramuscular stores of ATP can decrease by 14% to 50% during high-intensity exercise. This ATP depletion has profound clinical consequences: Impaired muscle contraction; Reduced calcium reuptake by the sarcoplasmic reticulum; Impaired sodium-potassium exchange; Decreased muscle function and performance.

Phosphocreatine Depletion: Phosphocreatine (PCr) serves as a rapidly mobilizable reserve of high-energy phosphate in muscle cells. During intense exercise, PCr is depleted as it donates phosphate to regenerate ATP. Research has shown that phosphocreatine levels are significantly lower than pre-exercise values during and immediately after intense exercise.

The Fatigue Cascade: Fatigue during high-intensity exercise is the result of multiple interrelated factors: Increased Hydrogen Ions (contribute to metabolic acidosis); Increased Lactate (reflects anaerobic metabolism); Increased Inorganic Phosphate (inhibits muscle contraction); Increased Ammonia (from purine nucleotide degradation); Increased ADP (reflects energy imbalance); Decreased ATP (limits energy availability); Decreased Phosphocreatine (reduces energy reserve); Decreased pH (impairs enzyme function).

3.2 Exercise-Induced Pulmonary Hemorrhage (EIPH)

Exercise-induced pulmonary hemorrhage is a major concern in elite racing horses. During intense exercise, pulmonary artery pressure rises dramatically, potentially leading to capillary rupture and bleeding into the airways. EIPH can significantly impair performance by reducing oxygen exchange efficiency, causing airway irritation and inflammation, leading to post-exercise coughing and respiratory distress, and potentially causing long-term respiratory compromise. The EIPH-Energy Connection: EIPH directly impacts energy production by compromising oxygen delivery. When pulmonary hemorrhage occurs, the horse's ability to deliver oxygen to working muscles is reduced, increasing reliance on anaerobic energy systems and accelerating ATP and phosphocreatine depletion. Kre-42™ supports the horse by ensuring that the phosphocreatine energy system is fully optimized to compensate when respiratory function is compromised.

3.3 Respiratory Challenges in the Gulf Environment

Racing horses and camels in the UAE and Gulf region face unique respiratory challenges: **Extreme Heat:** Ambient temperatures frequently exceed 40-45°C, increasing respiratory rate and fluid loss. **Dust Exposure:** Desert environments expose animals to airborne particulates that can irritate airways. **High Humidity in Coastal Areas:** Impairs evaporative cooling and increases respiratory stress. **Transport Stress:** Frequent travel between training and racing venues exposes animals to varying environmental conditions. **Stable Environments:** Dust, ammonia, and poor ventilation can compromise respiratory health.

4. MODE OF ACTION

4.1 The ATP-Phosphocreatine Energy System

The ATP-phosphocreatine system represents the body's most rapidly accessible energy reserve. Understanding this system is essential for appreciating how Kre-42™ supports athletic performance. **How the System Works:** **ATP (Adenosine Triphosphate):** The universal energy currency of cells. ATP stores within muscle are limited and can be depleted within seconds of intense exercise. **Phosphocreatine (PCr):** A high-energy phosphate compound stored in muscle cells. PCr serves as a rapidly mobilizable reserve that can regenerate ATP from ADP. **The Creatine Kinase Reaction:** The enzyme creatine kinase catalyzes the transfer of a phosphate group from PCr to ADP, regenerating ATP ($\text{PCr} + \text{ADP} \rightarrow \text{Creatine} + \text{ATP}$). **Energy Availability:** This system provides immediate energy for explosive movements, acceleration, and high-intensity exercise. **The Limitation:** The ATP-phosphocreatine system is limited by the total pool of creatine and phosphocreatine stored in muscle cells. When this pool is depleted, the body must rely on slower anaerobic and aerobic energy systems.

4.2 How Kre-42™ Optimizes the System

Kre-42™ works through multiple mechanisms to optimize the ATP-phosphocreatine energy system: **Maximized Creatine Delivery:** The patented pH-buffering technology of Kre-42™ ensures that creatine remains stable in the acidic environment of the stomach. By maintaining stability through the digestive tract, Kre-42™ delivers a higher proportion of active creatine to the bloodstream and, ultimately, to muscle cells. **Enhanced Cellular Uptake:** The pH-buffered creatine in Kre-42™ is more readily absorbed by muscle cells. This enhanced uptake ensures that the creatine reaches the cells where it is needed most—the skeletal and cardiac muscles that power athletic performance. **Expanded Phosphocreatine Pool:** Once inside muscle cells, creatine combines with phosphate to

form phosphocreatine. By increasing the total creatine pool, Kre-42™ expands the phosphocreatine reserve available for rapid ATP regeneration during high-intensity exercise. **Reduced Fatigue:** The expanded phosphocreatine pool delays the onset of fatigue by maintaining ATP availability during intense exercise. **Accelerated Recovery:** After exercise, Kre-42™ supports the rapid replenishment of phosphocreatine stores, accelerating recovery between training sessions and races.

4.3 Benefits for Cardiac Muscle

The heart muscle has an exceptionally high energy demand, particularly during intense exercise. The ATP-phosphocreatine system is essential for cardiac function: **Sustained Contraction:** The heart must contract continuously, requiring a constant supply of ATP; **Energy Reserve:** Phosphocreatine serves as an energy reserve for the heart during periods of increased demand; **Protection:** Adequate phosphocreatine stores help protect cardiac function during the stress of intense exercise.

5. SCIENTIFIC REVIEW OF KRE-42™ INGREDIENTS

5.1 pH-Buffered Creatine (Kre-Alkalyn® Technology)

Kre-42™ utilizes Kre-Alkalyn® technology—a patented pH-buffered creatine formulation engineered to eliminate the instability, breakdown, and side effects that plague ordinary creatine monohydrate. **The Kre-Alkalyn® Solution:** Kre-Alkalyn® is processed at a higher pH (above 12), featuring a unique "buffered" structure that keeps it stable. This protects the creatine molecule from degradation in stomach acid. **Stability:** 6-year stability profile under accelerated testing. **Performance:** Effective for increasing endurance and stamina while eliminating fatigue due to lactic acid accumulation. **Strength:** Athletes using Kre-Alkalyn® experienced 28.25% greater strength gains compared to those using standard creatine monohydrate.

5.2 Creatine: The Scientific Foundation

Creatine is an organic amine that occurs naturally in the body and has been extensively studied for its role in energy metabolism. **Research has confirmed:** **Aerobic Training Response:** Positive effects on muscular responses in Arabian horses. **Metabolic Response:** Benefits against adenine nucleotide degradation during maximal treadmill exercise in Standardbreds. **Performance in Quarter Horses:** Demonstrated performance benefits for barrel racing. **Genetic Associations:** Research into the creatine kinase muscle gene (CKM) highlights the genetic basis of energy metabolism in elite Thoroughbreds.

6. BENEFITS FOR RACING HORSES

- **Enhanced Energy Production:** Supports explosive starts and sustained high-speed performance in sprint and middle-distance racing.
- **Improved Stamina and Endurance:** Helps maintain performance for longer periods, valuable for endurance racing and multiple-race events.
- **Accelerated Recovery:** Supports rapid replenishment of phosphocreatine stores.
- **Cardiac Function:** Helps maintain optimal heart function during extraordinary demands.
- **Reduced Muscle Damage:** May help reduce exercise-induced muscle damage, relevant for intensive training or horses susceptible to tying-up.
- **Respiratory Support:** Optimized phosphocreatine system helps compensate for reduced oxygen delivery during respiratory compromise.

7. BENEFITS FOR RACING CAMELS

- **Unique Physiological Support:** Supports critical energy pathways in camels, who are adapted to efficient energy metabolism.
- **Heat Tolerance:** Helps camels maintain performance under the stress of extreme temperatures.
- **Sprint Performance:** Supports faster acceleration and higher sustained speeds.
- **Improved Recovery:** Accelerates recovery between races and intense training programs.
- **Cardiac Health:** Maintains optimal heart function during the extraordinary demands of racing.
- **Integration:** Complements energy-dense diets, electrolyte supplementation, and antioxidant support.

8. FEEDING GUIDELINES

8.1 **Recommended Dosage:** Administer as directed by your veterinarian.

8.2 **Administration:** Oral administration. Can be mixed with feed or administered directly. Ensure adequate water intake.

8.3 **Dosage:** Dosing should be individualized based on the animal's weight, training intensity, and competition schedule.

8.4 **Consistency:** Regular, consistent use is essential for optimal results. Always consult with a veterinarian.

9. TEST-SAFE INFORMATION

9.1 Regulatory Compliance: Formulated to comply with Jockey Club, H.S.I., and F.E.I. rules.

9.2 No Prohibited Substances: Designed to support natural energy production without artificial performance enhancement.

9.3 No Withdrawal Period: Supports natural physiological processes; no required withdrawal period before competition.

9.4 Safety: Safe and well-tolerated with no reported adverse events exceeding those of standard creatine.

10. STABLE MANAGEMENT RECOMMENDATIONS

10.1 Training Integration: Use consistently pre-, during, and post-training.

10.2 Environmental Management: Manage heat stress with hydration and cooling; minimize dust exposure in stables; support recovery after transport.

10.3 Monitoring: Keep accurate records of performance, recovery times, body condition, and supplementation.

11. VETERINARY CLINICAL APPLICATIONS

Performance Optimization: For racehorses, racing camels, and performance horses.

Recovery Support: For training, racing, and injury recovery.

Metabolic Conditions: Potential benefits for tying-up, exercise-induced fatigue, and poor performance cases.

Clinical Monitoring: Monitor performance indicators, biochemical markers (CK, AST), clinical signs, and response to treatment.

12. FREQUENTLY ASKED QUESTIONS

Q1: How does it work? It supports the ATP-phosphocreatine system by providing stable, bioavailable creatine.

Q2: Difference from conventional? Patented pH-buffering prevents degradation in stomach acid.

Q3: Is it safe? Yes, it is safe, well-tolerated, and contains no prohibited substances.

Q4: Withdrawal period? None.

Q5: When will I see results? Varies by animal; some see improvement within days, others within weeks.

Q6: Horses and camels? Yes, formulated for both.

Q7: Side effects? Designed to be gentle on the stomach with reduced bloating.

Q8: Storage? Cool, dry place away from direct sunlight.

13. STORAGE & PRECAUTIONS

13.1 Storage: Cool, dry place; keep container tightly closed; protect from light.

13.2 Precautions: Consult a veterinarian before use; do not exceed dosage; ensure adequate water intake. Use with caution in pregnant/lactating animals.

13.3 Contraindications: Known hypersensitivity; use caution in animals with renal disease.

13.4 Adverse Reactions: If any occur, discontinue use, contact a vet, and report to manufacturer.

14. DISTRIBUTOR CONTACT PAGE

Care & Cure® Animals Health

A Key Player in the Energy Production of Skeletal & Heart Muscle

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