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University Of Arkansas Releases Independent, Placebo Controlled Vasodilation Study Showing 1.5g Of Nitrosigine is Equal to 8g of Citrulline Malate- Both Significantly Better Than Placebo

PURCHASE, New York: In attendance at this year's ISSN (International Society of Sports Nutrition) Annual Conference, Nutrition 21 was excited to hear the significant results of an independent study presented by researchers from the University of Arkansas studying the significant blood flow impact of Nitrosigine®. The clinical study poster entitled "The Acute Effects of Citrulline Malate and Bonded Arginine Silicate Supplementation on Vasodilation of Young Adults" was presented by lead author Jeffrey Rogers from the University of Arkansas American College of Sports Medicine. Nutrition 21 provided no support and did not participate in the design or implementation of the study.

The study compared two popular ingredients used in sports nutrition today: citrulline malate (CM) and bonded arginine silicate (Nitrosigine®). Nitrosigine® is a leading branded ingredient used in a variety of consumer products with a legacy of continued success in the sports nutrition and pre-workout arena. Nitrosigine® is added to formulations in order to significantly increase serum arginine and nitric oxide (NO) levels, reduce markers of post-workout muscle damage and increase cognitive processing speed. CM is used for its ability to increase blood serum concentrations of arginine, resulting in NO production.

Dr. Michelle Gray, Associate Professor and the Director of the Exercise Science Research Center at the University of Arkansas, commented "Current research has yet to compare CM and Nitrosigine® *in vivo* using a flow-mediated dilation (FMD) technique, a validated measure of the vascular endothelium's NO producing ability. We identified a need and designed the experiment with the purpose of determining the effectiveness of Nitrosigine® and CM compared to placebo, in up-regulating NO production in blood vessels as measured by acute changes in vasodilation."

The double-blind, placebo-controlled, crossover design study was performed, with a 7-day washout period between test visits. The subjects were 22 healthy, normotensive, and at least moderately active male (n=14) and female (n=8) young adults.

Results showed that a single dose of 1.5g of Nitrosigine® significantly increased FMD, a measurement of increased vasodilation, blood flow, and possibly nitric oxide levels, more than placebo ($p < 0.01$) and to the same extent as 8g of CM.

Overall Clinical Results of the Study:

- In a double-blind, placebo-controlled study, both Nitrosigine® and CM supplementation led to an equally significant increase in vasodilation and blood flow, but with a dose of CM (8g) that was 5x more than the dose of Nitrosigine (1.5g)
- Overall, these data show that a single dose of 1.5g of Nitrosigine®:
 - Significantly increases vasodilation and blood flow, important for increases in muscle pump, as measured by FMD, in active young adults compared to placebo

- Significantly increases FMD, a nitric oxide-related measurement, in active young adults compared to placebo
- Significantly increases FMD, a measurement of vasodilation, blood flow, and nitric oxide production, as well as 8g of CM increases those metrics

“Nutrition 21 was excited to hear of this independent study and the positive results showing the benefits of Nitrosigine® on increasing vasodilation, a process driven by increasing nitric oxide production, and believed to enhance a number of sports performance endpoints. We are especially pleased that this study was designed to test a healthy, athletically trained population, and showed that a 1.5g dose of Nitrosigine® worked as well as 8g of Citrulline Malate, in increasing flow mediated dilation.” says James Komorowski, MS, CNS, Chief Science Office at Nutrition 21.

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About Nitrosigine®: Nitrosigine® is a patented complex of bonded arginine silicate with FDA New Dietary Ingredient (NDI) notification status and has been self-affirmed Generally Recognized As Safe (GRAS) at the level of 1,500 mg per day for use in nutritional bars and beverages. Nitrosigine® is scientifically engineered to boost nitric oxide levels, which have been shown to be a key factor in generating greater blood flow and vasodilation in working muscles. The unique Nitrosigine® complex bonds arginine and silicate – unlocking powerful synergistic effects that offer enhanced benefits. Nitrosigine® is a safe, non-stimulant, effective ingredient that is easy to formulate into new and existing products for sports nutrition, men’s health and cardiovascular health.

About Nutrition 21, LLC: Nutrition 21, is an industry-leading developer and marketer of efficacious, high-value, clinically substantiated ingredients for use in dietary supplements, medical foods, and beverages. With over 30 years of biotechnology and pharmaceutical experience, the company’s scientific platform has continued to create unique, patented products that are both safe and clinically effective. To build consumer trust, Nutrition 21 ensures product efficacy and safety through a product development strategy that involves rigorous preclinical and clinical research. The company currently holds over 100 domestic and international issued and pending patents for its ingredients which support unique claims associated with glucose metabolism, weight management, cognition, and sports nutrition, among others. For more information, please visit: www.Nutrition21.com

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