

BioCeuticals Research & Development Laboratory

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Date: December 1th, 2001
Study: Creatine-vs-Kre-Alkalyn^R US Patent 6,39,661 (**Buffered Creatine**) upon ingestion

Purpose of Study: To measure the stability upon ingestion of Creatine-vs-Kre-Alkalyn

Procedures: 18 Name brand products were purchased off the shelf from Retail Stores in Billings, Montana. Six Creatine Monohydrate products, Six Effervescent Creatine mixes, Six Creatine in Fruit flavor/Dextrose, mixes were randomly chosen.

Six Lots of Kre-Alkalyn were chosen

Step 1: All creatine products were tested for:
Total Creatine levels
Total Creatinine levels
Total Dicyanimide levels
Total Dihydrotriazine
pH

All lots of Kre-Alkalyn were tested for:
Total Creatine levels
Total Creatinine levels
Total Creatinine levels
Total Dicyanimide levels
Total Dihydrotriazine
pH

These test were done on an "AS IS or DRY BASIS.

Testing Method:

FTNIR Analysis by:

Identification performed by FTNIR, against in-house external library standards obtained from Sigma & produced by HPLC. / Quantification by FTNIR against external library standards obtained from Sigma & produced by HPLC

Testing Equipment:

Bran & Luebbe InfraProver II FTNIR

HPLC Analysis by:

Analysis performed by HPLC using Intersil ODS-2 5 μ m (250x4.6mm) and 25 min. gradient elution with 0.1% phosphoric acid buffer in H₂O and 0.1% phosphoric acid in acetonitrile. External reference standards obtained from Sigma-Aldrich.

Step 2:

All 24 products were activated with water according to the label.

Step 3:

All 24 products were placed in a stomacher at pH 3 for 15 minutes to simulate digestion.

Step 4:

After 15 minutes of digestion simulation in stomacher, all 24 products were tested for:

- Total Creatine levels
- Total Creatinine levels
- Total Creatinine levels
- pH

Results:

Product	Amount Used: Elemental Creatine	pH of Stomacher after addition of product	Total conversion to Creatinine at 15 minutes of digestion
Creatine 1	1.5 grams	3.5	100%
Creatine 2	1.5 grams	3.5	100%
Creatine 3	1.5 grams	3.5	100%
Creatine 4	1.5 grams	3.5	100%
Creatine 5	1.5 grams	3.5	100%
Creatine 6	1.5 grams	3.5	100%
Creatine Effervescent 1	1.5 grams	3.9	100%
Creatine Effervescent 2	1.5 grams	3.8	100%
Creatine Effervescent 3	1.5 grams	3.8	100%
Creatine Effervescent 4	1.5 grams	3.8	100%
Creatine Effervescent 5	1.5 grams	3.9	100%
Creatine Effervescent 6	1.5 grams	3.9	100%
Creatine Fruit Drink mix 1	1.5 grams	3.4	100%
Creatine Fruit Drink mix 2	1.5 grams	3.4	100%

Creatine Fruit Drink mix 3	1.5 grams	3.3	100%
Creatine Fruit Drink mix 4	1.5 grams	3.5	100%
Creatine Fruit Drink mix 5	1.5 grams	3.4	100%
Creatine Fruit Drink mix 6	1.5 grams	3.4	100%
Kre-Alkalyn Lot#3311101	1.5 grams	9.0	0%
Kre-Alkalyn Lot#3311102	1.5 grams	9.0	0%
Kre-Alkalyn Lot#3311103	1.5 grams	9.0	0%
Kre-Alkalyn Lot#3311201	1.5 grams	9.0	0%
Kre-Alkalyn Lot#3311102	1.5 grams	9.0	0%
Kre-Alkalyn Lot#3311103	1.5 grams	9.0	0%

1). NIR Analysis of stomach:

*1.5 grams of creatine monohydrate mixed with water and added to stomacher at pH 3, raised stomach pH level to 3.5, with remainder of creatine being converted to creatinine.

*1.5 grams of effervescent creatine mixed with water and added to stomacher at pH 3, raised stomach pH level to 3.9, with remainder of creatine being converted to creatinine.

*1.5 grams of creatine fruit flavored powder mixed with water and added to stomacher at pH 3, raised stomach pH level to pH 3.4, with remainder of creatine being converted to creatinine.

*1.5 grams of Kre-Alkalyn^R mixed with water and added to stomacher at pH 3, buffered stomach pH level to 9, keeping buffer creatine stable with ample time for absorption, with no conversion to creatinine.

Conclusions:

Eighteen Name brand creatine products were activated and digested. All eighteen converted 100% creatinine. Since there was no creatine left in these products, no creatine would be absorbed into the blood stream, only creatinine.

Six Kre-Alkalyn lots were activated and digested with 0% conversion to creatinine. All creatine remained intact and would be absorbed into the blood stream.

Test performed by Charles Burchell, PHD.