



# U.S. Department of Health & Human Services

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**Food and Drug Administration**

## SAVE REQUEST

**USER:** (cwf)  
**FOLDER:** K925794 - 62 pages  
**COMPANY:** TRACE AMERICA, INC. (TRACAMER)  
**PRODUCT:** TURBIDIMETRIC, TOTAL PROTEIN (JGQ)  
**SUMMARY:** Product: TRACE MICROPROTEIN REAGENT

**DATE REQUESTED:** Aug 26, 2016

**DATE PRINTED:** Aug 26, 2016

**Note:** Printed



DO NOT REMOVE THIS ROUTE SLIP!!!!

K-92-5794

2/18/93

<b>FROM:</b> TRACE AMERICA INC. ATTN: DAVID JOHNSTON 7260 NORTH WEST 58TH STREET  MIAMI, FL 33166  SHORT NAME: TRACAMER		LETTER DATE 11/13/92	LOGIN DATE 11/16/92	DUE DATE 05/18/93
		TYPE OF DOCUMENT 510 (k)	CONTROL # K925794	
		PHONE NO: 305-592-8221 ESTABLISHMENT NO: 8020041		
<b>TO:</b> ODE/DMC	CONT. CONF.: ? STATUS : R REV PANEL : CH PAN/PROD CODE(S): CH/	JGQ MAR 29 1993		FA
<b>SUBJECT:</b> TRACE MICROPROTEIN REAGENT				
DECISION: DECISION DATE: / /	RQST INFO DATE: 12/09/92 DATE: 01/27/93 DATE: / / DATE: / / DATE: / / DATE: / /	INFO DUE DATE: 01/08/93 DATE: 02/26/93 DATE: / / DATE: / / DATE: / / DATE: / /	CLCB	

*CLASS II*

SUPPLEMENT: 01  
 SUPPLEMENT: 02

LTR DATE: 930119  
 LTR DATE: 930204

LOGIN DATE: 930119  
 LOGIN DATE: 930217



MAR 29 1993

Food and Drug Administration  
1390 Piccard Drive  
Rockville MD 20850Mr. Peter Murphy  
Technical Manager  
Trace America Incorporated  
7260 North West 58th Street  
Miami, FL 33166Re: K925794/B  
Product: TRACE MICROPROTEIN REAGENT  
Dated: February 4, 1993  
Received: February 17, 1993  
Regulatory Class: II

Dear Mr. Murphy:

We have reviewed your Section 510(k) notification of intent to market the device referenced above and we have determined the device is substantially equivalent to devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments. You may, therefore, market the device, subject to the general controls provisions of the Federal Food, Drug, and Cosmetic Act (Act). The general controls provisions of the Act include requirements for registration, listing of devices, good manufacturing practice, and labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (Premarket Approval), it may be subject to such additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 895. In addition, the Food and Drug Administration (FDA) may publish further announcements concerning your device in the Federal Register. Please note: this response to your premarket notification submission does not affect any obligation you might have under the Radiation Control for Health and Safety Act of 1968, or other Federal Laws or regulations.

This letter immediately will allow you to begin marketing your device as described. An FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and permits your device to proceed to the market, but it does not mean that FDA approves your device. Therefore, you may not promote or in any way represent your device or its labeling as being approved by FDA. If you desire specific advice on the labeling for your device, please contact the Division of Compliance Operations, Device Labeling Compliance Branch (HFZ-326) at (301) 427-1342. Other general information on your responsibilities under the Act, may be obtained from the Division of Small Manufacturers Assistance at their toll free number (800) 638-2041 or at (301) 443-6597.

Sincerely yours,

Thomas M. Tsakeris  
Director  
Division of Clinical Laboratory Devices  
Office of Device Evaluation  
Center for Devices and Radiological Health

DO NOT REMOVE THIS ROUTE SLIP!!!!

K-92-5794

1/21/93

<b>FROM:</b> TRACE AMERICA INC. ATTN: DAVID JOHNSTON 7260 NORTH WEST 58TH STREET MIAMI, FL 33166 SHORT NAME: TRACAMER		LETTER DATE 11/13/92	LOGIN DATE 11/16/92	DUE DATE 04/19/93	
		TYPE OF DOCUMENT: 510 (k)		CONTROL # K925794	
		PHONE NO: 305-592-8221 ESTABLISHMENT NO: 8020041			
<b>TO:</b> ODE/DMC <i>DMC 01-27-93 Hold</i>		CONT. CONF.: ? STATUS : R REV PANEL : CH PAN/PROD CODE(S): CH / /			
<b>SUBJECT:</b> TRACE MICROPROTEIN REAGENT					
DECISION: DECISION DATE: / /		RQST INFO DATE: 12/09/92 DATE: / / DATE: / / DATE: / / DATE: / / DATE: / /			INFO DUE DATE: 01/08/93 DATE: / / DATE: / / DATE: / / DATE: / / DATE: / /

*Class 2*

SUPPLEMENT: 01

LTR DATE: 930119

LOGIN DATE: 930119

*OK Hold*

DO NOT REMOVE THIS ROUTE SLIP!!!!

K-92-5794

11/19/92

FROM: TRACE AMERICA INC. ATTN: DAVID JOHNSTON 7260 NORTH WEST 58TH STREET  MIAMI, FL 33166  SHORT NAME: TRACAMER		LETTER DATE 11/13/92	LOGIN DATE 11/16/92	DUE DATE 02/14/93
		TYPE OF DOCUMENT: 510 (k)		CONTROL # K925794
		PHONE NO: 305-592-8221 ESTABLISHMENT NO: 8020041		
TO: ODE/DMC <i>Dmc 12-09-92 Hold</i>	CONT. CONF.: ? STATUS : R REV PANEL : CH <i>12/24</i> PAN/PROD CODE(S): CH / /			
SUBJECT: TRACE MICROPROTEIN REAGENT				
DECISION: DECISION DATE: / /	RQST INFO DATE: / / DATE: / / DATE: / / DATE: / / DATE: / / DATE: / /	INFO DUE DATE: / / DATE: / / DATE: / / DATE: / / DATE: / / DATE: / /		

*7*  
*CLAS 77*

*92-5794*  
*11-19-92*

*3*



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Memorandum

3-17-93

Date

From

REVIEWER(S) - NAME(S)

Jheresa P. Nelson

Subject

510(k) NOTIFICATION

K 925794/B

To

THE RECORD

It is my recommendation that the subject 510(k) Notification:

- (A) Is substantially equivalent to marketed devices.
- (B) Requires premarket approval. NOT substantially equivalent to marketed devices.
- (C) Requires more data.
- (D) Other (e.g., exempt by regulation, not a device, duplicate, etc.)

Additional Comments: Trace America, Inc. Micro Protein reagent for use in the quantitative determination of protein in urine for manual/automated systems. Turbidimetric method/Benzethonium Chloride. Is this device subject to Postmarket Surveillance? Yes  No

This 510(k) contains: (check appropriate box(es)) SEto Turbidimetric, Total Protein

- A 510(k) summary of safety and effectiveness, or
- A 510(k) statement that safety and effectiveness information will be made available
- The required certification and summary for class III devices

The submitter requests under 21 CFR 807.95:\*

Predicate Product Code w/panel and class:

- No Confidentiality
- Confidentiality for 90 days
- Continued Confidentiality exceeding 90 days

II / 75 / JGQ  
Additional Product Code(s) w/Panel (optional):

REVIEW:

(BRANCH CHIEF)

Crooks

CICR  
BRANCH CODE

3/23/93  
(DATE)

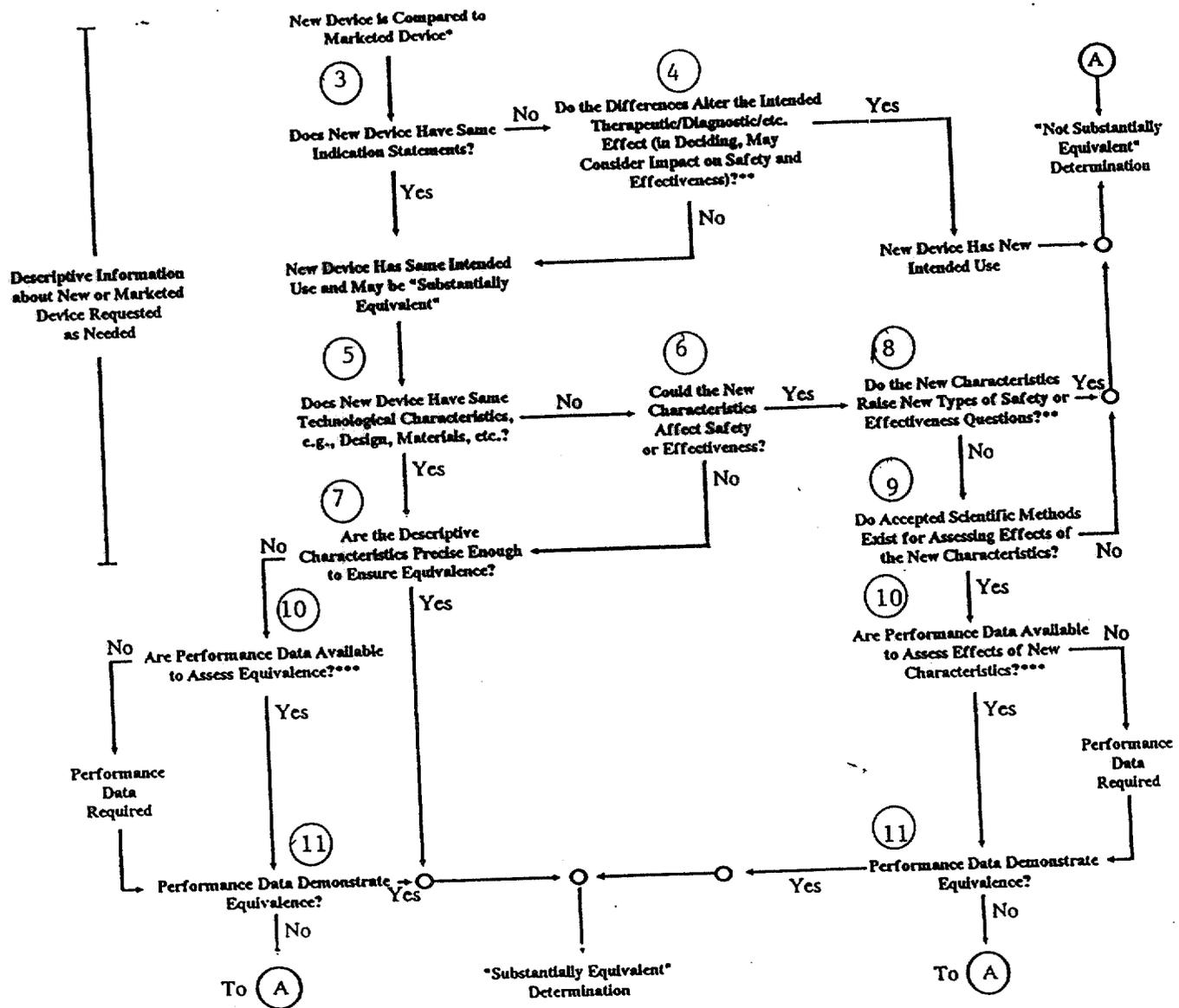
FINAL REVIEW:

(DIVISION DIRECTOR)

Handwritten signature

3/26/93  
(DATE)

## 510(k) "SUBSTANTIAL EQUIVALENCE" DECISION-MAKING PROCESS (DETAILED)



- \* 510(k) submissions compare new devices to marketed devices. FDA requests additional information if the relationship between marketed and "predicate" (pre-Amendments or reclassified post-Amendments) devices is unclear.
- \*\* This decision is normally based on descriptive information alone, but limited testing information is sometimes required.
- \*\*\* Data may be in the 510(k), other 510(k)s, the Center's classification files, or the literature.

K 925794

"SUBSTANTIAL EQUIVALENCE" (SE) DECISION MAKING DOCUMENTATION  
Records processed under FOIA Request #2016-1895 Released by CDRH on 8/30/2016

REVIEWER: Theresa Wilson DIVISION/BRANCH: DCLD/CICB

TRADE NAME: Trace Scientific Traceable Urinary Protein Reagent COMMON NAME: Protein

PRODUCT TO WHICH COMPARED: Dupont ACA Benzethonium Chloride Urinary Protein  
(510(k) NUMBER IF KNOWN)

YES | (NO)

- 1. IS PRODUCT A DEVICE?  YES  NO - IF NO STOP
- 2. DEVICE SUBJECT TO 510(k)?  YES  NO - IF NO STOP
- 3. SAME INDICATION STATEMENT?  YES  NO - IF YES GO TO 5
- 4. DO DIFFERENCES ALTER THE EFFECT OR RAISE NEW ISSUES OF SAFETY OR EFFECTIVENESS?  YES  NO - IF YES STOP - NE
- 5. SAME TECHNOLOGICAL CHARACTERISTICS?  YES  NO - IF YES GO TO 7
- 6. COULD THE NEW CHARACTERISTICS AFFECT SAFETY OR EFFECTIVENESS?  YES  NO - IF YES GO TO 8
- 7. DESCRIPTIVE CHARACTERISTICS PRECISE ENOUGH?  YES  NO - IF NO GO TO 10 - IF YES STOP - SE
- 8. NEW TYPES OF SAFETY OR EFFECTIVENESS QUESTIONS?  YES  NO - IF YES STOP - NE
- 9. ACCEPTED SCIENTIFIC METHODS EXIST?  YES  NO - IF NO STOP - NE
- 10. PERFORMANCE DATA AVAILABLE?  YES  NO - IF NO REQUEST DATA
- 11. DATA DEMONSTRATE EQUIVALENCE?  YES  NO

NOTE: IN ADDITION TO COMPLETING PAGE TWO, "YES" RESPONSES TO QUESTIONS 4, 6, 8, AND 11, AND EVERY "NO" RESPONSE REQUIRES AN EXPLANATION ON PAGE THREE AND/OR FOUR

**NARRATIVE DEVICE DESCRIPTION**

1. INTENDED USE: Trace America, Inc. Micro Protein reagent  
is intended for the quantitative determination of protein  
in urine, for manual and automated systems.

2. DEVICE DESCRIPTION: Provide a statement of how the device is either similar to and/or different from other marketed devices, plus data (if necessary) to support the statement. The following should be considered when preparing the summary of the statement. Is the device life-supporting or life sustaining? Is the device implanted (short-term or long-term)? Does the device design use software? Is the device sterile? Is the device for single use? Is the device for home use or prescription use? Does the device contain drug or biological product as a component? Is this device a kit? Provide a summary about the devices design, materials, physical properties and toxicology profile if important.

SUMMARY: The Trace America, Inc. Micro Protein kit  
is an IVD reagent composed of 100 mmol/L of  
Carbonated Buffer, 200 mmol/L of Sodium Chloride,  
33 mmol/L of EDTA in Reagent I and 20 g/L  
of Benzothonium Chloride in Reagent II. The  
Trace Micro Protein reagent is similar to  
other micro protein reagents currently marketed  
for the same intended use. QC and Calibration  
requirements are included in the PI.

1. EXPLAIN WHY NOT A DEVICE: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. EXPLAIN WHY NOT SUBJECT TO 510(k): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. HOW DOES THE NEW INDICATION DIFFER FROM THE PREDICATE DEVICE'S INDICATION: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. EXPLAIN WHY THERE IS OR IS NOT A NEW EFFECT OR SAFETY OR EFFECTIVENESS ISSUE: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. DESCRIBE THE NEW TECHNOLOGICAL CHARACTERISTICS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. EXPLAIN HOW NEW CHARACTERISTICS COULD OR COULD NOT AFFECT SAFETY OR EFFECTIVENESS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8

7. EXPLAIN HOW DESCRIPTIVE CHARACTERISTICS ARE NOT PRECISE ENOUGH

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. EXPLAIN NEW TYPES OF SAFETY OR EFFECTIVENESS QUESTIONS RAISED OR WHY THE QUESTIONS ARE NOT NEW:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. EXPLAIN WHY EXISTING SCIENTIFIC METHODS CAN NOT BE USED:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. EXPLAIN WHAT PERFORMANCE DATA IS NEEDED:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11. EXPLAIN HOW THE PERFORMANCE DATA DEMONSTRATES THAT THE DEVICE IS OR IS NOT SUBSTANTIALLY EQUIVALENT:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ATTACH ADDITIONAL SUPPORTING INFORMATION

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Food and Drug Administration  
Center for Devices and  
Radiological Health  
Office of Device Evaluation  
Document Mail Center (HFZ-401)  
1390 Piccard Drive  
Rockville, Maryland 20850

FEBRUARY 18, 1993

TRACE AMERICA INC.  
ATTN: DAVID JOHNSTON  
7260 NORTH WEST 58TH STREET  
MIAMI, FL 33166

510(k) Number: K925794  
Received: 02-17-93  
Product: TRACE MICROPROTEIN  
REAGENT

The additional information you have submitted has been received.

We will notify you when the processing of this submission has been completed or if any additional information is required. Please remember that all correspondence concerning your submission MUST be sent to the Document Mail Center (HFZ-401) at the above letterhead address. Correspondence sent to any address other than the one above will not be considered as part of your official premarket notification submission. Because of equipment and personnel limitations we cannot accept telefaxed material as part of your official premarket notification submission, unless specifically requested of you by an FDA official.

The Safe Medical Devices Act of 1990, signed on November 28, states that you may not place this device into commercial distribution until you receive a letter from FDA allowing you to do so. As in the past, we intend to complete our review as quickly as possible. Generally we do so within 90 days. However, the complexity of a submission or a requirement for additional information may occasionally cause the review to extend beyond 90 days. Thus, if you have not received a written decision or been contacted within 90 days of our receipt date you may want to check with FDA to determine the status of your submission.

If you have procedural or policy questions, please contact the Division of Small Manufacturers Assistance at (301) 443-6597 or at their toll-free number (800) 638-2041, or contact me at (301) 427-1190.

Sincerely yours,

Marjorie Shulman  
Supervisory Consumer Safety Officer  
Premarket Notification Section  
Office of Device Evaluation  
Center for Devices and  
Radiological Health

**TRACE**  
K925794/B  
**TRACE SCIENTIFIC** Pty. Ltd.  
A.C.N. 002 634 442

4th February, 1993

Incorporating:  
TRACE AMERICA Inc.  
CYTOSYSTEMS PTY. LTD.

Reviewing Officer  
Pre-Market Notification Section  
Food & Drug Administration  
Centre for Devices and Radiological Health  
Document Mail Centre HFZ-401  
1390 Piccard Drive  
ROCKVILLE, MARYLAND 20850  
U.S.A.

Dear Sir/Madam,

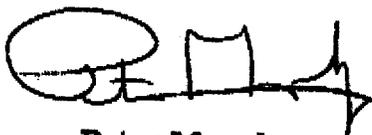
**RE: 510K NUMBER K925794 - TRACE MICROPROTEIN REAGENT**

Please find enclosed a revised Package Insert for the above mentioned product which incorporates your recommendations, mainly -

1. Reference numbers for clinical significance and hook affect.
2. Clarification of storage temperatures.
3. Clarification of reaction temperature, and
4. Separate Quality Control Section.

Thank you for your assistance with this application.

Your sincerely,



**Peter Murphy**  
**Technical Manager**

**HEAD OFFICE:**  
1860 Princes Highway  
Clayton, Victoria, 3168  
Australia  
Telephone (03) 543 1255  
Toll Free (008) 333 110

**POSTAL ADDRESS:**  
R&D Centre  
Clayton, Victoria, 3168

**MANUFACTURING:**  
1st Floor, 5/11 Packard Ave  
Clayton, Victoria, 3168  
Telephone (03) 544 8711  
Fax (03) 544 4404

**NEW SOUTH WALES:**  
5/11 Packard Ave  
Castle Hill, N.S.W. 2154  
Telephone (02) 899 1122  
Toll Free (008) 252 227

**QUEENSLAND:**  
1st Floor, 12 Swann Rd  
Taringa, Qld. 4068  
Telephone (07) 870 1922  
Fax (07) 870 1966

Questions: Contact FDA/CDRH/OCE/DID at (301) 594-5055 or STATUS@fda.hhs.gov or 800-738-8118

# MICROPROTEIN REAGENT

## BENZETHONIUM CHLORIDE METHOD

### INTENDED USE

This reagent is intended for the in vitro quantitative determination of protein in urine for both manual and automated systems.

### CLINICAL SIGNIFICANCE<sup>1,2</sup>

The role of the renal system in the conservation of plasma proteins has been recognised for some time. Under normal physiological conditions small molecular weight proteins such as insulin pass through the glomeruli in relatively large amounts. Intermediate size proteins such as Transferrin and Albumin also pass through but only in relatively small amounts. Most of these proteins are reabsorbed in the renal tubules such that normal urine contains less than 150 mg of protein per day. This also includes the protein of non serum origin normally secreted by the distal tubule (mucoprotein) and collecting ducts. Increased levels of urinary protein, (proteinuria) usually more than 0.15 g per 24 hours (150 mg/24 hours), almost always indicates disease.

Proteinuria may be classified as renal proteinuria or proteinuria with normal renal function. Renal proteinuria may be further classified as Glomerular or tubular proteinuria.

Glomerular proteinuria is due to increased glomerular permeability (nephrotic syndrome) and may be seen in glomerular nephritis or secondary to other diseases such as diabetic nephropathy. Albumin is usually the predominant protein in the urine. Tubular proteinuria may be due to renal tubular damage from any cause especially pyelonephritis. Tubular proteinuria results in modest increases in the low molecular weight proteins if glomerular permeability is normal. Proteinuria with normal renal function may be the result of physiological increases in protein excretion or the production of abnormally large amounts of low molecular weight proteins. Increased protein excretion is seen during normal pregnancy, after strenuous exercise or following prolonged maintenance of an upright posture. Increases in low molecular weight proteins may be due to the production of Bence Jones protein, haemoglobinuria as a result of severe haemolysis and myoglobinuria as a result of severe muscle damage.

### METHODOLOGY

Methods employed for the determination of total protein in urine include dye binding, chemical and turbidimetric procedures, the latter being the most commonly employed technique<sup>3</sup>. The popularity of the turbidimetric procedures can be attributed to the simplicity of use and increased sensitivity.

The Trace microprotein kit is a turbidimetric procedure in which benzethonium chloride is used as the protein denaturing agent. Proteins present in the urine are denatured by benzethonium chloride resulting in the formation of a fine suspension which is quantitated turbidimetrically at 405 nm. The reagent has been modified to overcome the problem of high concentration (Hook) effect, where very high concentrations of protein in urine can cause an apparent zero or low reading.<sup>4</sup>

### REAGENT COMPOSITION

Active Ingredients	Concentration
<b>Reagent 1</b>	
Carbonate Buffer	100 mmol/L
Sodium Chloride	200 mmol/L
EDTA	33 mmol/L
<b>Reagent 2</b>	
Benzethonium Chloride	20 g/L

Reagents also contain surfactants and stabilisers necessary for optimum reagent performance.

**WARNING:** Do not mouth pipette. If spilt, thoroughly wash affected areas with water. Reagent contains sodium azide (0.1% W/V) which may react with copper or lead plumbing. Flush with plenty of water when disposing. For further information, please consult the Trace Microprotein Material Safety Data Sheet.

### REAGENT PREPARATION

All reagents are supplied ready for use.

### STABILITY AND STORAGE

The two reagent components are stable until the expiry date shown on the label when stored refrigerated (2 - 8°C) or at room temperature (9 - 25°C).

### SPECIMEN COLLECTION AND HANDLING

Urine samples when stored at 4°C are stable for 2 - 3 days<sup>5</sup>. If it is expected that there will be some time delay in transporting the urine to the laboratory the use of a chemical preservative such as Merthiolate (0.24 mmol/L) is recommended.

**ADDITIONAL EQUIPMENT REQUIRED**

- The equipment required for this procedure is
- A manual or an automated spectrophotometer capable of measuring absorbance at 405 nm (405 - 415 nm)
  - Temperature stability
  - 1.0 cm cuvettes or flowcell
  - Timer if an automated instrument is not available
  - Accurate pipettes or automated dispenser for reagent and sample addition.

**PROCEDURE**

These instructions apply for manual instrumentation, but can be adapted to most automated instruments. Specific instructions are available upon request. (Refer to table 1.)

**SYSTEM PARAMETERS**

Temperature	Constant (see Note 2)
Wavelength	405 nm (405 - 415)
Absorbance Range	0 - 2 AU
Cuvette Path Length	1.0 cm
Reagent 1 Volume	1.5 mL
Sample Volume	0.04 mL
Reagent 2 Volume	0.3 mL
Incubation	5 minutes

1. Label a test tube or cuvette for a reagent blank, each standard, control and unknown specimen.
2. Add 1.5 mL of Reagent 1 to each tube.
3. Add 0.04 mL of H<sub>2</sub>O to the reagent blank tube and 0.04 mL of each standard, control and unknown specimen to the appropriately labeled tube.
4. Select a wavelength of 405 nm and zero the spectrophotometer with the reagent blank.
5. Measure and record the absorbance of each standard, control and unknown sample tube or cuvette (A1).
6. Add 0.3 mL of Reagent 2 to each tube or cuvette, mix and incubate for 5 minutes.
7. Zero the spectrophotometer at 405 nm with the reagent blank.
8. Measure and record the absorbance of each standard, control and unknown sample tube or cuvette (A2).

**TABLE 1**

	<u>REAGENT BLANK</u>	<u>STANDARD</u>	<u>TESTS</u>
Water	0.04 mL	—	—
Standard	—	0.04 mL	—
Sample	—	—	0.04 mL
Reagent 1	1.5 mL	1.5 mL	1.5 mL

Measure and record A1 absorbance

Reagent 2	0.3 mL	0.3 mL	0.3 mL
-----------	--------	--------	--------

Incubate for 5 minutes. Measure and record A2 absorbance

**CALCULATIONS**

Calculate the results as follows:

Final Absorbance = A2 - A1

Prepare a standard curve by plotting absorbance versus concentration of at least 5 standards ranging from 0.1 to 2.4g/L (100 to 2400 mg/L). (See Calibration Section)  
The protein concentration for controls and unknowns can be determined by locating the applicable absorbance value on the standard curve and reading the corresponding protein concentration.

**24 HOUR URINARY PROTEIN EXCRETION**

1. Measure and record the 24 hour urine volume in litres.
2. Determine the protein concentration in g/L or mg/L using the above procedure.
3. Multiply the protein concentration by the 24 hour urine volume. This value is the protein excretion/24 hours.

Example: 24 hour urine volume = 1.12 litres  
Urine protein concentration = 0.13 g/L or 130 mg/L  
24 hour urine protein excretion  
 $0.13 \times 1.12 = 0.146 \text{ g/24 hours}$   
 $130 \times 1.12 = 146 \text{ mg/24 hours.}$

**NOTES**

1. The reagent and sample volumes may be altered proportionally to accommodate different spectrophotometer requirements.
2. The temperature of the reaction is not critical, however, the temperature of the spectrophotometer should be held constant between room temperature and 37°C.
3. The final absorbance should be measured within 10 minutes
4. Unit conversion:  $\text{g/L} \times 1000 = \text{mg/L}$

**CALIBRATION**

Commercially available urine protein standards should be used for calibration purposes. Trace recommend that each run should be calibrated with at least 5 standards, referenced to NIST material and ranging in value from 0.1 to 2.4g/L (100 to 2400mg/L).

**QUALITY CONTROL**

To ensure adequate quality control, each run should also include a normal and abnormal urine control with assayed values handled as unknowns. It should be realised that the use of quality control checks both instrument and reagent functions together. Factors which might affect the performance of this test include proper instrument function, temperature control, cleanliness of glassware and accuracy of pipetting.

**LIMITATIONS**

1. No "hook" effect was observed with samples containing protein concentrations up to a level of 60 g/L<sup>6</sup>.
2. For a comprehensive review of factors affecting urine protein determination refer to the publication by Young<sup>7</sup>.

**EXPECTED VALUES**

Urinary excretion of protein is normally less than 0.15 g/24 hours (150 mg/24 hours). Values above this almost always indicates disease<sup>1</sup>.

It is recommended that each laboratory verify this value or derives a reference interval for the population that it serves.

**PERFORMANCE DATA**

The following data was obtained using the *Trace* microprotein reagent on an automated clinical chemistry analyser.

**IMPRECISION:**

Within Run	Level I	Level II	Level III
Number of Samples	20	20	20
Mean g/L	0.18	0.51	1.75
SD	0.009	0.024	0.03
CV%	5.0	4.7	1.7

Overall	Level I	Level II	Level III
Number of Samples	20	20	20
Mean g/L	0.18	0.51	1.76
SD	0.01	0.02	0.03
CV%	5.5	3.9	1.7

**ACCURACY:**

Comparison studies were carried out using another commercially available Benzethonium Chloride method as a reference. Normal and abnormal urine specimens were assayed in parallel and the results compared by least squares regression. The following statistics were obtained:-

Number of samples	63
Range of results (g/L)	0.08 to 1.41
Reference method mean (g/L)	0.42
Trace mean (g/L)	0.44
Slope	1.14
Intercept	-0.04
Correlation coefficient	0.992

**LINEARITY:**

When run as recommended the assay is linear to 2.0 g/L (2000 mg/L)

**SENSITIVITY:**

The reagent when run according to the recommended procedure is sensitive to a level of 0.05 g/L (50 mg/L).

**REFERENCES**

1. Zilva JF, Pannell PR. "Plasma Proteins and Immunoglobulins" in *Clinical Chemistry in Diagnosis and Treatment*. Lloyd-Luke 1979; Chap XIV:305-29.
2. First MR. "Renal Function" in *Clinical Chemistry theory, analysis and correlation*. Kaplan LA, Amadeo JP (Ed). CV Mosby Co. 1984; Chap 23:418.
3. Koller A. "Total Urine Protein" in *Clinical Chemistry theory, analysis and correlation* Kaplan LA, Amadeo JP (Ed). CV Mosby Co. 1984; Chap 60: 1319-20.
4. Watkins I, Jenkins L. *Clinical Chemistry* 1987; 33:2127-8.
5. Shephard MDS, Mazzachi RD. *The Clinical Biochemist* 1983; 4: 61-7.
6. Data on file with manufacturer.
7. Young DS. *Effects of Drugs on Clinical Laboratory Tests*. Third Edition 1990; 3: 296-300.

Date Started:.....

Lot Number:.....

Expiry Date:.....

**NOTES / EVALUATION RESULTS**

**For use with Trace Reagents:**

**Catalogue No**  
TR50001

**Size**  
1x125mL  
1x25mL

**ORDERS & TECHNICAL SUPPORT**

	<b>Phone</b>	<b>Facsimile</b>
Australia	(008) 333 110	(03) 543 6719
U.S.A.	(800) 872 2313	(308) 477 0256
International	61 3 543 1255	61 3 543 6719

Made in AUSTRALIA

**TRACE SCIENTIFIC Pty. Ltd.**  
10 Treforest Drive, Clayton  
Melbourne, VIC. 3168  
AUSTRALIA  
Phone: (03) 543 1255  
Fax: (03) 543 6719  
Telex: AA 154479

**TRACE AMERICA Inc**  
7260 N.W. 58th Street,  
Miami, FL, 33166  
U.S.A.  
Phone: (305) 592 8221  
Fax: (305) 477 0256  
Telex: 4974313 TRACEU

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Food and Drug Administration  
Center for Devices and  
Radiological Health  
Office of Device Evaluation  
Document Mail Center (HFZ-401)  
1390 Piccard Drive  
Rockville, Maryland 20850

JANUARY 28, 1993

TRACE AMERICA INC.  
ATTN: DAVID JOHNSTON  
7260 NORTH WEST 58TH STREET  
MIAMI, FL 33166

510(k) Number: K925794  
Product: TRACE MICROPROTEIN  
REAGENT

We are holding your above-referenced Premarket Notification (510(k)) for 30 days pending receipt of the additional information that was requested by the Office of Device Evaluation. Please remember that all correspondence concerning your submission MUST be sent in duplicate to the Document Mail Center (HFZ-401) at the above letterhead address. Correspondence sent to any address other than the one above will not be considered as part of your official premarket notification submission. Because of equipment and personnel limitations, we cannot accept telefax material as part of your official premarket notification submission unless specifically requested of you by an FDA official.

If after 30 days the requested information is not received, we will discontinue review of your submission and proceed to delete your file from our review system. Pursuant to 21 CFR 20.29, a copy of your 510(k) submission will remain in the Office of Device Evaluation. If you then wish to resubmit this 510(k) notification, a new number will be assigned and your submission will be considered a new premarket notification submission.

Please remember that the Safe Medical Devices Act of 1990 states that you may not place this device into commercial distribution until you receive a decision letter from FDA allowing you to do so.

If you have procedural or policy questions, please contact the Division of Small Manufacturers Assistance at (301) 443-6597 or at their toll-free number (800) 638-2041, or contact me at (301) 427-1190.

Sincerely yours,

Marjorie Shulman  
Supervisory Consumer Safety Officer  
Premarket Notification Section  
Office of Device Evaluation

DO NOT REMOVE THIS ROUTE SLIP!!!!

K-92-5794

1/28/93

<b>FROM:</b> TRACE AMERICA INC. ATTN: DAVID JOHNSTON 7260 NORTH WEST 58TH STREET  MIAMI, FL 33166  SHORT NAME: TRACAMER		<b>LETTER DATE</b> 11/13/92	<b>LOGIN DATE</b> 11/16/92	<b>DUE DATE</b> 04/19/93
		<b>TYPE OF DOCUMENT:</b> 510 (k)		<b>CONTROL #</b> K925794
		<b>PHONE NO:</b> 305-592-8221 <b>ESTABLISHMENT NO:</b> 8020041		
<b>TO:</b> ODE/DMC	<b>CONT. CONF.:</b> ? <b>STATUS:</b> H <b>REV PANEL:</b> CH <b>PAN/PROD CODE(S):</b> CH/ / /			
<b>SUBJECT:</b> TRACE MICROPROTEIN REAGENT				
<b>DECISION:</b> DECISION DATE: / /	<b>RQST INFO</b>	<b>DATE:</b> 12/09/92 DATE: 01/27/93 DATE: / / DATE: / / DATE: / / DATE: / /	<b>INFO DUE</b>	<b>DATE:</b> 01/08/93 DATE: 02/26/93 DATE: / / DATE: / / DATE: / / DATE: / /

SUPPLEMENT: 01

LTR DATE: 930119

LOGIN DATE: 930119



# Memorandum

Date

From

REVIEWER(S) - NAME(S)

*Theresa P. Wilson*

Subject

510(k) NOTIFICATION

*15925794/A*

To

THE RECORD

It is my recommendation that the subject 510(k) Notification:

(A) Is substantially equivalent to marketed devices.

(B) Requires premarket approval. NOT substantially equivalent to marketed devices.

*1-27-92* ✓

(C) Requires more data.

(D) Other (e.g., exempt by regulation, not a device, duplicate, etc.)

Additional Comments:

Is this device subject to Postmarket Surveillance? Yes  No

This 510(k) contains: (check appropriate box(es))

A 510(k) summary of safety and effectiveness, or

A 510(k) statement that safety and effectiveness information will be made available

The required certification and summary for class III devices

The submitter requests under 21 CFR 807.95:\*

No Confidentiality

Confidentiality for 90 days

Continued Confidentiality exceeding 90 days

Predicate Product Code w/panel and class:

*75 / JGQ/II*

Additional Product Code(s) w/Panel (optional):

REVIEW:

(BRANCH CHIEF)

*CLCB*  
BRANCH CODE

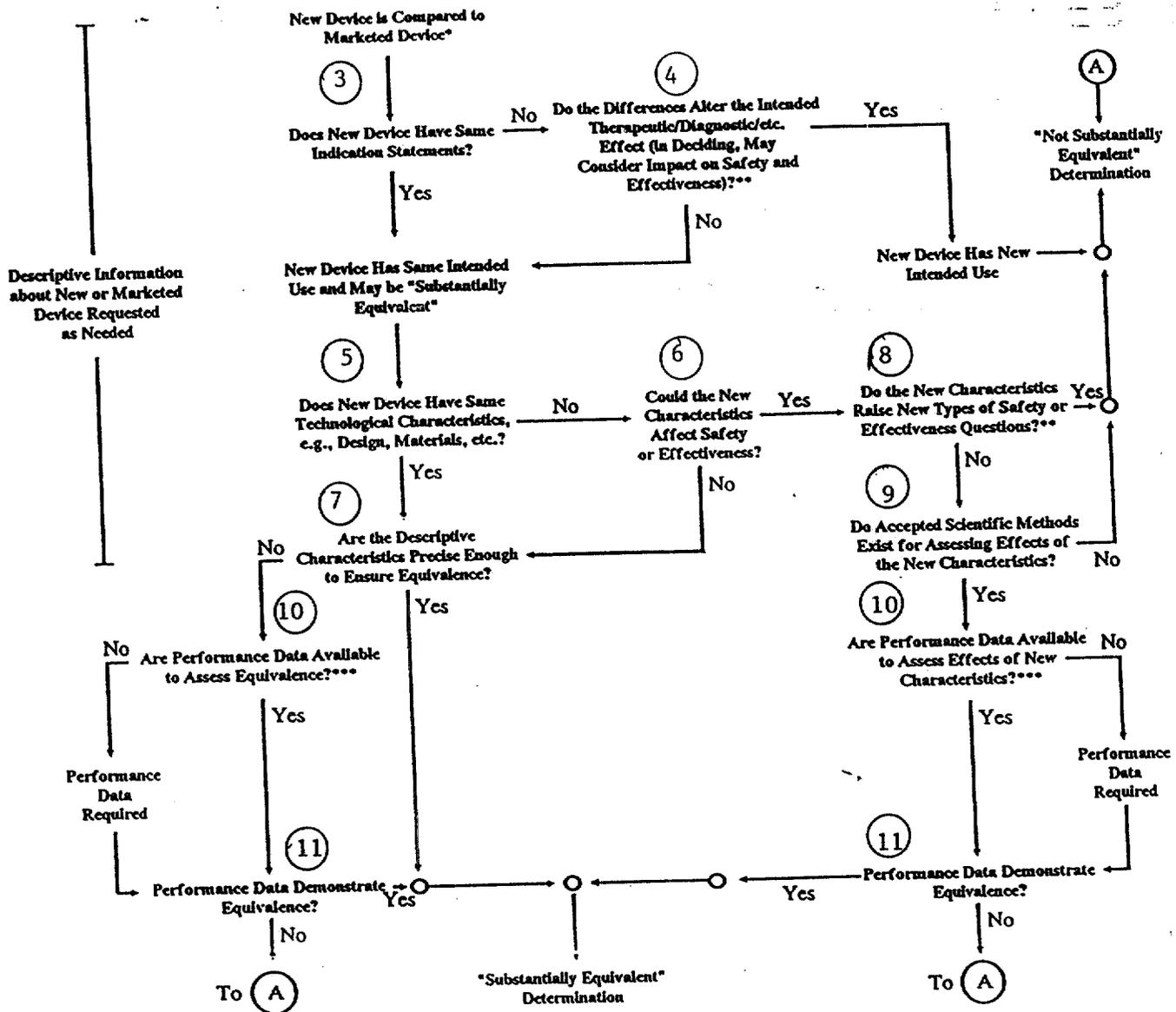
(DATE)

FINAL REVIEW:

(DIVISION DIRECTOR)

(DATE)

## 510(k) "SUBSTANTIAL EQUIVALENCE" DECISION-MAKING PROCESS (DETAILED)



- \* 510(k) submissions compare new devices to marketed devices. FDA requests additional information if the relationship between marketed and "predicate" (pre-Amendments or reclassified post-Amendments) devices is unclear.
- \*\* This decision is normally based on descriptive information alone, but limited testing information is sometimes required.
- \*\*\* Data may be in the 510(k), other 510(k)s, the Center's classification files, or the literature.

U: the record

Mr. David Johnston

DEW/CUCB

SUBJECT: (K) 925994 Trace Microprotein Reagent Trace Scientific

SUMMARY

I called Mr. Johnston to request the following additional information in order to continue the review of this submission.

- 1. 2nd request for temperature range at room temperature (2-25°C) is not room temperature.

SIGNATURE

Theresa P. Nelson

DOCUMENT NO.

(K)

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Food and Drug Administration  
Center for Devices and  
Radiological Health  
Office of Device Evaluation  
Document Mail Center (HFZ-401)  
1390 Piccard Drive  
Rockville, Maryland 20850

JANUARY 21, 1993

TRACE AMERICA INC.  
ATTN: DAVID JOHNSTON  
7260 NORTH WEST 58TH STREET  
MIAMI, FL 33166

510(k) Number: K925794  
Received: 01-19-93  
Product: TRACE MICROPROTEIN  
REAGENT

The additional information you have submitted has been received.

We will notify you when the processing of this submission has been completed or if any additional information is required. Please remember that all correspondence concerning your submission MUST be sent to the Document Mail Center (HFZ-401) at the above letterhead address. Correspondence sent to any address other than the one above will not be considered as part of your official premarket notification submission. Because of equipment and personnel limitations we cannot accept telefaxed material as part of your official premarket notification submission, unless specifically requested of you by an FDA official.

The Safe Medical Devices Act of 1990, signed on November 28, states that you may not place this device into commercial distribution until you receive a letter from FDA allowing you to do so. As in the past, we intend to complete our review as quickly as possible. Generally we do so within 90 days. However, the complexity of a submission or a requirement for additional information may occasionally cause the review to extend beyond 90 days. Thus, if you have not received a written decision or been contacted within 90 days of our receipt date you may want to check with FDA to determine the status of your submission.

If you have procedural or policy questions, please contact the Division of Small Manufacturers Assistance at (301) 443-6597 or at their toll-free number (800) 638-2041, or contact me at (301) 427-1190.

Sincerely yours,

Marjorie Shulman  
Supervisory Consumer Safety Officer  
Premarket Notification Section  
Office of Device Evaluation  
Center for Devices and  
Radiological Health

**TRACE**

high quality diagnostic reagents

**TRACE-AMERICA, INC.**  
A Trace Scientific Pty. Ltd. Subsidiary

enclosed is the update  
TRACE Package Insert  
for Micro Protein Reagent

SID(K) #: K925794 per  
your request!



1-800-872-2313

**TRACE**

K925794/A

# MICROPROTEIN REAGENT BENZETHONIUM CHLORIDE METHOD

## INTENDED USE

This reagent is intended for the in vitro quantitative determination of protein in urine for both manual and automated systems.

## CLINICAL SIGNIFICANCE<sup>1,2</sup>

The role of the renal system in the conservation of plasma proteins has been recognised for some time. Under normal physiological conditions small molecular weight proteins such as insulin pass through the glomeruli in relatively large amounts. Intermediate size proteins such as Transferrin and Albumin also pass through but only in relatively small amounts. Most of these proteins are reabsorbed in the renal tubules such that normal urine contains less than 150 mg of protein per day. This also includes the protein of non serum origin normally secreted by the distal tubule (muco protein) and collecting ducts. Increased levels of urinary protein, (proteinuria) usually more than 0.15 g per 24 hours (150 mg/24 hours), almost always indicates disease.

Proteinuria may be classified as renal proteinuria or proteinuria with normal renal function. Renal proteinuria may be further classified as Glomerular or tubular proteinuria.

Glomerular proteinuria is due to increased glomerular permeability (nephrotic syndrome) and may be seen in glomerular nephritis or secondary to other diseases such as diabetic nephropathy. Albumin is usually the predominant protein in the urine. Tubular proteinuria may be due to renal tubular damage from any cause especially pyelonephritis. Tubular proteinuria results in modest increases in the low molecular weight proteins if glomerular permeability is normal. Proteinuria with normal renal function may be the result of physiological increases in protein excretion or the production of abnormally large amounts of low molecular weight proteins. Increased protein excretion is seen during normal pregnancy, after strenuous exercise or following prolonged maintenance of an upright posture. Increases in low molecular weight proteins may be due to the production of Bence Jones protein, haemoglobinuria as a result of severe haemolysis and myoglobinuria as a result of severe muscle damage.

## METHODOLOGY

Methods employed for the determination of total protein in urine include dye binding, chemical and turbidimetric procedures, the latter being the most commonly employed technique<sup>3</sup>. The popularity of the turbidimetric procedures can be attributed to the simplicity of use and increased sensitivity.

The Trace microprotein kit is a turbidimetric procedure in which benzethonium chloride is used as the protein denaturing agent. Proteins present in the urine are denatured by benzethonium chloride resulting in the formation of a fine suspension which is quantitated turbidimetrically at 405 nm. The reagent has been modified to overcome the problem of high concentration (Hook) effect, where very high concentrations of protein in urine can cause an apparent zero or low reading.<sup>4</sup>

## REAGENT COMPOSITION

Active Ingredients	Concentration
<b>Reagent 1</b>	
Carbonate Buffer	100 mmol/L
Sodium Chloride	200 mmol/L
EDTA	33 mmol/L
<b>Reagent 2</b>	
Benzethonium Chloride	20 g/L

Reagents also contain surfactants and stabilisers necessary for optimum reagent performance.

**WARNING:** Do not mouth pipette. If split, thoroughly wash affected areas with water. Reagent contains sodium azide (0.1% W/V) which may react with copper or lead plumbing. Flush with plenty of water when disposing. For further information, please consult the Trace Microprotein Material Safety Data Sheet.

## REAGENT PREPARATION

All reagents are supplied ready for use.

## STABILITY AND STORAGE

The two reagent components are stable until the expiry date shown on the label when stored refrigerated (2 - 8°C) or at room temperature (2 - 25°C).

## SPECIMEN COLLECTION AND HANDLING

Urine samples when stored at 4°C are stable for 2 - 3 days<sup>5</sup>. If it is expected that there will be some time delay in transporting the urine to the laboratory the use of a chemical preservative such as Merthiolate (0.24 mmol/L) is recommended.

**ADDITIONAL EQUIPMENT REQUIRED**

- The equipment required for this procedure is
- A manual or an automated spectrophotometer capable of measuring absorbance at 405 nm (405 - 415 nm)
  - Temperature stability
  - 1.0 cm cuvettes or flowcell
  - Timer if an automated instrument is not available
  - Accurate pipettes or automated dispenser for reagent and sample addition.

**PROCEDURE**

These instructions apply for manual instrumentation, but can be adapted to most automated instruments. Specific instructions are available upon request. (Refer to table 1.)

**SYSTEM PARAMETERS**

Temperature	Constant (see Note 2)
Wavelength	405 nm (405 - 415)
Absorbance Range	0 - 2 AU
Cuvette Path Length	1.0 cm
Reagent 1 Volume	1.5 mL
Sample Volume	0.04 mL
Reagent 2 Volume	0.3 mL
Incubation	5 minutes

1. Label a test tube or cuvette for a reagent blank, each standard, control and unknown specimen.
2. Add 1.5 mL of Reagent 1 to each tube.
3. Add 0.04 mL of H<sub>2</sub>O to the reagent blank tube and 0.04 mL of each standard, control and unknown specimen to the appropriately labelled tube.
4. Select a wavelength of 405 nm and zero the spectrophotometer with the reagent blank.
5. Measure and record the absorbance of each standard, control and unknown sample tube or cuvette (A1).
6. Add 0.3 mL of Reagent 2 to each tube or cuvette, mix and incubate for 5 minutes.
7. Zero the spectrophotometer at 405 nm with the reagent blank.
8. Measure and record the absorbance of each standard, control and unknown sample tube or cuvette (A2).

**TABLE 1**

	<u>REAGENT BLANK</u>	<u>STANDARD</u>	<u>TESTS</u>
Water	0.04 mL	—	—
Standard	—	0.04 mL	—
Sample	—	—	0.04 mL
Reagent 1	1.5 mL	1.5 mL	1.5 mL

Measure and record A1 absorbance

Reagent 2	0.3 mL	0.3 mL	0.3 mL
-----------	--------	--------	--------

Incubate for 5 minutes. Measure and record A2 absorbance

**CALCULATIONS**

Calculate the results as follows:

Final Absorbance = A2 - A1

Prepare a standard curve by plotting absorbance versus concentration of at least 5 standards ranging from 0.1 to 2.4g/L (100 to 2400 mg/L). (See Calibration Section)  
The protein concentration for controls and unknowns can be determined by locating the applicable absorbance value on the standard curve and reading the corresponding protein concentration.

**24 HOUR URINARY PROTEIN EXCRETION**

1. Measure and record the 24 hour urine volume in litres.
2. Determine the protein concentration in g/L or mg/L using the above procedure.
3. Multiply the protein concentration by the 24 hour urine volume. This value is the protein excretion/24 hours.

Example: 24 hour urine volume = 1.12 litres  
Urine protein concentration = 0.13 g/L or 130 mg/L  
24 hour urine protein excretion  
0.13 x 1.12 = 0.146 g/24 hours  
130 x 1.12 = 146 mg/24 hours.

**NOTES \***

1. The reagent and sample volumes may be altered proportionally to accommodate different spectrophotometer requirements.
2. The temperature of the reaction is not critical, however, the temperature of the spectrophotometer should be held constant between room temperature and 37°C.
3. The final absorbance should be measured within 10 minutes
4. Unit conversion: g/L x 1000 = mg/L

**CALIBRATION**

Commercially available urine protein standards should be used for calibration purposes. Trace recommend that each run should be calibrated with at least 5 standards, referenced to NIST material and ranging in value from 0.1 to 2.4g/L (100 to 2400mg/L).

**QUALITY CONTROL**

To ensure adequate quality control, each run should also include a normal and abnormal urine control with assayed values handled as unknowns. It should be realised that the use of quality control checks both instrument and reagent functions together. Factors which might affect the performance of this test include proper instrument function, temperature control, cleanliness of glassware and accuracy of pipetting.

**LIMITATIONS**

1. No "hook" effect was observed with samples containing protein concentrations up to a level of 60 g/L<sup>6</sup>.
2. For a comprehensive review of factors affecting urine protein determination refer to the publication by Young<sup>7</sup>.

**EXPECTED VALUES**

Urinary excretion of protein is normally less than 0.15 g/24 hours (150 mg/24 hours). Values above this almost always indicates disease<sup>1</sup>.  
It is recommended that each laboratory verify this value or derives a reference interval for the population that it serves.

**PERFORMANCE DATA**

The following data was obtained using the Trace microprotein reagent on an automated clinical chemistry analyser.

**IMPRECISION:**

Within Run	Level I	Level II	Level III
Number of Samples	20	20	20
Mean g/L	0.18	0.51	1.76
SD	0.009	0.024	0.03
CV%	5.0	4.7	1.7

Overall	Level I	Level II	Level III
Number of Samples	20	20	20
Mean g/L	0.18	0.51	1.76
SD	0.01	0.02	0.03
CV%	5.5	3.9	1.7

**ACCURACY:**

Comparison studies were carried out using another commercially available Benzethonium Chloride method as a reference. Normal and abnormal urine specimens were assayed in parallel and the results compared by least squares regression. The following statistics were obtained:-

Number of samples	63
Range of results (g/L)	0.08 to 1.41
Reference method mean (g/L)	0.42
Trace mean (g/L)	0.44
Slope	1.14
Intercept	-0.04
Correlation coefficient	0.992

**LINEARITY:**

When run as recommended the assay is linear to 2.0 g/L (2000 mg/L)

**SENSITIVITY:**

The reagent when run according to the recommended procedure is sensitive to a level of 0.05 g/L (50 mg/L).

**REFERENCES**

1. Zilva JF, Pannall PR. "Plasma Proteins and Immunoglobulins" in Clinical Chemistry in Diagnosis and Treatment. Lloyd-Luke 1979; Chap XIV:305-29.
2. First MR. "Renal Function" in Clinical Chemistry theory, analysis and correlation. Kaplan LA, Amadeo JP (Ed). CV Mosby Co. 1984; Chap 23:418.
3. Koller A. "Total Urine Protein" in Clinical Chemistry theory, analysis and correlation Kaplan LA, Amadeo JP (Ed). CV Mosby Co. 1984; Chap 60: 1319-20.
4. Watkins I, Jenkins L. Clinical Chemistry 1987; 33:2127-8.
5. Shephard MDS, Mazzachi RD. The Clinical Biochemist 1983; 4: 61-7.
6. Data on file with manufacturer.
7. Young DS. Effects of Drugs on Clinical Laboratory Tests. Third Edition 1990; 3: 286-300.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Food and Drug Administration  
Center for Devices and  
Radiological Health  
Office of Device Evaluation  
Document Mail Center (DFZ-401)  
1390 Piccard Drive  
Rockville, Maryland 20850

DECEMBER 9, 1992

TRACE AMERICA INC.  
ATTN: DAVID JOHNSTON  
7260 NORTH WEST 58TH STREET  
MIAMI, FL 33166

510(k) Number: K925794  
Product: TRACE MICROPROTEIN  
REAGENT

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Please remember that the Safe Medical Devices Act of 1990 states that you may not place this device into commercial distribution until you receive a decision letter from FDA allowing you to do so.

If you have procedural or policy questions, please contact the Division of Small Manufacturers Assistance at (301) 443-6597 or at their toll-free number (800) 638-2041, or contact me at (301) 427-1190.

Chief, Safe Medical  
Devices Division  
Office of Device  
Evaluation  
Center for  
Devices and  
Radiological Health

DO NOT REMOVE THIS ROUTE SLIP!!!!

K-92-5794

12/9/92

<b>FROM:</b> TRACE AMERICA INC. ATTN: DAVID JOHNSTON 7260 NORTH WEST 58TH STREET  MIAMI, FL 33166  SHORT NAME: TRACAMER		LETTER DATE 11/13/92	LOGIN DATE 11/16/92	DUE DATE 02/14/93
		TYPE OF DOCUMENT: 510 (k)	CONTROL # K925794	
		PHONE NO: 305-592-8221 ESTABLISHMENT NO: 8020041		
<b>TO:</b> ODE/DMC	CONT. CONF.: ? STATUS : H REV PANEL : CH PAN/PROD CODE(S): CH/ / /			
<b>SUBJECT:</b> TRACE MICROPROTEIN REAGENT				
DECISION: DECISION DATE: / /	RQST INFO DATE: 12/09/92 DATE: / / DATE: / / DATE: / / DATE: / / DATE: / /	INFO DUE DATE: 01/08/93 DATE: / / DATE: / / DATE: / / DATE: / / DATE: / /		

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Memorandum

REVIEWER(S) - NAME(S) Theresa P. Wilson

510(k) NOTIFICATION K925799

THE RECORD

It is my recommendation that the subject 510(k) Notification:

- (A) Is substantially equivalent to marketed devices.
- (B) Requires premarket approval. NOT substantially equivalent to marketed devices.
- (C) Requires more data.
- (D) Other (e.g., exempt by regulation, not a device, duplicate, etc.)

Additional Comments:

Is this device subject to Postmarket Surveillance? Yes  No

This 510(k) contains: (check appropriate box(es))

- A 510(k) summary of safety and effectiveness, or
- A 510(k) statement that safety and effectiveness information will be made available
- The required certification and summary for class III devices

The submitter requests under 21 CFR 807.95:\*

- No Confidentiality
- Confidentiality for 90 days
- Continued Confidentiality exceeding 90 days

Predicate Product Code w/panel and class:

75/JGQ/II

Additional Product Code(s) w/Panel (optional):

REVIEW:

(BRANCH CHIEF)

CLCB  
BRANCH CODE

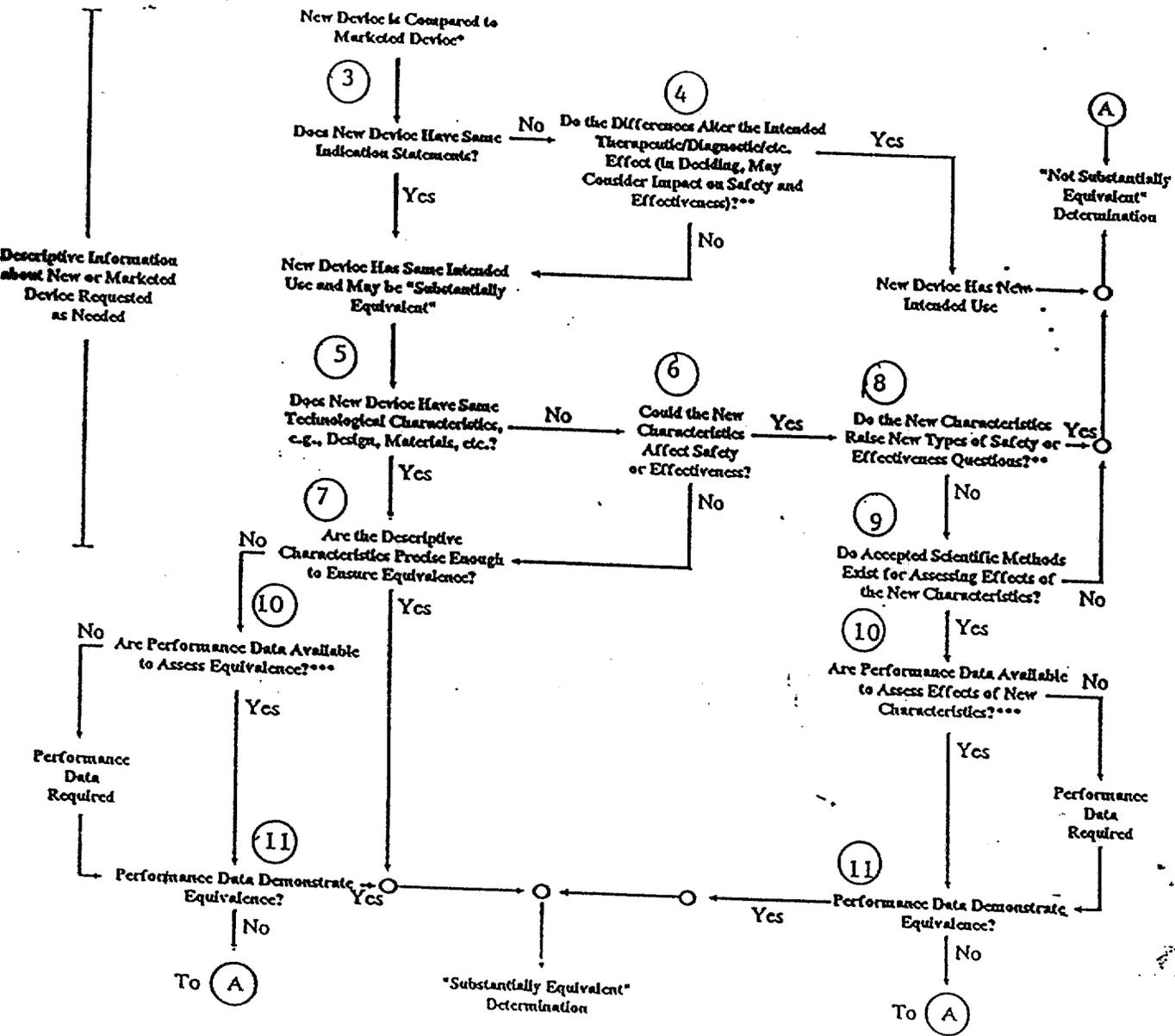
(DATE)

FINAL REVIEW:

(DIVISION DIRECTOR)

(DATE)

## 510(k) "SUBSTANTIAL EQUIVALENCE" DECISION-MAKING PROCESS (DETAILED)



510(k) submissions compare new devices to marketed devices. FDA requests additional information if the relationship between marketed and "predicate" (pre-Amendments or reclassified post-Amendments) devices is unclear.

This decision is normally based on descriptive information alone, but limited testing information is sometimes required.

Data may be in the 510(k), other 510(k)s, the Center's classification files, or the literature.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Food and Drug Administration  
Center for Devices and  
Radiological Health  
Office of Device Evaluation  
Document Mail Center (HFZ-401)  
1390 Piccard Drive  
Rockville, Maryland 20850

NOVEMBER 19, 1992

TRACE AMERICA INC.  
ATTN: DAVID JOHNSTON  
7260 NORTH WEST 58TH STREET  
MIAMI, FL 33166

510(k) Number: K925794  
Received: 11-16-92  
Product: TRACE MICROPROTEIN  
REAGENT

We have received the Premarket Notification you submitted in accordance with Section 510(k) of the Federal Food, Drug, and Cosmetic Act (Act) for the above referenced product. We have assigned your submission a unique 510(k) number that is cited above. Please refer prominently to this 510(k) number in any future correspondence that relates to this submission. We will notify you when the processing of your premarket notification has been completed or if any additional information is required.

The Safe Medical Devices Act of 1990 (SMDA), signed on November 28, states that you may not place this device into commercial distribution until you receive a letter from FDA allowing you to do so. As in the past, we intend to complete our review as quickly as possible. Generally we do so within 90 days. However, the complexity of a submission or a requirement for additional information may occasionally cause the review to extend beyond 90 days. Thus, if you have not received a written decision or been contacted within 90 days of our receipt date, you may want to check with FDA to determine the status of your submission.

In addition, the SMDA requires all persons submitting a premarket notification submission to include either (1) a summary of the safety and effectiveness information in the premarket notification submission upon which an equivalence determination could be based (510(k) summary), OR (2) a statement that safety and effectiveness information will be made available to interested persons upon request (510(k) statement). Safety and effectiveness information refers to information in the premarket notification submission, including adverse safety and effectiveness information, that is relevant to an assessment of substantial equivalence. The information could be descriptive information about the new and predicate device(s), or performance or clinical testing information. We cannot issue a final decision on your 510(k) unless you comply with this requirement.

Although FDA acknowledges that the law provides the 510(k) submitter an alternative, FDA encourages manufacturers to provide a 510(k) statement to FDA and to make their safety and effectiveness information available to the public, excluding confidential manufacturing process information, in lieu of submitting a 510(k) summary to the agency until FDA promulgates a regulation on the content and format of 510(k) summaries. Since the law

requires that FDA must make the 510(k) summary, or the source of information referred to in the 510(k) statement, publicly available within 30 days of making a substantial equivalence determination, we advise you that we may no longer honor any request for extended confidentiality under 21 CFR 807.95.

Additionally, the new legislation also requires any person who asserts that a device is substantially equivalent to a class III device to (1) certify that he or she has conducted a reasonable search of all information known, or otherwise available, about the generic type of device, AND (2) provide a summary description of the types of safety and effectiveness problems associated with the type of device and a citation to the literature, or other sources of information, upon which they have based the description (class III summary and certification). The description should be sufficiently comprehensive to demonstrate that an applicant is fully aware of the types of problems to which the device is susceptible. If you have not provided this class III summary and certification in your premarket notification, please provide it as soon as possible. We cannot complete the review of your submission until you do so.

Furthermore, the new legislation, section 522(a)(1), of the Act, states that if your device is a permanent implant the failure of which may cause death, you may be subject to required postmarket surveillance. If the premarket notification for your device was originally received on or after November 8, 1991, is subsequently found to be substantially equivalent to an Aneurysm Clip, Annuloplasty Ring, Artificial Embolization Device, Automatic Implanted Cardioverter Defibrillator System, Cardiovascular Intravascular Filter, Cardiovascular Permanent Pacemaker Electrode (Lead), Central Nervous System Fluid Shunt, Coronary Vascular Stent, Implantable Pacemaker Pulse Generator, Implanted Diaphragmatic/Phrenic Nerve Stimulator, Intracardiac Patch or Pledget, Intravascular Occluding Catheter, Replacement Heart Valve, Total Artificial Heart, Tracheal Prosthesis, Vascular Graft Prosthesis (less than 6 mm diameter), Vascular Graft Prosthesis (6 mm or greater diameter), Vena Cava Clip, or Ventricular Assist Device - Implant, you will be subject to the required postmarket surveillance and so notified of this determination in your substantially equivalent letter. (Some of the above listed types of devices may require a premarket approval application). This list is subject to change without notification. If you have any questions as to whether or not your device may be subject to postmarket surveillance or about this program, please contact the Postmarket Surveillance Studies Branch at (301) 227-8639.

Please note that the SMDA may have additional requirements affecting your device. You will be informed of these requirements as they become effective.

Please remember that all correspondence concerning your submission MUST be sent to the Document Mail Center (HFZ-401) at the above letterhead address. Correspondence sent to any address other than the Document Mail Center will not be considered as part of your official premarket notification submission. Because of equipment and personnel limitations we cannot accept telefaxed material as part of your official premarket notification submission, unless specifically requested of you by an FDA official.

If you have procedural or policy questions, please contact the Division of Small Manufacturers Assistance at (301) 443-6597 or their toll-free number (800) 638-2041, or contact me at (301) 427-1190.

Sincerely yours,

Marjorie Shulman  
Supervisory Consumer Safety Officer  
Premarket Notification Section  
Office of Device Evaluation  
Center for Devices and  
Radiological Health

U: the record

SUBJECT: (K) 925794 Trace Microprotein Reagent Trace Scientific

SUMMARY

12-9-92

I called Mr. Murphy to request the following additional information in order to continue the review of this submission. Mr. Murphy was not in. I spoke to Mr. David Johnston

1-28-92  
2nd request  
needed  
1-27-92  
need

1. Where does the information presented in the clinical significance section of the PI come from. Reference this information.

2. Stability and Storage section: Room temperature range given as (2°-25°C). Is this the correct range? 2°C is not room temperature.

3. Procedure section: Include incubation temperature requirement

4. Calibration section: Describe the number of standards used and range of concentration. Frequency of calibration. Recommend protein standards which have been referenced against NIST reference material.

6. Include a separate Quality Control section: Include the frequency of use of controls at the normal and abnormal levels. Other QC information in the QC section may be included

7. When adapting this reagent to specific automated systems, the firm will be required to submit the specific instrument application through the 510(k) process. Must include appropriate data for use with the specific instrument, parameters for operation, calibration and QC recommendations and requirements.

8. Send 2 copies of the revised PI when all changes have been made.

SIGNATURE

Theresa P. Wilson

DOCUMENT NO.

(K) 925794

Mr. Johnston said that he would send the information via DMC to me.

6925794

**TRACE SCIENTIFIC PTY. LTD.  
Melbourne, Australia**

**MICROPROTEIN REAGENT**

**510 (K) NOTIFICATION**

**USA FOOD & DRUG ADMINISTRATION**

**November, 1992.**



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**TRACE**

13th November, 1992

TRACE SCIENTIFIC Pty. Ltd.  
N.S.W. 2154

Food & Drug Administration  
Centre for Devices and Radiological Health  
Document Mail Centre HFZ-401  
1390 Piccard Drive  
ROCKVILLE, MARYLAND 20850  
U.S.A.

Incorporated  
TRACE AMERICA Inc.  
CYTOSYSTEMS PTY. LTD.

RECEIVED  
16 NOV 92 09 48  
FOIA REQUEST OPENING

Dear Sir/Madam,

**RE: 510 (K) NOTIFICATION FOR INVITRO DIAGNOSTIC DEVICE**

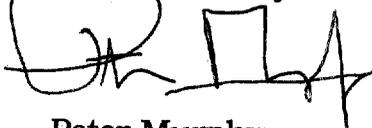
In accordance with Section 510 (K) of the Federal Food, Drug and Cosmetic Act, this premarket notification is being submitted at least 90 days to the date when Trace Scientific Pty. Ltd. proposes to manufacture and introduce into interstate commerce for commercial distribution a reagent kit for the invitro determination of protein in human urine (microprotein).

The following information is being submitted in conformance with 21CFR807.87 and Trace Scientific understands that submission of false information to the United States Government is prohibited by 18USC1001 and 21USC331(q).

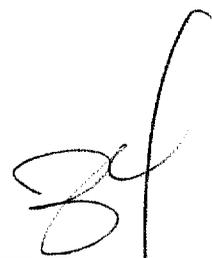
If any further information is required regarding this application, please do not hesitate to contact myself or -

Mr. David Johnston  
Trace America Inc.  
7260 North West 58th Street  
MIAMI, FLORIDA. 33166. U.S.A.  
Telephone No: (305) 592 8221  
Fax No: (305) 477 0256

Yours faithfully,



**Peter Murphy,**  
**TECHNICAL MANAGER**



HEAD OFFICE:  
1860 Princes Highway  
Clayton, Victoria. 3168  
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POSTAL ADDRESS:  
P.O. Box 310  
Clayton,  
Victoria. 3168

MANUFACTURING:  
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Clayton, Victoria. 3168  
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NEW SOUTH WALES:  
5/11 Packard Ave  
Castle Hill, N.S.W. 2154  
Telephone (02) 899 1122  
Toll Free (008) 252 327  
Fax (02) 899 1260

QUEENSLAND:  
1st Floor, 12 Swann Rd  
Taringa, Qld. 4068  
Telephone (07) 870 1922  
Fax (07) 870 1966

Questions? Contact FDA/CDRH/OCE/DID at CDRH-FOI@STATUS.fda.hhs.gov or 800-538-8118

## **TRACE SCIENTIFIC 510 (K) NOTIFICATION**

**TRACE SCIENTIFIC PTY. LTD.  
10 TREForest DRIVE  
CLAYTON. VICTORIA. AUSTRALIA.**

### **2. MICROPROTEIN - 510 (K) NOTIFICATION**

#### **2.1 Device Name**

Proprietary Name: Trace Microprotein Reagent

Common/Usual Name: Urinary Protein Reagent

#### **2.2 Establishment Registration Number**

802 0041

#### **2.3 Labels, Package Insert and Advertisements**

See Section 3. for copies of package insert, box labels and vial labels. Advertisements will be based upon information contained within the package insert. A historical record of all documents will be maintained by David Johnston at Trace America Inc.

#### **2.4 Substantial Equivalence**

There are a number of procedures currently available for the determination of total protein in urine mainly, dye binding methods, chemical and turbidimetric procedures, the latter being the most commonly employed technique.

Turbidimetric procedures currently available employ a range of protein denaturing agents such as sulfosalicylic acid (SSA), Trichloroacetic Acid (TCA) and Benzethonium Chloride (BZC). Protein in the sample is denatured by the "denaturing agent" present in the reagent producing a fine suspension which is quantitated turbidimetrically.

## **TRACE SCIENTIFIC 510 (K) NOTIFICATION**

The Trace Microprotein method is similar to other urinary protein methods which utilise Benzethonium Chloride as the protein denaturing agent. Protein in the urine is denatured by Benzethonium Chloride, resulting in a fine suspension, the absorbance of which is measured at 405 nm (405-415) on a manual spectrophotometer or automated clinical chemistry analyser. The change in absorbance produced by the turbidity is proportional to the concentration of protein present in the sample.

For comparative purposes labelling from Boehringer Mannheim and DuPont Urinary Protein kits are included in Section 5. of this 510 (k) notification.

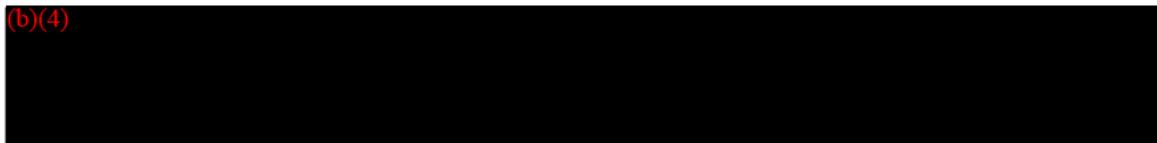
### **2.5 Summary of Performance Data**

#### **2.5.1 Accuracy**

Correlation studies were carried out with the Trace Microprotein reagent and the DuPont method for the ACA discrete clinical analyser. The following results were obtained on human urine specimens:

<u>Test</u>	<u>Sample Size</u>	<u>Range g/L</u>	<u>Correlation Coefficient</u>	<u>Linear Regression</u>
-------------	--------------------	------------------	--------------------------------	--------------------------

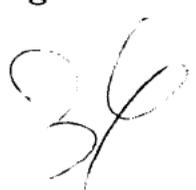
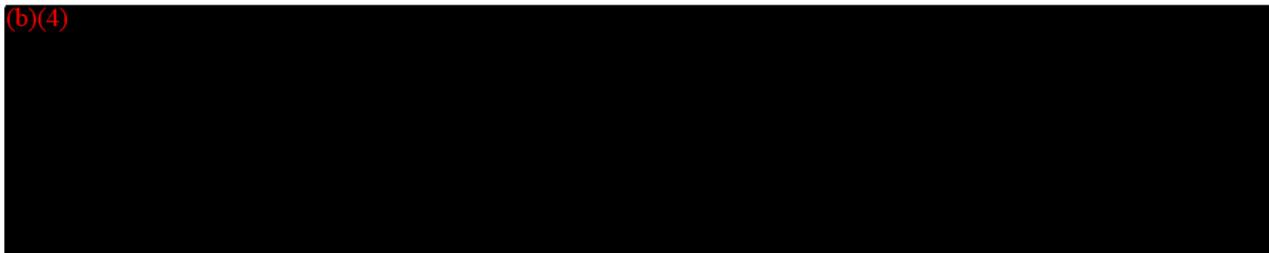
(b)(4)



#### **2.5.2 Imprecision**

The intrabatch and overall imprecision studies were carried out using the Trace Microprotein reagent on a Cobas Bio Analyser.

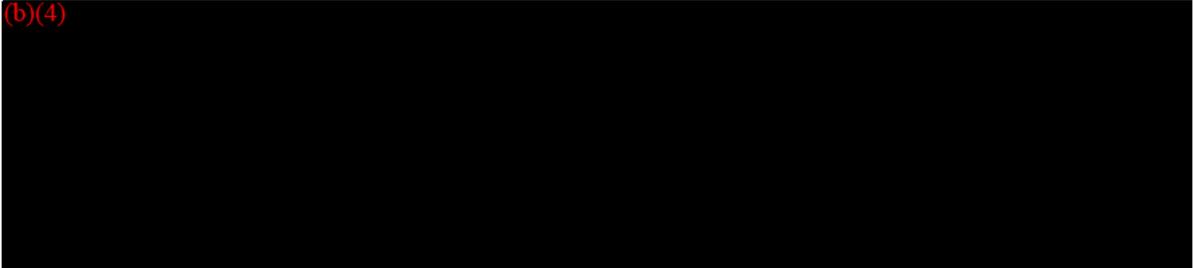
(b)(4)



## **TRACE SCIENTIFIC 510 (K) NOTIFICATION**

Overall imprecision was also carried out using the Trace Microprotein reagent on a Cobas Bio Analyser.

(b)(4)



### **2.5.3 Linearity**

Linearity studies were carried out on a Cobas Bio. Data is on hand showing that the assay is linear to [REDACTED] (b)(4) when the recommended procedure is followed.

### **2.5.4 Sensitivity**

The reagent when run according to the recommended procedure is sensitive to a level of (b)(4).

### **2.5.5 Stability**

The reagents are stable when stored at (b)(4) for at least 18 months.

39

**TRACE SCIENTIFIC 510 (K) NOTIFICATION**

**3. LABELLING**

**3.1 Box Label**

The following label will be placed on the outside of the Trace Microprotein kit box.

**TRACE**

Reagent for

**MICROPROTEIN**

(**BENZETHONIUM CHLORIDE**)

P/N: TR50001

1x125mL REAGENT 1

1x 25mL REAGENT 2

MANUFACTURED BY  
TRACE SCIENTIFIC PTY. LTD  
MELBOURNE, AUSTRALIA

FOR *IN VITRO*  
DIAGNOSTIC USE ONLY  
STORE: 2-25°C

SEE PACKAGE INSERT  
FOR DIRECTIONS

**ACTIVE INGREDIENTS**

Carbonate Buffer ... 100 mmol/L  
Sodium Chloride ... 200 mmol/L  
EDTA ..... 33 mmol/L  
**Benzethonium  
Chloride** ..... 20 g/l

LOT No.: 12345

EXP DATE: DEC 94

**WARNING:**

Avoid contact with skin and eyes. If spilt flush with plenty of water. Do not ingest.

**TRACE SCIENTIFIC 510 (K) NOTIFICATION**

**3.2 Bottle Labels**

The reagent bottles will carry the following labels respectively.

**TRACE**  
**MICROPROTEIN REAGENT** FOR *IN VITRO*  
(REAGENT 1) DIAGNOSTIC  
USE  
*See package insert for directions*  
CAT No. 50001 STORE: 2-25°C  
CONTENTS LOT No  
125 mL EXP. DATE:  
MANUFACTURED IN AUSTRALIA BY  
**TRACE SCIENTIFIC PTY. LTD.** L1500140 RB92

**TRACE** MICROPROTEIN  
REAGENT  
(REAGENT 2)  
*See package insert for directions*  
CAT No. 50001 STORE: 2-25°C  
CONTENTS 25mL For In Vitro Diagnostic use only.  
MANUFACTURED IN AUSTRALIA BY  
**TRACE SCIENTIFIC PTY. LTD.** LOT  
EXP.

**TRACE SCIENTIFIC 510 (K) NOTIFICATION**

**3.3 Package Insert**

To follow is a package insert which is included with every kit of Trace Microprotein reagent.



# TRACE

## MICROPROTEIN REAGENT BENZETHONIUM CHLORIDE METHOD

### INTENDED USE

This reagent is intended for the in vitro quantitative determination of protein in urine for both manual and automated systems.

### CLINICAL SIGNIFICANCE

The role of the renal system in the conservation of plasma proteins has been recognised for some time. Under normal physiological conditions small molecular weight proteins such as insulin pass through the glomeruli in relatively large amounts. Intermediate size proteins such as Transferrin and Albumin also pass through but only in relatively small amounts. Most of these proteins are reabsorbed in the renal tubules such that normal urine contains less than 150 mg of protein per day. This also includes the protein of non serum origin normally secreted by the distal tubule (muco protein) and collecting ducts. Increased levels of urinary protein, (proteinuria) usually more than 0.15 g per 24 hours (150 mg/24 hours), almost always indicates disease.

Proteinuria may be classified as renal proteinuria or proteinuria with normal renal function. Renal proteinuria may be further classified as Glomerular or tubular proteinuria.

Glomerular proteinuria is due to increased glomerular permeability (nephrotic syndrome) and may be seen in glomerular nephritis or secondary to other diseases such as diabetic nephropathy. Albumin is usually the predominant protein in the urine. Tubular proteinuria may be due to renal tubular damage from any cause especially pyelonephritis. Tubular proteinuria results in modest increases in the low molecular weight proteins if glomerular permeability is normal. Proteinuria with normal renal function may be the result of physiological increases in protein excretion or the production of abnormally large amounts of low molecular weight proteins. Increased protein excretion is seen during normal pregnancy, after strenuous exercise or following prolonged maintenance of an upright posture. Increases in low molecular weight proteins may be due to the production of Bence Jones protein, haemoglobinuria as a result of severe haemolysis and myoglobinuria as a result of severe muscle damage.

### METHODOLOGY

Methods employed for the determination of total protein in urine include dye binding, chemical and turbidimetric procedures, the latter being the most commonly employed technique<sup>2</sup>. The popularity of the turbidimetric procedures can be attributed to the simplicity of use and increased sensitivity.

The *Trace* microprotein kit is a turbidimetric procedure in which benzethonium chloride is used as the protein denaturing agent. Proteins present in the urine are denatured by benzethonium chloride resulting in the formation of a fine suspension which is quantitated turbidimetrically at 405 nm. The reagent has been modified to overcome the problem of high concentration (Hook) effect, where very high concentrations of protein in urine can cause an apparent zero or low reading.

### REAGENT COMPOSITION

<u>Active Ingredients</u>	<u>Concentration</u>
<b>Reagent 1</b>	
Carbonate Buffer	100 mmol/L
Sodium Chloride	200 mmol/L
EDTA	33 mmol/L
<b>Reagent 2</b>	
Benzethonium Chloride	20 g/L

Reagents also contain surfactants and stabilisers necessary for optimum reagent performance.

**WARNING:** Do not mouth pipette. If spilt, thoroughly wash affected areas with water. Reagent contains sodium azide (0.1% W/V) which may react with copper or lead plumbing. Flush with plenty of water when disposing. For further information, please consult the *Trace* Microprotein Material Safety Data Sheet.

### REAGENT PREPARATION

All reagents are supplied ready for use.

### STABILITY AND STORAGE

The two reagent components are stable until the expiry date shown on the label when stored at room temperature (2 - 25°C).

### SPECIMEN COLLECTION AND HANDLING

Urine samples when stored at 4°C are stable for 2 - 3 days<sup>5</sup>. If it is expected that there will be some time delay in transporting the urine to the laboratory the use of a chemical preservative such as Merthiolate (0.24 mmol/L) is recommended.

**EQUIPMENT**

The equipment required for this procedure is a manual or an automated spectrophotometer capable of measuring absorbance at 405 nm (405 - 415 nm), temperature stability, 1.0 cm cuvettes or flowcell, timer, accurate pipettes or automated dispenser for reagent and sample addition.

**PROCEDURE**

These instructions apply for manual instrumentation, but can be adapted to most automated instruments. Specific instructions are available upon request. (Refer to table 1.)

**SYSTEM PARAMETERS**

Temperature	Constant
Wavelength	405 nm (405 - 415)
Absorbance Range	0 - 2 AU
Cuvette Path Length	1.0 cm
Reagent 1 Volume	1.5 mL
Sample Volume	0.04 mL
Reagent 2 Volume	0.3 mL
Incubation	5 minutes

1. Label a test tube or cuvette for a reagent blank, each standard, control and unknown specimen.
2. Add 1.5 mL of Reagent 1 to each tube.
3. Add 0.04 mL of H<sub>2</sub>O to the reagent blank tube and 0.04 mL of each standard, control and unknown specimen to the appropriately labelled tube.
4. Select a wavelength of 405 nm and zero the spectrophotometer with the reagent blank.
5. Measure and record the absorbance of each standard, control and unknown sample tube or cuvette (A1).
6. Add 0.3 mL of Reagent 2 to each tube or cuvette, mix and incubate for 5 minutes.
7. Zero the spectrophotometer at 405 nm with the reagent blank.
8. Measure and record the absorbance of each standard, control and unknown sample tube or cuvette (A2).

**TABLE 1**  
**REAGENT BLANK    STANDARD    TESTS**

Water	0.04 mL	---	---
Standard	---	0.04 mL	---
Sample	---	---	0.04 mL
Reagent 1	1.5 mL	1.5 mL	1.5 mL

Measure and record A1 absorbance

Reagent 2	0.3 mL	0.3 mL	0.3 mL
-----------	--------	--------	--------

Incubate for 5 minutes. Measure and record A2 absorbance

**CALCULATIONS**

Calculate the results as follows:

Final Absorbance = A2 - A1

Prepare a standard curve by plotting absorbance versus concentration of at least 5 standards ranging from 0.1 to 2.4 g/L (100 to 2400 mg/L). (See Calibration Section)

The protein concentration for controls and unknowns can be determined by locating the applicable absorbance value on the standard curve and reading the corresponding protein concentration.

**24 HOUR URINARY PROTEIN EXCRETION**

1. Measure and record the 24 hour urine volume in litres.
2. Determine the protein concentration in g/L or mg/L using the above procedure.
3. Multiply the protein concentration by the 24 hour urine volume. This value is the protein excretion/24 hours.

Example:    24 hour urine volume = 1.12 litres  
                   Urine protein concentration = 0.13 g/L or 130 mg/L  
                   24 hour urine protein excretion  
                   0.13 x 1.12 = 0.146 g/24 hours  
                   130 x 1.12 = 146 mg/24 hours.

**NOTES**

1. The reagent and sample volumes may be altered proportionally to accommodate different spectrophotometer requirements.
2. The temperature of the reaction is not critical, however, the temperature of the spectrophotometer should be held constant.
3. The final absorbance should be measured within 10 minutes
4. Unit conversion: g/L x 1000 = mg/L

**CALIBRATION AND QUALITY CONTROL**

Commercially available urine protein standards may be used for calibration purposes.

To ensure adequate quality control, each run should also include a normal and abnormal urine control with assayed values handled as unknowns. It should be realised that the use of quality control checks both instrument and reagent functions together. Factors which might affect the performance of this test include proper instrument function, temperature control, cleanliness of glassware and accuracy of pipetting.

**LIMITATIONS**

1. No "hook" affect was observed with samples containing protein concentrations up to a level of 60 g/L.
2. For a comprehensive review of factors affecting urine protein determination refer to the publication by Young<sup>6</sup>.

**EXPECTED VALUES**

Urinary excretion of protein is normally less than 0.15 g/24 hours (150 mg/24 hours). Values above this almost always indicates disease<sup>1</sup>.

It is recommended that each laboratory verify this value or derives a reference interval for the population that it serves.

**PERFORMANCE DATA**

The following data was obtained using the *Trace* microprotein reagent on an automated clinical chemistry analyser.

**IMPRECISION:**

Within Run	Level I	Level II	Level III
Number of Samples	20	20	20
Mean g/L	0.18	0.51	1.75
SD	0.009	0.024	0.03
CV%	5.0	4.7	1.7
<b>Overall</b>	<b>Level I</b>	<b>Level II</b>	<b>Level III</b>
Number of Samples	20	20	20
Mean g/L	0.18	0.51	1.76
SD	0.01	0.02	0.03
CV%	5.5	3.9	1.7

**ACCURACY:**

Comparison studies were carried out using another commercially available Benzethonium Chloride method as a reference. Normal and abnormal urine specimens were assayed in parallel and the results compared by least squares regression. The following statistics were obtained:-

Number of samples	63
Range of results (g/L)	0.08 to 1.41
Reference method mean (g/L)	0.42
Trace mean (g/L)	0.44
Slope	1.14
Intercept	-0.04
Correlation coefficient	0.992

**LINEARITY:**

When run as recommended the assay is linear to 2.0 g/L (2000 mg/ L)

**SENSITIVITY:**

The reagent when run according to the recommended procedure is sensitive to a level of 0.05 g/L (50 mg/L).

**REFERENCES**

1. Zilva JF, Pannall PR. "Plasma Proteins and Immunoglobulins" in *Clinical Chemistry in Diagnosis and Treatment*. Lloyd-Luke 1979; Chap XIV:305-29.
2. First MR. "Renal Function" in *Clinical Chemistry theory, analysis and correlation*. Kaplan LA, Amadeo JP (Ed). CV Mosby Co. 1984; Chap 23:418.
3. Koller A. "Total Urine Protein" in *Clinical Chemistry theory, analysis and correlation* Kaplan LA, Amadeo JP (Ed). CV Mosby Co. 1984; Chap 60: 1319-20.
4. Watkins I, Jenkins L. *Clinical Chemistry* 1987; 33:2127-8.
5. Shephard MDS, Mazzachi RD. *The Clinical Biochemist* 1983; 4: 61-7.
6. Young DS. *Effects of Drugs on Clinical Laboratory Tests*. Third Edition 1990; 3: 296-300.

**Date Started:**.....

**Lot Number:**.....

**Expiry Date:**.....

**NOTES / EVALUATION RESULTS**

**For use with Trace Reagents:**

<u>Catalogue No</u>	<u>Size</u>
TR50001	1x125mL
	1x25mL

***ORDERS & TECHNICAL SUPPORT***

	<b>Phone</b>	<b>Facsimile</b>
Australia	(008) 333 110	(03) 543 6719
U.S.A.	(800) 872 2313	(305) 477 0256
International	61 3 543 1255	61 3 543 6719

Made in AUSTRALIA

**TRACE SCIENTIFIC** Pty. Ltd.  
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Melbourne, VIC. 3168  
AUSTRALIA  
Phone: (03) 543 1255  
Fax: (03) 543 6719  
Telex: AA 154479

**TRACE AMERICA** Inc  
7260 N.W. 58th Street,  
Miami, FL, 33166  
U.S.A.  
Phone: (305) 592 8221  
Fax: (305) 477 0256  
Telex: 4974313 TRACEUI

P/N: PI500040.01  
Revised August 1992.



**TRACE SCIENTIFIC 510 (K) NOTIFICATION**

**3.4 MSDS**

To follow is a copy of the MSDS from the Trace Microprotein reagent.

Section 3. Page 8

# **TRACE**

## **MATERIAL SAFETY DATA SHEET**

### **MICROPROTEIN**

**TRACE SCIENTIFIC PTY LTD  
10 TREFOREST DRIVE  
CLAYTON VIC 3168  
AUSTRALIA**

**TRACE AMERICA INC.  
7260 NORTH WEST 58TH ST.  
MIAMI FL 33166  
U.S.A.**

#### **EMERGENCY PHONE NUMBERS**

AUSTRALIA (03) 543 1255  
USA (305) 592 8221  
(800) 872 2313

#### **DATE OF PREPARATION**

July 1992

**IDENTIFICATION: PRODUCT NAME  
CATALOGUE NO.**

**MICROPROTEIN REAGENT  
TR50001 1 x 125mL R1  
1 x 25mL R2**

#### **HAZARDOUS INGREDIENTS/IDENTITY INFORMATION**

One present above minimum guidelines set out in the U.S.A. Code of Federal Regulations Labor 29 Parts 1900-1910, July 1985 page 884 (g) Material Safety Data Sheets.

#### **PHYSICAL/CHEMICAL CHARACTERISTICS**

Appearance:	Clear, Colourless Liquids
Boiling Point:	Not available
Vapour Pressure:	Not available
Vapour Density:	Not available
Evaporation Rate:	Not available
Specific gravity:	Not available
Solubility in Water:	Not applicable

#### **FIRE AND EXPLOSION HAZARD DATA**

Fire:	Not considered to be a fire hazard.
Explosion:	Not considered to be an explosion hazard.
Extinguishing Media:	Use any means suitable for extinguishing surrounding fire.
Special Fire Fighting Procedures:	Not available.



## REACTIVITY DATA

Stability:	Stable.
Conditions to avoid:	Not available
Incompatibility:	Not available
Hazardous Decomposition: . Byproducts	Toxic gases and vapours may be released if involved in a fire.
Hazardous Polymerizations:	Will not occur
Conditions to avoid:	Not available

## HEALTH HAZARD DATA

The toxicological properties of this material have not been investigated. Exercise appropriate care to avoid direct contact with skin and eyes.

EXPOSURE EFFECTS: Not available.

### FIRST AID:

Skin:	Wash with plenty of water.
Eyes:	Immediately flush with water.

## VENTILATION AND PERSONAL PROTECTION

Ventilation:	Not required.
Respiratory Protection:	Not required.
Skin:	Gloves and Laboratory coat required.
Eyes:	Protection required.

In general, good Laboratory procedures should be followed.

## SPECIAL STORAGE AND DISPOSABLE PROCEDURES

Not applicable.

## SPILL, LEAK AND DISPOSAL PROCEDURES

Spillage:	Flush affected area with water.
Disposal:	Flush to sewer with excess water. Disposal may be subject to Federal, State or Local Laws.

The information contained herein is furnished without warranty of any kind. Users should consider this data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of this material and the safety and health of employees and customers.

P/N: PD500050.01  
Revised July, 1992

## **TRACE SCIENTIFIC 510 (K) NOTIFICATION**

### **3.5 Advertising**

To follow is material prepared for the promotion of this product. The contents are based upon information contained within the package insert.

TRACE

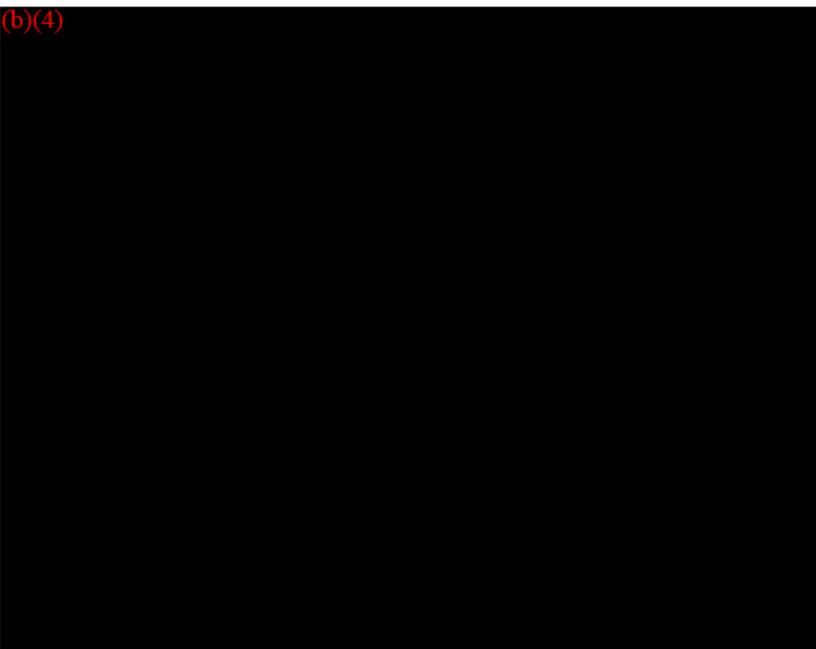
# MICROPROTEIN REAGENT

**METHOD:** BENZETHONIUM CHLORIDE

**CONFIGURATION:** CATALOGUE NO: TR50001  
1 x 125 mL R1  
1 x 25 mL R2

**ADVANTAGES:**

(b)(4)

A large black rectangular redaction box covers the right side of the page, obscuring the text under the 'ADVANTAGES' heading. The text '(b)(4)' is written in red at the top left corner of the redacted area.

**Applications:** Available for most routine Clinical Biochemistry Analysers.

**Distributed by:**

10

**TRACE SCIENTIFIC 510 (K) NOTIFICATION**

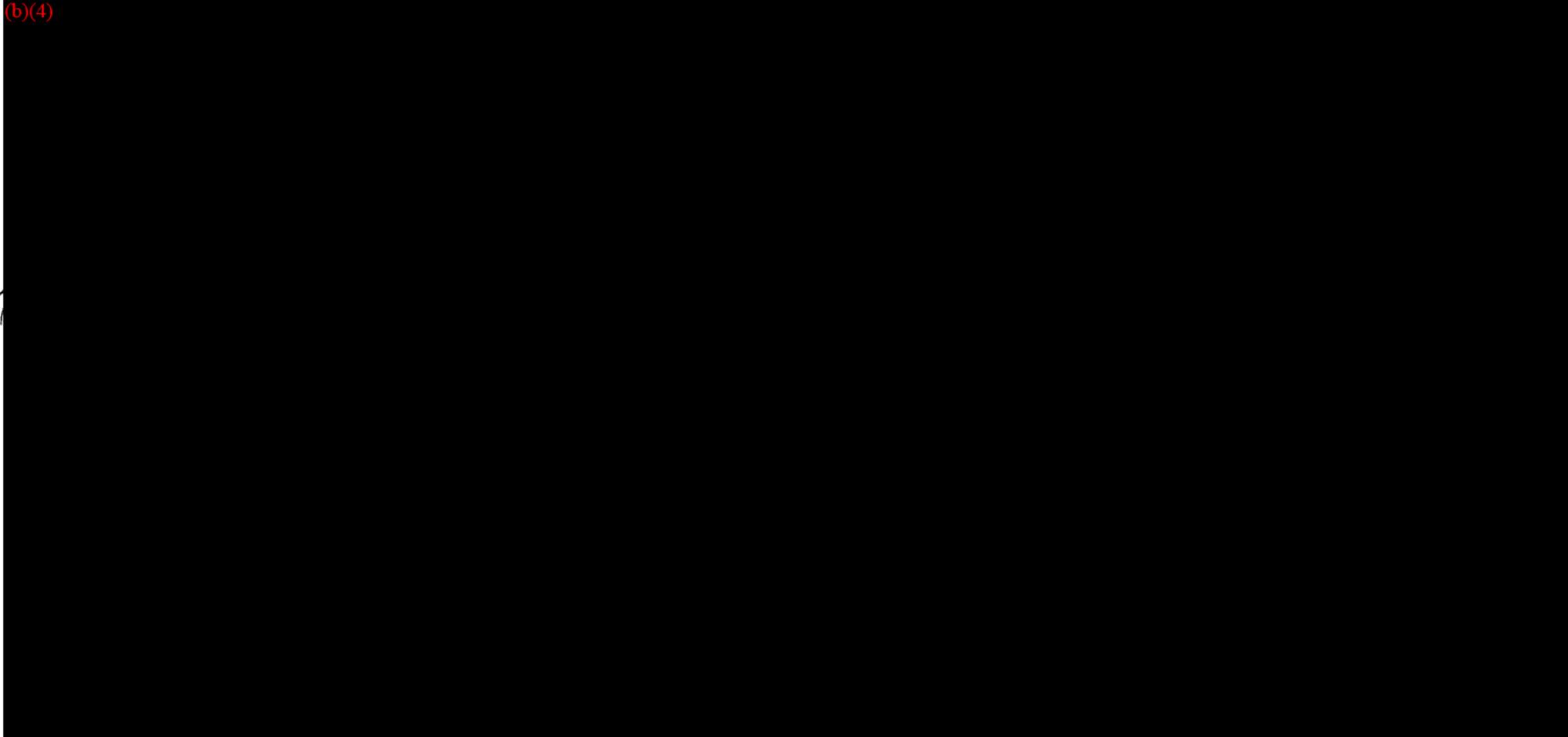
**4. PERFORMANCE DATA**

Section 4. Page 1

GRAPH No: 8

# MICROPROTEIN PATIENT CORRELATION DATA

(b)(4)



**TRACE SCIENTIFIC 510 (K) NOTIFICATION**

**5. EQUIVALENT DEVICE LABELLING**

To follow are the package inserts of devices we believe are equivalent to the Trace Microprotein reagent.





**TEST METHODOLOGY**  
for the **aca®**  
discrete clinical analyzer

**UP**  
**URINARY PROTEIN**

**INTENDED USE:**

The UP pack is used in the DuPont aca® discrete clinical analyzer to quantitatively measure protein in urine.

**SUMMARY:**

The UP method allows direct quantitation of protein in most urine samples within the normal and abnormal range. The UP method is an adaptation of the turbidimetric method of Iwata and Nishikaze. A split-sample comparison between the UP method and biuret methods showed good correlation (see SPECIFIC PERFORMANCE CHARACTERISTICS)

**PRINCIPLES OF PROCEDURE:**

The UP method uses a two-pack, end-point technique to measure urinary protein. The UP-1 pack provides a sample blank at 540 nm. In the UP-2 pack, benzethonium chloride (BEC) precipitates urinary protein in an alkaline medium. Light scattering by the precipitate causes a decrease in light transmission. The decrease in light transmission is measured as absorbance at 540 nm. The absorbance difference between the UP-1 and UP-2 pack is related to the total protein concentration in the sample by means of a standard curve or mathematical function.



**REAGENTS:**

**UP-1 (Blank)**

Compartment*	Form	Ingredient	Quantity*
#1	Liquid	EDTA and Microbial Inhibitor	
#2 & #3	Liquid	NaOH*	
#4	Liquid	Surfactant and Microbial Inhibitor	

**REAGENTS: (continued)**

**UP-2 (Reaction)**

Compartment*	Form	Ingredient	Quantity*
#1	Liquid	EDTA and Microbial Inhibitor	
#2 & #3	Liquid	NaOH*	
#4	Liquid	Surfactant and Microbial Inhibitor	
#5 & #6	Liquid	Benzethonium Chloride†	46 µmole

- a. Compartments are numbered 1-7, with compartment #7 located closest to pack fill position #2
- b. Nominal value at manufacture
- c. See Precautions.

**PRECAUTIONS:**

COMPARTMENTS #2 AND #3 IN UP-1 AND UP-2 PACKS EACH CONTAIN 65 µL OF 14 mol/L NaOH. AVOID CONTACT SKIN IRRITANT; RINSE CONTACTED AREA WITH WATER.

COMPARTMENTS #5 AND #6 IN UP-2 PACKS EACH CONTAIN 50 µL OF 0.45 mol/L BENZETHONIUM CHLORIDE. AVOID CONTACT SKIN IRRITANT; CORROSIVE TO MUCOUS MEMBRANES; RINSE CONTACTED AREA WITH WATER.

USED PACKS CONTAIN HUMAN BODY FLUIDS; HANDLE WITH APPROPRIATE CARE TO AVOID SKIN CONTACT OR INGESTION.

**FOR IN VITRO DIAGNOSTIC USE**

**MIXING AND DILUTING:**

Mixing and diluting are automatically performed by the aca® discrete clinical analyzer. The sample cup must contain sufficient quantity to accommodate the sample volume plus the "dead volume"; precise cup filling is not required.

**Sample Cup Volumes (µL)**

Analyzer	Standard Capacity		Microsystem	
	Dead	Total	Dead	Total
III	120	3000	10	600
IV, SX	120	3000	30	600
V	90	3000	10	600



UP

**STORAGE OF UNPROCESSED PACKS:**

Store at 2-8°C. Do not freeze. Do not expose unprocessed packs to temperatures above 35°C or to direct sunlight.

**EXPIRATION:**

Refer to EXPIRATION DATE on the tray label.

**SPECIMEN COLLECTION:**

Normal procedures for collecting urine may be used for samples to be analyzed by the UP method<sup>2</sup>. Specimens must be well mixed and centrifuged to remove particulate matter before analysis. Specimens which have been refrigerated must be returned to room temperature, mixed well and centrifuged before analysis. Specimens stored at 4°C with no additives are stable for at least three days<sup>2</sup>. Specimens stored under toluene or those containing sodium hydroxide (5%) or boric acid (100 mg/mL [1.6 mmol/L])<sup>2</sup> are acceptable. Specimens stored at room temperature with no additives showed an increase (approximately 10%) in the protein level over a three day period.

(1) Hydrochloric acid and boric acid (5.1 units) are in brackets.

**KNOWN INTERFERING SUBSTANCES**

- Magnesium at levels greater than 49 mg/dL [20 mmol/L] will depress urinary protein results. Patients on intravenous MgSO<sub>4</sub> therapy may attain urinary magnesium levels high enough to depress results as much as 60%.<sup>2</sup>
- Hydrochloric acid (0.1N) or boric acid (>200 mg/mL; [ >3.2 mmol/L]) cause destruction of protein and should be avoided as additives at these concentrations.<sup>2</sup>
- Bilirubin at a level of 1.9 mg/dL [32.5 μmol/L] did not interfere.<sup>2</sup> Bilirubin added to a level of 20 mg/dL [342 μmol/L] increased the apparent protein level by 76 mg/L [0.076 g/L] at a level of 200 mg/L [0.20 g/L] and by 120 mg/L [0.13 g/L] at a level of 1300 mg/L [1.30 g/L].
- The following substances at the levels shown had no effect on the UP method:
 

Ammonia	180 μg/dL [100 mmol/L]
Ascorbic acid	100 mg/dL [6.7 mmol/L]
Creatinine	20 mg/dL [1.8 mmol/L]
Glucose	2.5 g/dL [138 mmol/L]
Phosphorous	1 g/L [32 mmol/L]
Urea	1.7 g/dL [600 mmol/L]
Uric Acid	50 mg/dL [3 mmol/L]
- Hemoglobin interferences (see ANALYTICAL SPECIFICITY)

**PROCEDURE:**

**TEST MATERIALS**

Item	II, III DuPont Cat. #	IV, 8X DuPont Cat. #	V DuPont Cat. #
800 <sup>2</sup> UP-1, UP 2 Analytical Test Pack, Graph Paper (GR DA) <sup>2</sup>	706213901	706213901	708213901
Sample Kit or Micro Sample System Kit and Micro Sample System Holder	701989201	710842601	713847901
Dylox <sup>2</sup> Photo-Sensitive Printer Paper	702694901	710366901	NA
Thermal Printer Paper	702795000	NA	NA
Purified Water	700036000	NA	NA
Cell Wash	NA	710843001	713845901
	704209901	710815901	710816901
	701864901	701864901	701864901

<sup>2</sup> Graph papers are packaged in each carton of UP-2 test packs. Each sheet of graph paper and each carton label has the letter code "GR DA" and the pack lot number. For proper calibration, the lot number on the graph paper must match that on the carton label and the graph paper must contain the letters "GR DA".

**TEST STEPS**

The operator need only load the sample kit and appropriate test pack(s) into a properly prepared ACA<sup>2</sup> discrete clinical analyzer. It automatically advances the packs through the test steps and prints a result(s). See the Instrument Manual for details of mechanical travel of the test packs.

**Preset Urinary Protein (UP) Test Conditions**

- Sample Size: 600 μL (400 μL/pack) for ACA<sup>2</sup> II-30, II-60, III analyzers or 540 μL (270 μL/pack) for ACA<sup>2</sup> IV, 8X, V analyzers
- Diluent: DuPont Purified Water
- Temperature: 37.0 ± 0.1°C
- Reaction Period: 45 seconds
- Type of Measurement: Two pack, end point
- Measurement Period: 17.07 seconds
- Wavelength: 540 nm
- Units: mg/L [g/L]

**CALIBRATION**

The general calibration procedure is described in the Calibration/Verification chapter of the Manual. Refer to it for calibration instructions.

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UP

The following information should be considered when calibrating the UP method.

- Assay Range: 00-2400 mg/L [0.00-2.40 g/L]
- Reference Material: Primary standards or secondary calibrators such as DuPont "ACA" Urinary Protein Calibrator (Cat #790680001)
- Suggested Calibration Levels: 00, 500, 1100, 1850, 2250 mg/L [0.00, 0.50, 1.10, 1.85, 2.25 g/L]
- Calibration Scheme: 5 levels, 2 packs per level
- Frequency: Each new pack lot  
Every 3 months for any one pack lot

1. For results in SI Units (g/L) multiply  $C_0$  (see graph paper) by the conversion factor of 0.001. Enter the recalculated  $C_0$ .
2. If the DuPont ACA Urinary Protein Calibrator is used, prepare according to instructions on the calibrator insert sheet.

**PRESET URINARY PROTEIN (UP) TEST CONDITIONS:**

Item	ACA® Analyzers	
	II	III, IV, 8X, V
Count by	One (1)	NA
Decimal Point Location	0000	0000 (00.00)
Assigned Starting Point or Offset $C_0$	0000	Specific to pack lot
Scale Factor or Assigned Linear Term $C_1$	0.000 mA/count	Specific to pack lot
Assigned Linear Function Terms $C_1, C_2$	NA	Specific to pack lot
Assigned Logit Function Terms $C_1$	NA	0.000 E0 (ACA® III, IV, 8X, V) 5.000 E - 1 (ACA® II)

1. For 2-pack methods on ACA® II analyzers, the starting point must be set below zero. Only a below zero starting point negates the error circuitry which differentiates starting point printouts from the result printouts on the patient report slip.
2. See heading of graph paper averaged in pack carton.

**TO CALIBRATE:**

**ACA® II Analyzer**

Run the calibration material. Construct a calibration curve on the graph paper provided. Adjustment of the starting point and scale factor is not required.

**ACA® III, IV, 8X, and V Analyzers**

Enter the theoretical constants for the logit function given on the top of the graph paper packaged with the lot for your type of ACA® analyzer. Adjustment of the OFF-SET, ( $C_0$ ) and LINEAR TERM, ( $C_1$ ) may be required.

Logit function

$$CONC = C_0 \left[ \left( \frac{C_1}{AA - C_0} - 1 \right)^{-1} - C_2 \right]$$

**QUALITY CONTROL**

Two types of quality control procedures are recommended:

- **General Instrument Check.** Refer to the Filter Balance/Monitor Procedure and the Absorbance Test Method described in the Instrument Manual. Refer also to the ABS Test Methodology literature.
- **Urinary Protein Method Check.** At least once daily run a UP test on a solution of known protein concentration other than that used to calibrate the UP method. For further details, review the Quality Assurance Section of the Chemistry Manual. The result obtained should fall within acceptable limits defined by the day-to-day variability of the system as measured in the user's laboratory (See SPECIFIC PERFORMANCE CHARACTERISTICS for guidance.) If the result falls outside the laboratory's acceptable limits, follow the procedure outlined in the Chemistry Troubleshooting Section of the Chemistry Manual.

A possible system malfunction is indicated when analysis of a sample with five consecutive test packs gives the following results:

Level	ACA® Analyzers	
	II % CV mA	III, IV, 8X, V % CV mg/L (g/L)
340 mg/L (0.34 g/L)	> 0.6	> 6.6
1400 mg/L (1.4 g/L)	> 5.7	> 5.7

Refer to the procedure outlined in the Troubleshooting Section of the Chemistry Manual.

**RESULTS:**

**ACA® II Analyzer**

For each UP test run, two results will be listed on the printout in the order UP-1 result, UP-2 result and both will be preceded by the letters GR DA. The first result is the preset starting point. The second result is the sample measurement in millibecquerel (mA) units. Determine the Urinary Protein concentration from the calibration curve constructed accord-

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**UP**

ing to the instruction in the Calibration/Verification Chapter, Immunoseasy paragraph of the instrument manual.

- k. The calibration curve must be constructed on the correct graph paper. THE OPERATOR MUST VERIFY THAT THE CORRECT GRAPH PAPER IS BEING USED. Each sheet of graph paper has the letter code "QA OA" and the pack lot number. The letter code and lot number on the graph paper must match that on the carton label and the entry for "DATE PLOTTED" must be within the previous 3 months.

**aca<sup>®</sup> III, IV, 8X and V Analyzers**

The aca<sup>®</sup> analyzer automatically calculates and prints the concentration of Urinary Protein in mg/L using the logit function. Only one result is printed for each pair of UP packs.

**LIMITATION OF PROCEDURE:**

UP-1 and UP-2 TEST PACK LOTS WHICH ARE SHIPPED TOGETHER MUST BE USED TOGETHER

Results > 2400 mg/L (2.4 g/L)

- Dilute with DuPont Purified Water. Reassay. Correct for dilution before reporting.

Results < 60 mg/L (0.06 g/L)

- Report as "less than 60 mg/L (0.06 g/L)" instead of numerical value.

IN RARE CASES OF EXTREMELY ELEVATED URINARY PROTEIN LEVELS THE UP METHOD MAY GIVE AN ERRONEOUSLY LOW RESULT. THIS CAN BE DETECTED BY THE PRESENCE OF A FLOCCULENT PRECIPITATE WITH CLEAR SUPERNATANT IN THE SPENT UP-2 PACK (THE UP-2 PACK WILL NORMALLY BE CLOUDY.) SPECIMENS WHICH EXHIBIT THIS UNUSUAL BEHAVIOR SHOULD BE DILUTED 1:30 WITH DUPONT PURIFIED WATER AND RE-ASSAYED.

WE DO NOT RECOMMEND CHANGING THE SAMPLE SIZES FROM THOSE SPECIFIED UNDER PRESET URINARY PROTEIN (UP) TEST CONDITIONS (SEE TEST STEPS UNDER PROCEDURE.)

The reporting system contains error messages to warn the operator of specific malfunctions. Any report slip containing a letter code or word immediately following the numerical value should not be reported. Refer to the Manual for the definition of error codes.

- 1. On an aca<sup>®</sup> analyzer it is characteristic that the first printout of a 2-pack method will be the starting point followed by the code "A". The second printout is the measured value for the sample in milligrams per deciliter (m/dl) units.

When one pack of a 2-pack method is decoded in the photometer the computer is automatically programmed to receive pack 2 of that method as the next pack. However, circumstances where the next pack may not be the second pack of that test pair are possible e.g.

1. A single pack of a 2-pack method was used to check the starting point during calibration.
2. One pack of a 2-pack method fell off the transport pin.

3. Only one pack of a 2-pack method was loaded into the input tray.
4. The pack order may be reversed or out of sequence with other tests.

In these cases, if the next test processed is also a 2-pack method ERRONEOUS RESULTS WILL BE PRODUCED ON BOTH TESTS.

**Pack Sequence Printout on aca<sup>®</sup> analyzers:**

	II	III	IV, 8X, V
Case 1 & 3	3al 1 999 9A UP1 QR DA 2057m UP2 QR DA 9999A	Second pack missed	"U4C"
Case 2	UP1 QR DA 9999A ODDCC 0P-	Missing Pack	N/A
Case 4a	UP2 QR DA 9999A JP1 QR DA 9999A	Below Linear Limit	"A1C" or "U5"
Case 4b	UP1 QR DA 9999A 3al 1 999 9A UP2 QR DA 9999A	Second Pack missed	"U4C"

- m. Value will vary with sample.
- n. UP 2 was removed from the transport chain before it reached the photometer.

**To reset aca<sup>®</sup> II analyzers:**

Case 1, 2, 3 or 4B - To return the computer to proper sequence

1. Toggle the MOTOR HOLD RESET switch on the readout board, or
2. Decode a header in the photometer from any 2-pack method, or
3. If the next test processed is a single pack method, the computer automatically resets and prints out the proper answer.

Case 4a - The computer does not require resetting

**To reset aca<sup>®</sup> III, IV, 8X, V analyzers:**

Case 1 or 3 - An error message (SECOND PACK MISSED - aca<sup>®</sup> III analyzer) or error code ("U4C" - aca<sup>®</sup> IV, 8X, V analyzer) is displayed and the filling station shuts down. To reset the filling station, remove the improperly loaded pack from under the filling station decode head and push the SUBSYSTEM RESET button (aca<sup>®</sup> III analyzer) or the OPERATE key (aca<sup>®</sup> IV, 8X, V analyzer). The SAL-1 pack is processed to the photometer where an error message (MISSING PACK - aca<sup>®</sup> III analyzer) or code ("U4C" - aca<sup>®</sup> IV, 8X, V analyzer) is displayed and printed on the report slip. The system will automatically reset itself and be ready to process the next test.

Case 2 - On the aca<sup>®</sup> III analyzer, the error message "MISSING PACK" is displayed and printed on the report slip.

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Case 4a or 4b - On the  $\text{ACA}^{\text{®}}$  III analyzer, a below linear limit result is displayed and printed on the report slip. On the  $\text{ACA}^{\text{®}}$  IV, SX or V analyzer, the error code "A1C" or "U9" (Case 4a) or "U4C" (Case 4b) is displayed and printed on the report tape. Rerun the test with the packs in the correct order.

**REFERENCE INTERVAL:**

$\leq 165 \text{ mg/day}$  [0.16 g/day]  
 $\leq 135 \text{ mg/L}$  [0.14 g/L]

Twenty-four-hour urine collections were obtained from 195 apparently healthy adult individuals. This population consisted of laboratory personnel and their families and was nearly equally distributed between male (48%) and female (52%). One hundred and fifty-five (155) individuals were from southwestern Pennsylvania and forty (40) were from northcentral Texas.

The reference interval was derived non-parametrically by determining the 95th percentile.

Each laboratory should establish its own reference interval for UP as performed on the  $\text{ACA}^{\text{®}}$  discrete clinical analyzer.

**SPECIFIC PERFORMANCE CHARACTERISTICS:**

**REPRODUCIBILITY<sup>a</sup>**

Material	Mean	Standard Deviation (% CV)	
		Within-Run	Between-Day
<b>Urine Pools<sup>b</sup></b>			
Level I	126 mg/L	2.1 (1.7)	4.0 (3.2)
	[0.13 g/L]	[0.002]	[0.004]
50 mA		2.1 (4.2)	2.6 (5.2)
Level II	2184 mg/L	53 (2.5)	89 (3.2)
	[2.18 g/L]	[0.053]	[0.089]
9.5 mA		8.8 (1.0)	17.1 (3)
<b>URI-CHEM<sup>c</sup></b>			
Level I	560.5 mg/L	$\text{ACA}^{\text{®}}$ II and III	7.46 (1.29)
	[0.56 g/L]		[0.007]
340 mA		2.4 (0.7)	4.9 (1.4)
Level II	1108 mg/L	$\text{ACA}^{\text{®}}$ IV, SX, V	7.89 (0.89)
	[1.11 g/L]		[0.008]
832 mA		4.07 (0.72)	10.4 (1.84)
		[0.004]	[0.010]
Level III	564.0 mg/L		8.34 (0.77)
	[0.56 g/L]		[0.008]
Level IV	1087 mg/L		
	[1.09 g/L]		

URI-CHEM<sup>d</sup> Controls: Fisher Diagnostics, Orangeburg, NY

- a All specific performance characteristics tests were run after normal recommended equipment quality control checks were performed (see Instrument Manual)
- b Specimens at each level were analyzed in duplicate twice a day for twenty days. The within-run and between-day standard deviations were calculated by the analysis of variance method

**CORRELATION Regression Statistics<sup>a</sup>**

Method	Slope	Intercept	Correlation Coefficient	n
Gel filtration biuret <sup>b</sup>	0.98	-76	0.989	107
Phosphotungstic acid-biuret <sup>b</sup>	0.97	-86	0.978	100
Trichloroacetic acid-biuret <sup>b</sup>	0.94	48	0.990	49
Coomassie Blue	0.90	60	0.986	105
Sulfosalicylic acid-turbidimetric	1.04	110	0.968	94
Trichloroacetic acid-turbidimetric	1.54	-54	0.926	50

a. Model equation for regression statistics: (results of  $\text{ACA}^{\text{®}}$  analyzer) = slope x (comparative method results) + intercept

**ASSAY RANGE<sup>a</sup>**

60-2400 mg/L [0.06-2.40 g/L]

b. See REPRODUCIBILITY for method performance within the assay range

**ANALYTICAL SPECIFICITY<sup>a</sup>**

Recovery of various proteins by the UP method is shown below

Protein	% Recovery
Albumin	96
Gamma Globulin	77
Transferrin	103
Orosomucoid	64
B-Lipoprotein	11
Tamm-Horsfall	103
Lycosyme	11
Hemoglobin	10

See KNOWN INTERFERING SUBSTANCES section also

**BIBLIOGRAPHY:**

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 (13)

# Urinary/CSF Protein

Catalog No. 935000

System Pack for the  
 Boehringer Mannheim/Hitachi 704 Analyzer  
 for approximately 685 tests\*

## Principle:

The sample is preincubated in an alkaline solution containing EDTA, allowing for a sample blank while denaturing the protein and eliminating interference from magnesium ions. Benzethonium chloride is then added, producing a turbidity which is read at 505 nm.

## Reagents:

- 1 Blank (12 x 20 mL)
- 2 U/CSF Reagent (6 x 16.5 mL)

## Precautions and Warnings:

For In Vitro Diagnostic Use.

## Reagent Preparation:

1. R1 Working Solution: Use the contents of Bottle 1 (Blank) as supplied. No preparation is required.



Ready for use.

2. R2 Working Solution: Use the contents of Bottle 2 (U/CSF Reagent) as supplied. No preparation is required.



Ready for use.

## Storage and Stability:

The opened bottles of R1 and R2 Working Solutions are stable for 3 weeks at 2-12 °C.

## Specimen Collection and Preservation:

**Urine:** Use random or 24 hour urine specimens. Use no preservatives. Refrigerate specimen during collection.

**Cerebrospinal Fluid:** No special additives are required. Blood in a CSF specimen invalidates the protein value.<sup>1</sup>

**Storage:** Specimens may be stored at 2-8 °C for 48 hours.

## Instrument Settings:

TEMPERATURE: 37 °C

TEST	[UCTP]
ASSAY CODE	[2 POINT]:[15]-[32]
SAMPLE VOLUME	[ 20]
R1 VOLUME	[350][ 20][NO]
R2 VOLUME	[140][ 20][NO]
WAVELENGTH	[700][505]
CALIB. METHOD	[NONLINEAR][4][6]
STD. (1) CONC.-POS.	[ 0]-[ ]
STD. (2) CONC.-POS.	[ 10]-[ ]
STD. (3) CONC.-POS.	[ 20]-[ ]
STD. (4) CONC.-POS.	[ 40]-[ ]
STD. (5) CONC.-POS.	[ 80]-[ ]
STD. (6) CONC.-POS.	[200]-[ ]
UNIT	[MG/DL]
SD LIMIT	[ 45]
DUPLICATE LIMIT	[200]
SENSITIVITY LIMIT	[ 6500]
ABS. LIMIT (INC/DEC)	[ 0][INCREASE]
PROZONE LIMIT	[ 0][LOWER]
EXPECTED VALUE	[ ]-[ ]
INSTRUMENT FACTOR	[1.00]

\_\_\_ Denotes user or instrument specific settings.

## Calibration:

Use saline for STD 1. Use Preciset® U/CSF Protein, Cat. No. 935005 for STD 2 - STD 6.

## Calibration Frequency:

Calibrate weekly.  
 Perform a daily STD 1 update.

## Quality Control:

Commercially available urine and CSF protein controls are recommended for daily quality control.

## Calculation:

The analyzer computer constructs a calibration curve from absorbance measurements of the standards using a cubic spline fitting function (NONLINEAR TYPE 4). The cubic spline function fits a smooth line through the data points. The analyzer computer uses absorbance measurements of samples to calculate Urine/CSF protein concentrations by interpolation of the cubic spline function. Refer to the appropriate section of the Operator's Manual for further details.

\* Calculation based on total reagent volume per kit.



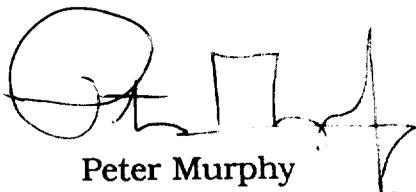
**TRACE SCIENTIFIC 510 (K) NOTIFICATION**

**6. SMDA STATEMENT**

Safety and Effectiveness Information for Trace Microprotein Reagent.

In accordance with the Safe Medical Devices Act of 1990, Trace Scientific Pty. Ltd. will make available to interested persons, upon written request, safety and effectiveness information pertaining to the Trace Microprotein reagent premarket notification.

**SIGNED FOR AND ON BEHALF OF  
TRACE SCIENTIFIC PTY. LTD.**



**Peter Murphy  
TECHNICAL MANAGER**

