LAB.1

A- DNA markers and laddersDNA

B- Analysis by electrophoresis

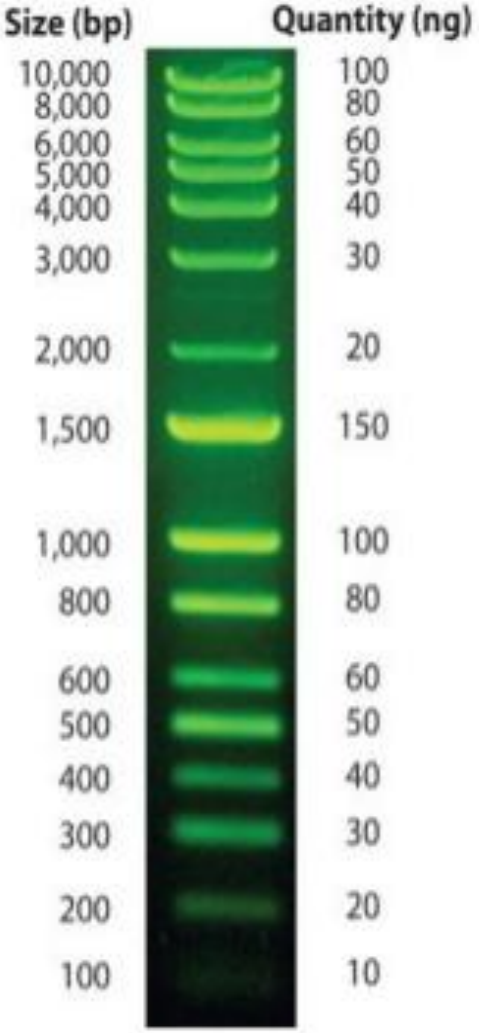
A- DNA markers and ladders

DNA markers (and ladders) are DNA fragments of known length that are run in the same gel as unknown samples to provide a "marker" for where DNA fragments of particular lengths will migrate. Note that distance migrated is proportional to the DNA fragment.

The DNA marker migration distances can be used to determine a standard curve for the migration of DNA in a gel.

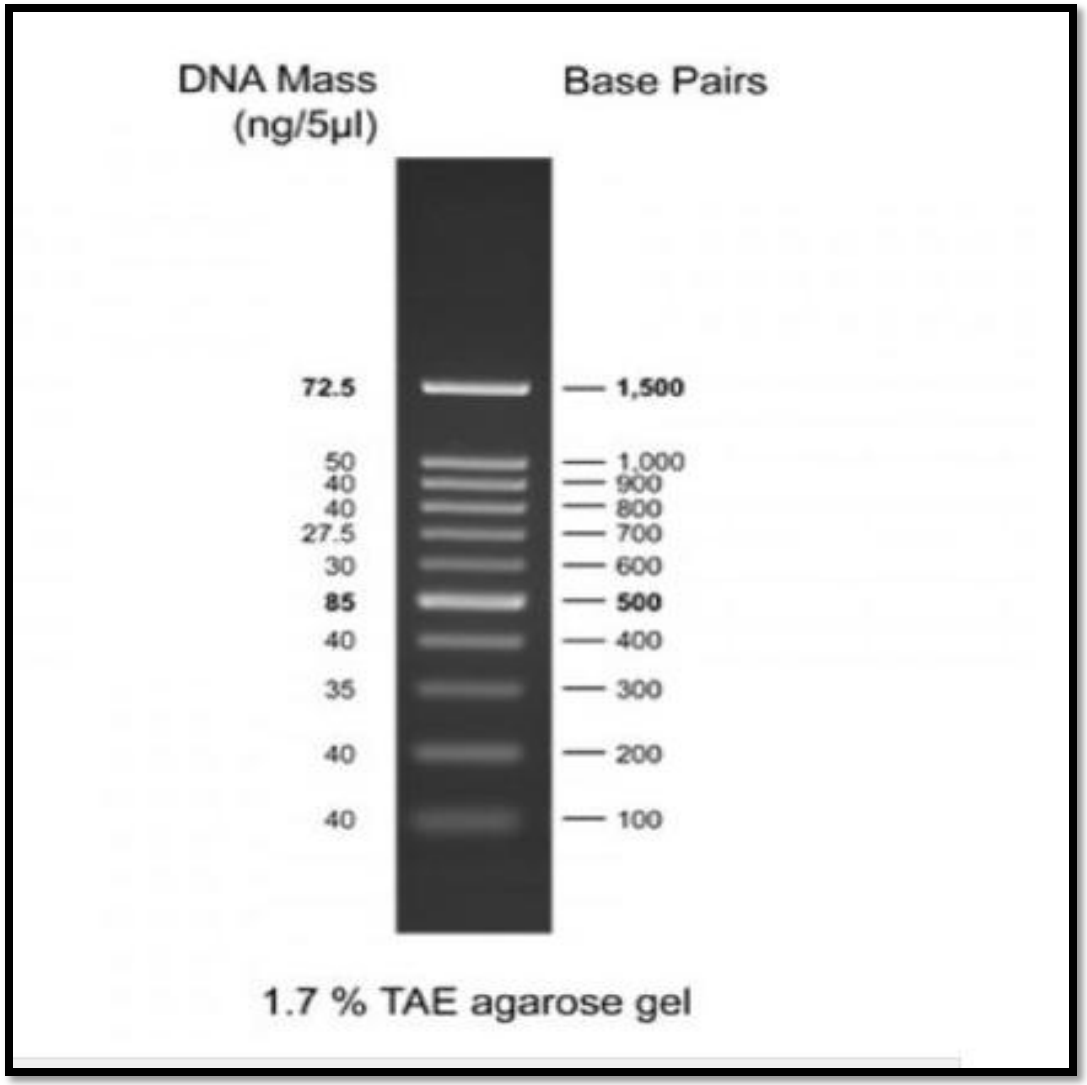
The Commercial preparations usually have many DNA fragments spaced every Kbp or so, and the bands look like the rungs of a ladder when run on a gel.

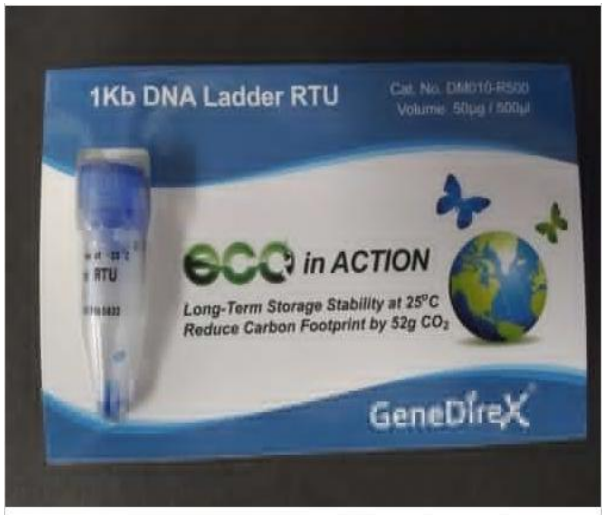
DNA ladder



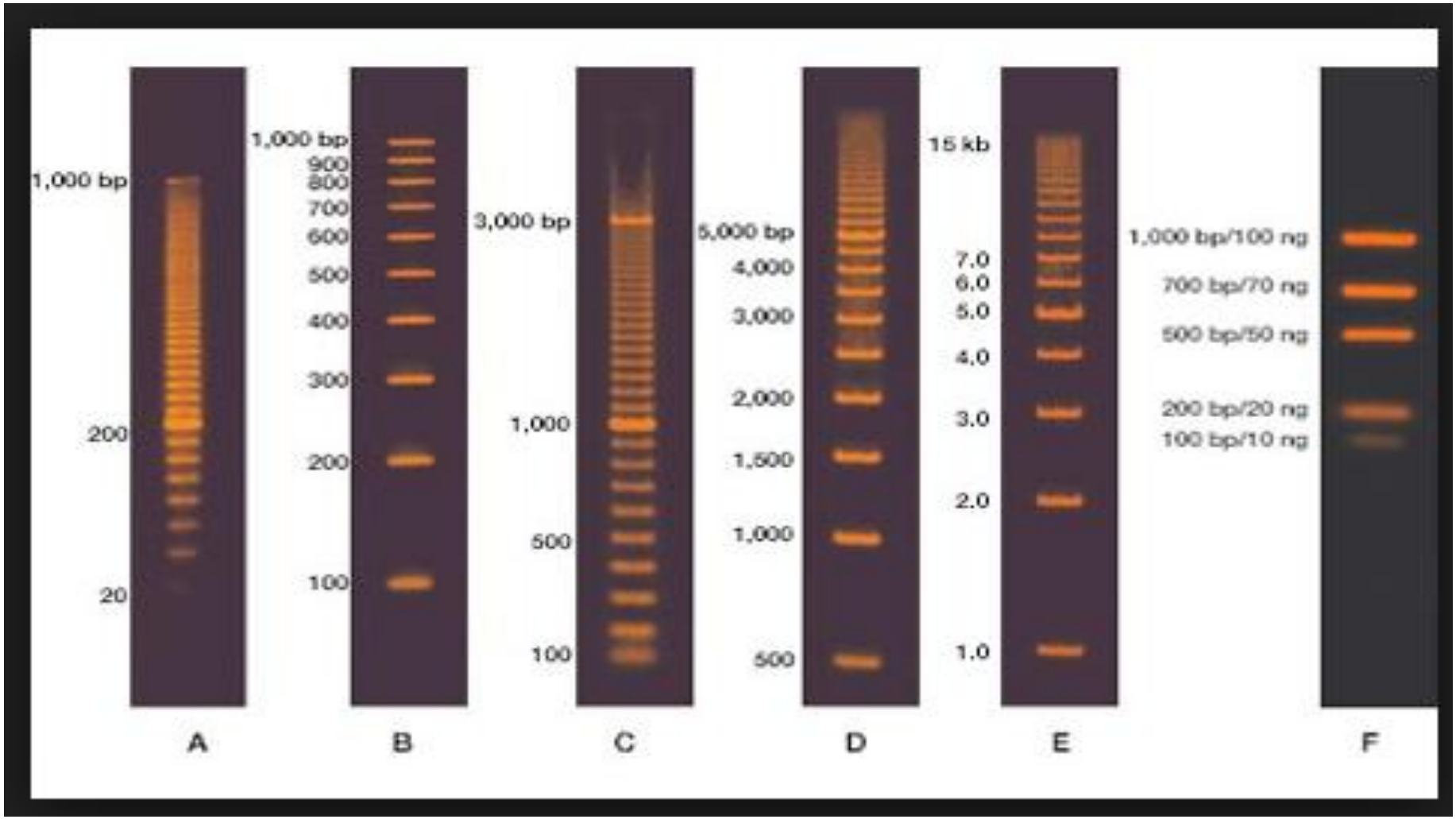
- It is a solution of DNA molecules of different length
- DNA Ladder consists of known DNA sizes used to determine the size of an unknown DNA sample.
- The DNA ladder usually contains regularly spaced sized samples which when run on an agarose gel looks like a "ladder".

DNA markers or ladders

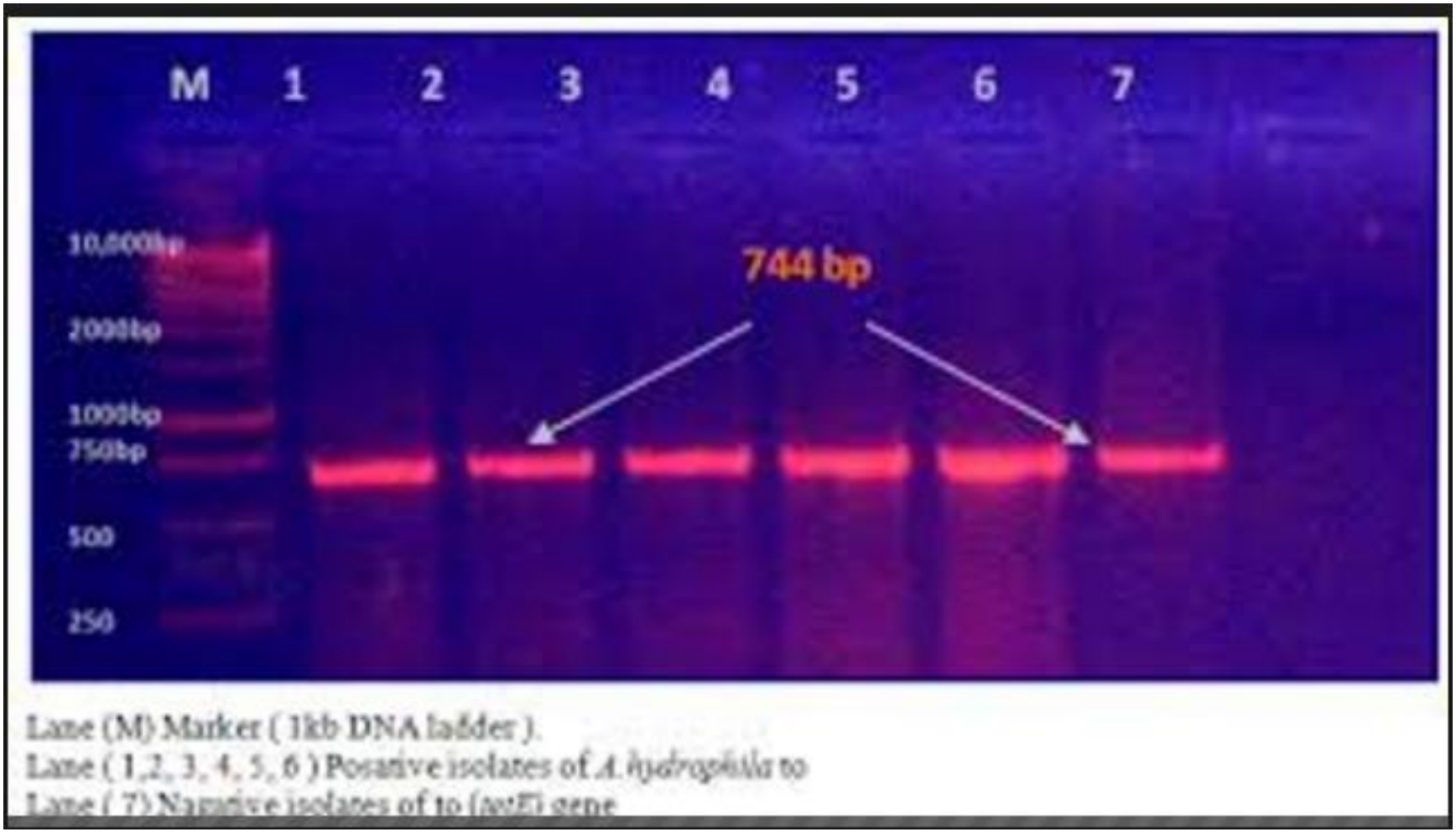




DNA markers


1,000 bp
200
20
A
1,000 bp
900
800
700
600
500
400
300
200
100
B
3,000 bp
1,000
500
100
C
5,000 bp
4,000
3,000
2,000
1,500
1,000
500
D
15 kb
7.0
6.0
5.0
4.0
3.0
2.0
1.0
E
1,000 bp/100 ng
700 bp/70 ng
500 bp/50 ng
200 bp/20 ng
100 bp/10 ng
F

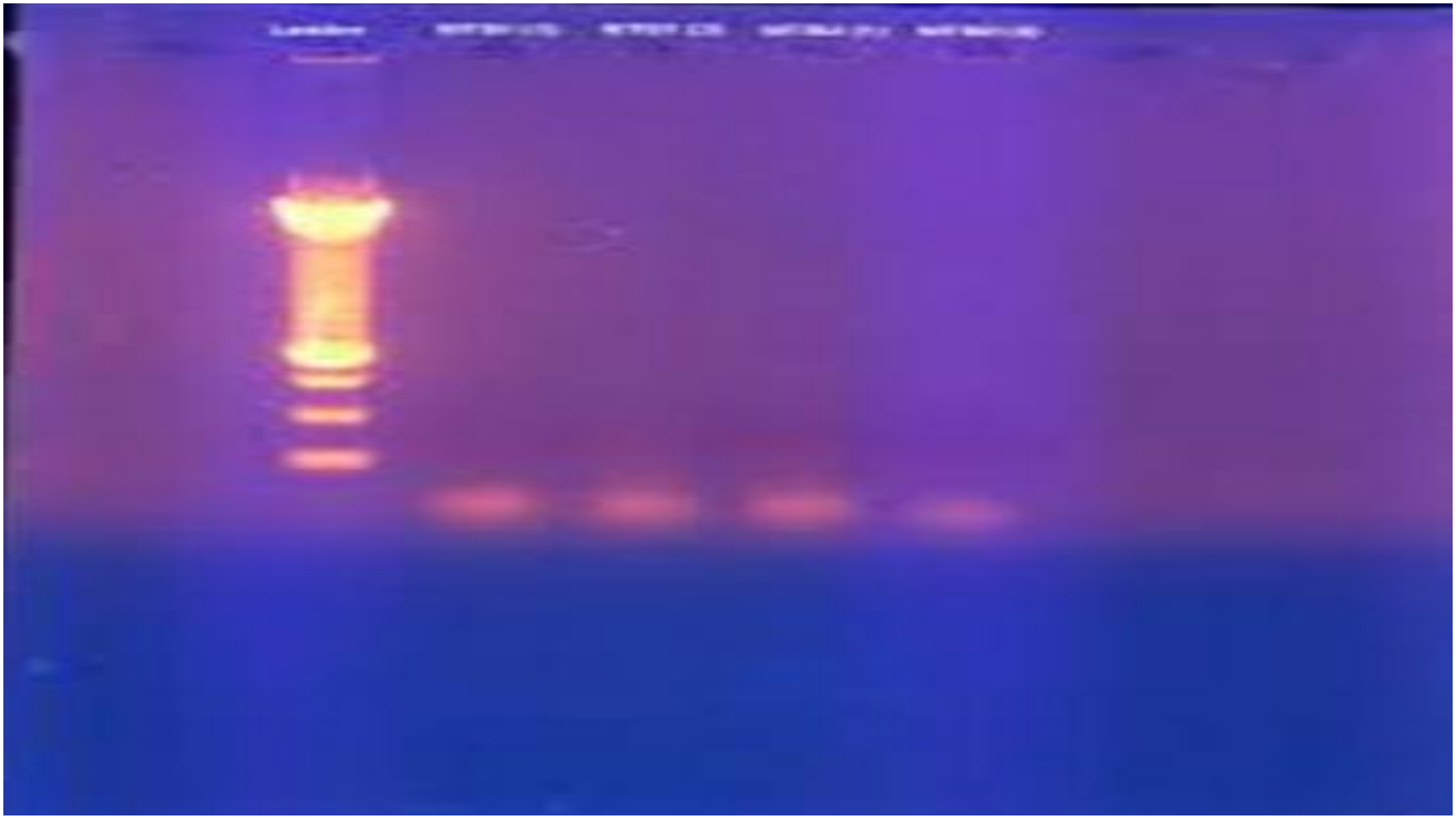
DNA markers



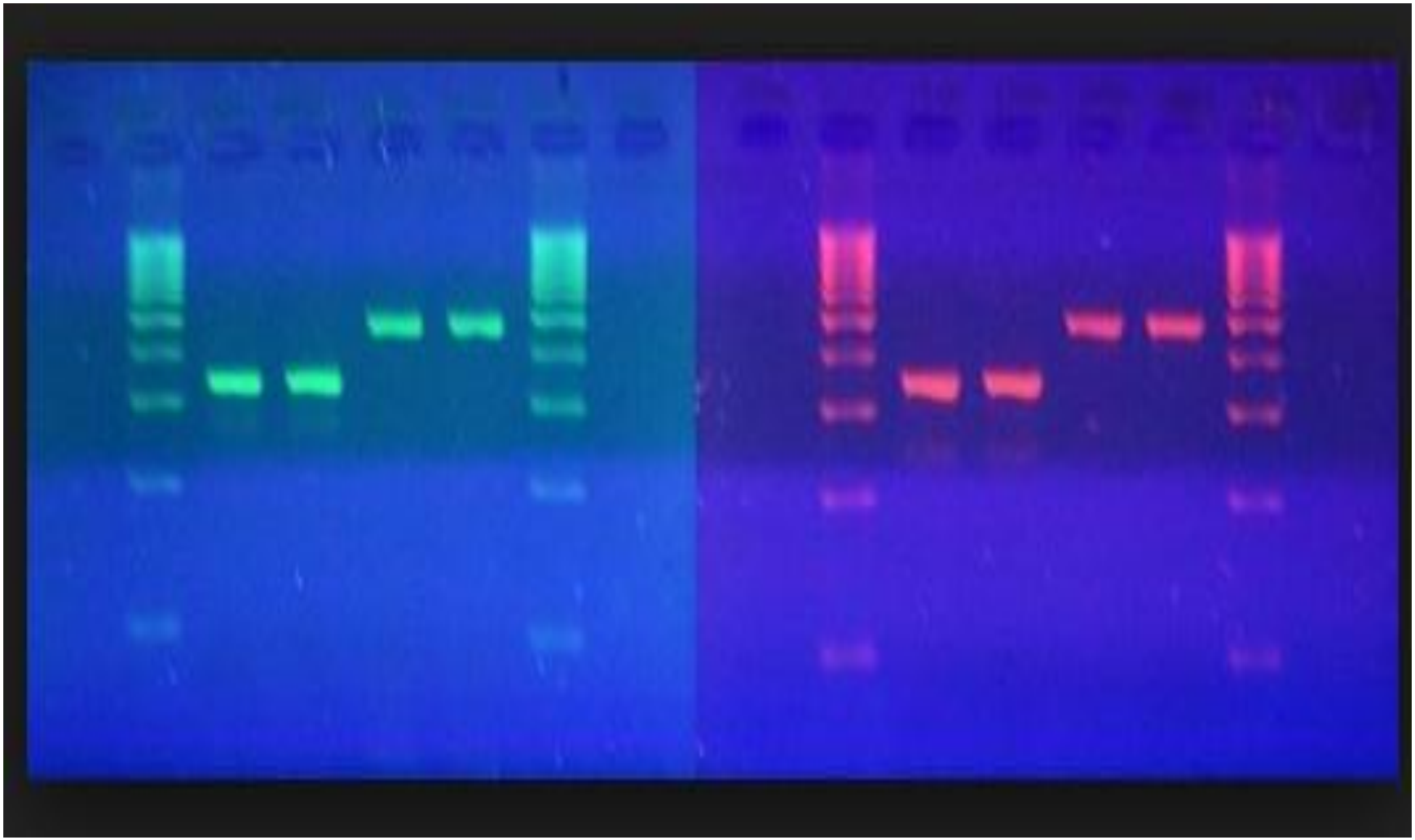
Lane (M) Marker (1kb DNA ladder).
Lane (1, 2, 3, 4, 5, 6) Posative isolates of *A.hydrophila* to
Lane (7) Nagative isolates of to (*aerE*) gene

DNA markers

DNA markers



DNA markers



B- Analysis by electrophoresis

1- plasmid DNA

2- Genomic DNA

3- Total RNA

1- Plasmid DNA

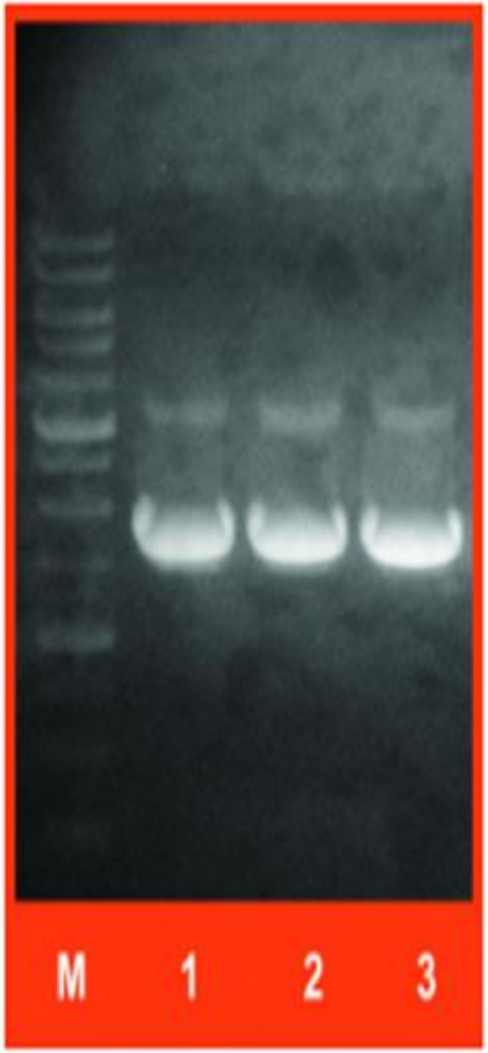


Figure 1. Plasmid DNA from a 100 ml overnight *E. coli* (DH5α) culture, containing plasmid by spectrophotometer and analyzed by electrophoresis on a 1% agarose gel. M = Geneaid 1 Kb DNA Ladder

Test	DNA Conc.	A260/280	A260/230	Yield
1	211.2 µg/ml	1.87	2.27	422.4 µg
2	216.6 µg/ml	1.87	2.27	433.2 µg
3	224.8 µg/ml	1.87	2.28	449.6 µg

Plasmid DNA

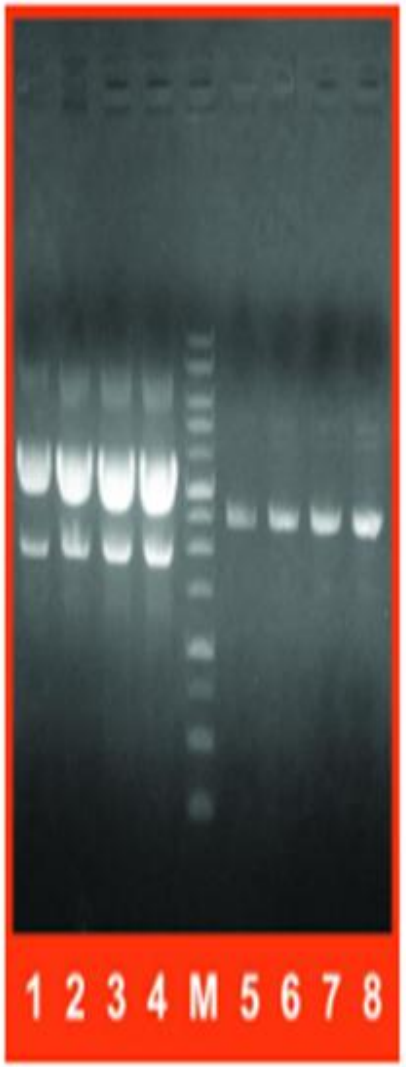


Figure 1. Plasmid DNA was extracted using the Presto™ Mini Plasmid Kit.
digestion and analyzed by electrophoresis on a 0.8% agarose gel. M = Geneaid 1 Kb DNA Ladder
pBluescript (1=1.5 ml, 2=3 ml, 3=5 ml, 4=7 ml) pBR322 (5=1.5 ml, 6=3 ml, 7=5 ml, 8=7 ml)

Copy Number	Cell Culture Volume Yield (OD600 = 4.0)			
	1.5 ml	3 ml	5 ml	7 ml
High-Copy (pBluescript)	13-15 µg	27-29 µg	36-38 µg	40-42 µg
Low-Copy (pBR322)	4-6 µg	8-10 µg	12-14 µg	18-20 µg

Plasmid DNA

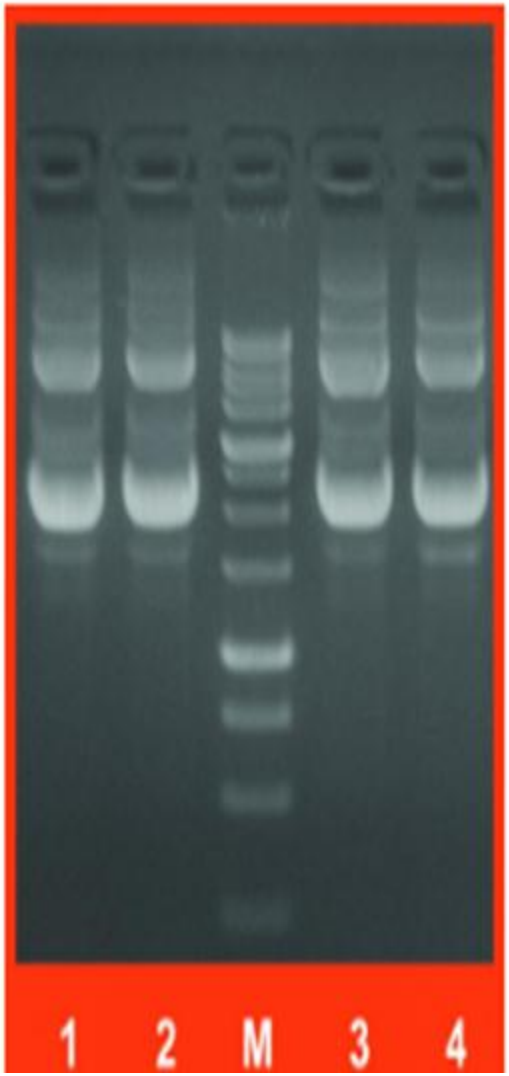


Figure 1. Plasmid DNA was extracted using both the High-Speed Plasmid Kit (lane 3,4) and digestion and analyzed by electrophoresis on a 1% agarose gel. M = Geneaid 1 Kb DNA Ladder

Test		260/280	260/230	Yield
Competitor Q	1	1.88	2.25	8.30 µg
	2	1.88	2.24	8.40 µg
Geneaid	3	1.87	2.21	8.30 µg
	4	1.89	2.23	8.50 µg

2- Genomic DNA

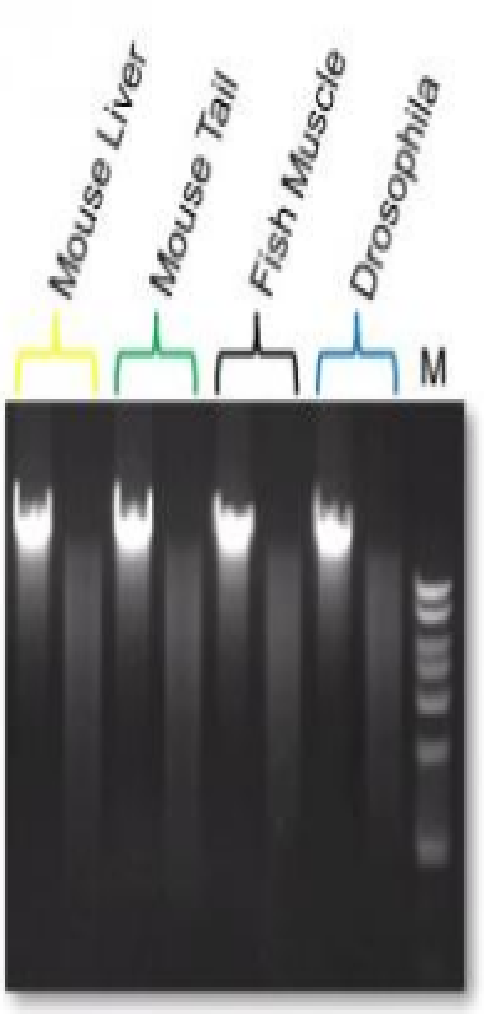


Figure 1. Genomic DNA from a variety of tissue samples was extracted using the Genomic DNA Mini Kit (Tissue). The purified genomic DNA (20-30 kb) was *Eco*RI digested and analyzed by electrophoresis on a 1% agarose gel.
M = Geneaid 1 Kb DNA Ladder

Mouse Tissue	Tissue Size	Total Yield
Tail	0.5 cm	10-20 µg
Liver	20 mg	10-20 µg
Brain	20 mg	10-20 µg
Lung	20 mg	5-10 µg
Muscle	20 mg	5-10 µg
Kidney	20 mg	20-50 µg

Genomic DNA

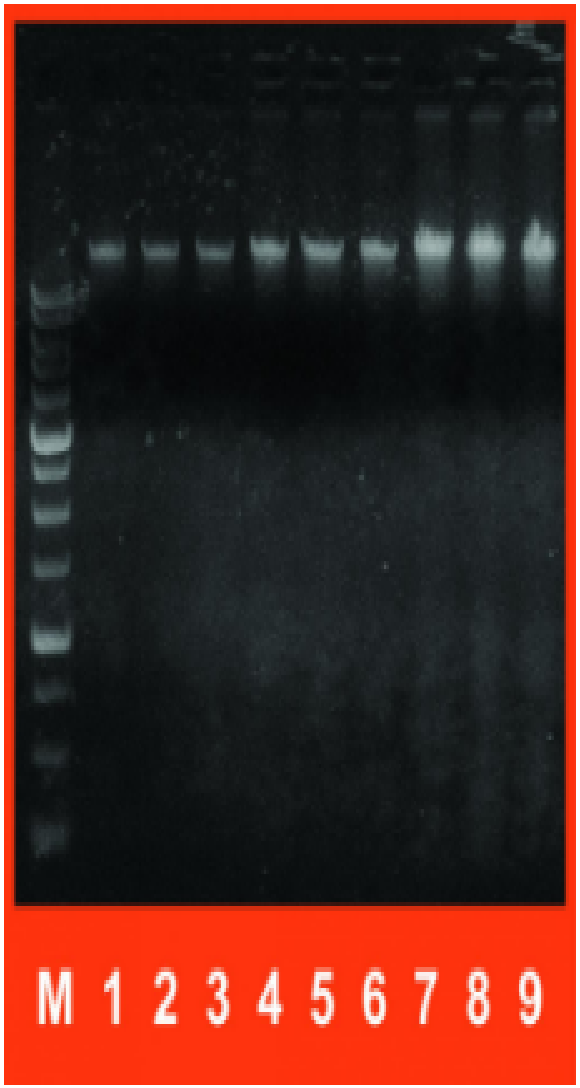


Figure 1. Genomic DNA from 50, 100 and 200 µl whole blood samples was extracted using the gSYNC™ DNA Extraction Kit. 10 µl from 100 µl eluates of purified genomic DNA was analyzed by electrophoresis on a 0.8% agarose gel.
1-3 = 50 µl whole blood sample, 4-6 = 100 µl whole blood sample, 7-9 = 200 µl whole blood sample
M = Geneaid 1 Kb DNA Ladder

Sample	Yield	260/280
50 µl	1.54 µg	1.85
100 µl	2.70 µg	1.87
200 µl	5.56 µg	1.90

Genomic DNA

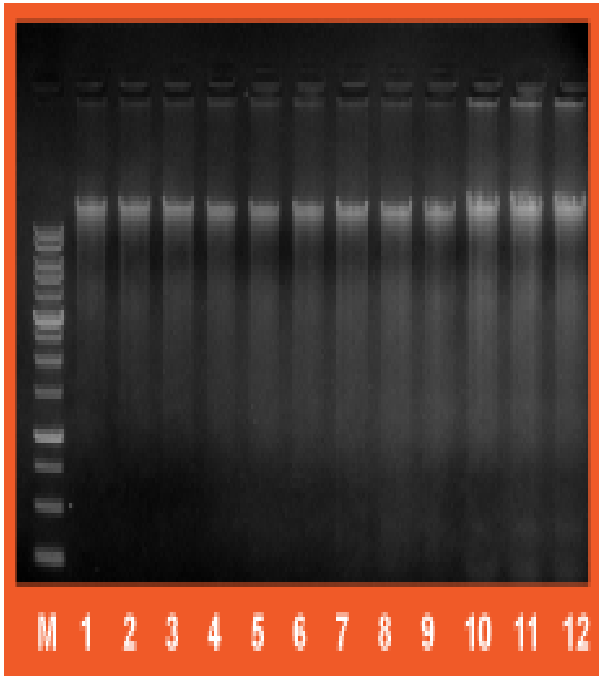


Figure 1. Genomic DNA from 10 mg mouse tissue was extracted using the 96 Well gSYNC™ DNA Extraction Kit. 5 µl aliquots from a 200 µl eluate of purified genomic DNA were analyzed by electrophoresis on a 0.8% agarose gel.

1-3 = kidney, 4-6 = muscle, 7-9 = liver, 10-12 = spleen

M = Geneaid 1 Kb DNA Ladder

Genomic DNA

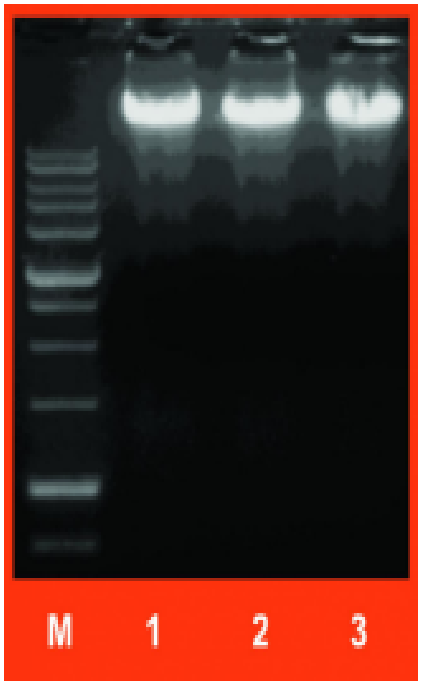


Figure 1. Genomic DNA (20-30 kb) was extracted from 300 µl of whole blood using the Genomic DNA Mini Kit (Blood/Cultured Cell). The purified DNA was eluted in 200 µl of Elution Buffer and 15 µl aliquots of the final sample were analyzed by electrophoresis on a 1% agarose gel. M = Geneaid 1 Kb DNA Ladder

Sample	Yield	260/280
1. 300 µl	8.07 µg	1.87
2. 300 µl	8.18 µg	1.87
3. 300 µl	8.19 µg	1.87

Genomic DNA

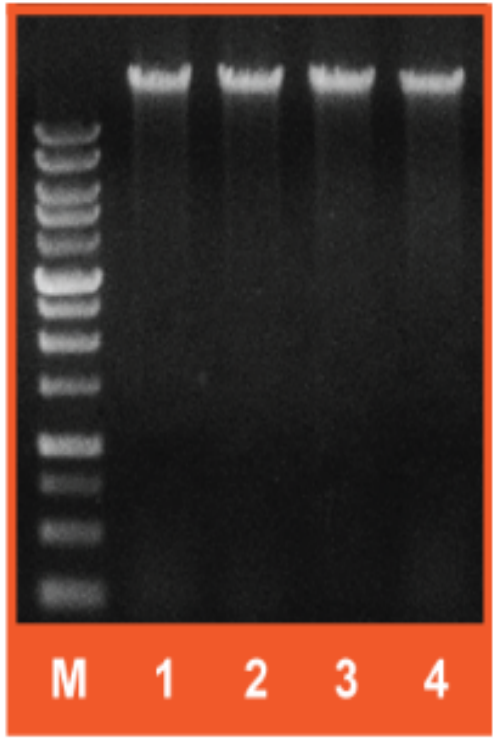


Figure 1. Genomic DNA was extracted from 200 µl whole human blood samples using the Presto™ 96 Well Genomic DNA Extraction Kit. The purified genomic DNA was eluted in 200 µl of Elution Buffer and 15 µl aliquots of the final sample (chosen from 4 random wells) were analyzed by electrophoresis on a 1% agarose gel. M = Geneaid™ 1 Kb DNA Ladder

Sample	ng/µl	260/280	Yield
1. 200 µl whole blood	27.6	1.81	4.7 µg
2. 200 µl whole blood	28.2	1.75	4.8 µg
3. 200 µl whole blood	32.9	1.74	5.6 µg
4. 200 µl whole blood	25.9	1.81	4.4 µg

Genomic DNA

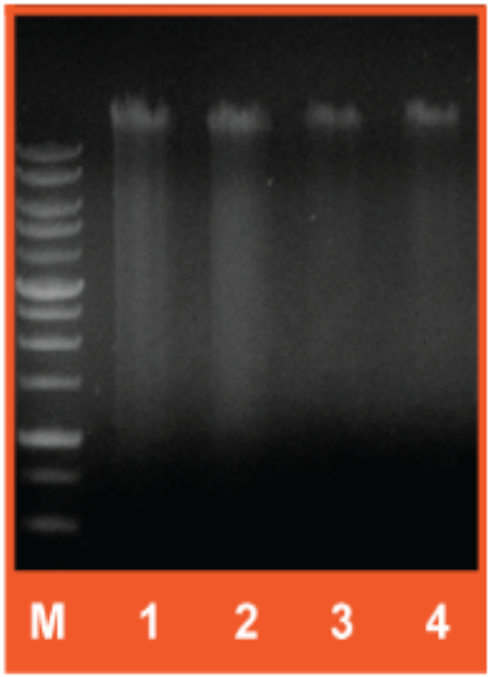


Figure 1. Genomic DNA (approximately 30 kb) was extracted using the Genomic DNA Maxi Kit (Plant). 0.5 g of fresh lemon leaves and 0.5 g of fresh coffee leaves were ground to a fine powder followed by DNA extraction. 2 µl aliquots from a 1 ml eluate were analyzed by electrophoresis on a 1% agarose gel.
M = Geneaid 1 Kb DNA ladder

Sample	DNA Conc.	260/280	Yield
1. Lemon Leaf	80.6 ng/µl	1.81	80.6 µg
2. Lemon Leaf	82.2 ng/µl	1.80	82.2 µg
3. Coffee Leaf	37.3 ng/µl	1.79	37.3 µg
4. Coffee Leaf	36.4 ng/µl	1.75	36.4 µg

3- Total RNA

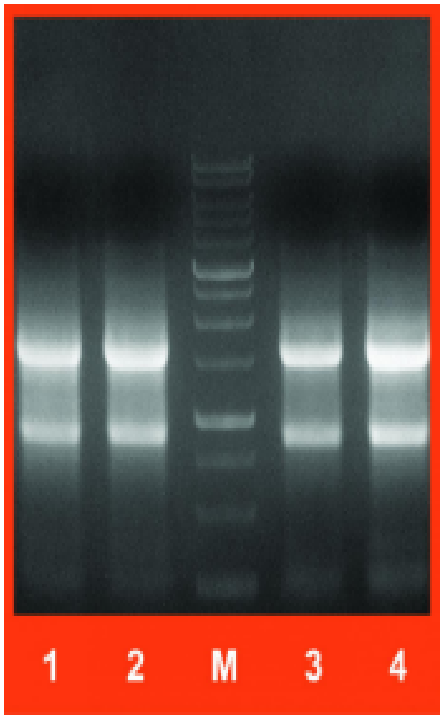


Figure 1. Total RNA from 1×10^6 293T cells was extracted using the Total RNA Mini Kit (Blood/Cultured Cell) and the equivalent competitors kit. The purified RNA was analyzed by electrophoresis on a 1% agarose gel. Lane 1, 2 = Geneaid, M = Geneaid 1 Kb DNA Ladder Lane 3, 4 = Competitor

Geneaid			Competitor		
Yield (µg)	260/280	260/230	Yield (µg)	260/280	260/230
28.70	1.96	2.32	20.50	1.85	2.31
29.90	1.99	2.02	28.90	1.84	2.32

Total RNA

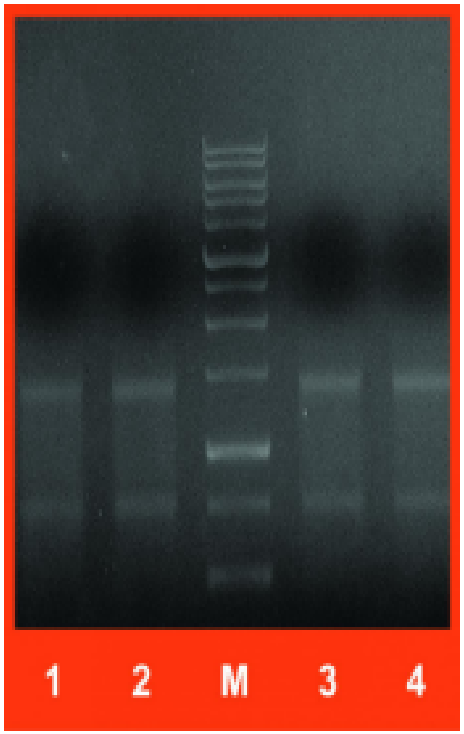


Figure 2. Total RNA from 300 µl of whole human blood was extracted using the Total RNA Mini Kit (Blood/Cultured Cell) and the equivalent competitors kit. The purified RNA was analyzed by electrophoresis on a 1% agarose gel. Lane 1, 2 = Geneaid
M = Geneaid 1 Kb DNA Ladder, Lane 3, 4 = Competitor

Geneaid			Competitor		
Yield (µg)	260/280	260/230	Yield (µg)	260/280	260/230
2.02	1.85	2.15	1.77	1.78	1.42
2.13	1.90	2.35	1.80	1.76	1.19

Total RNA

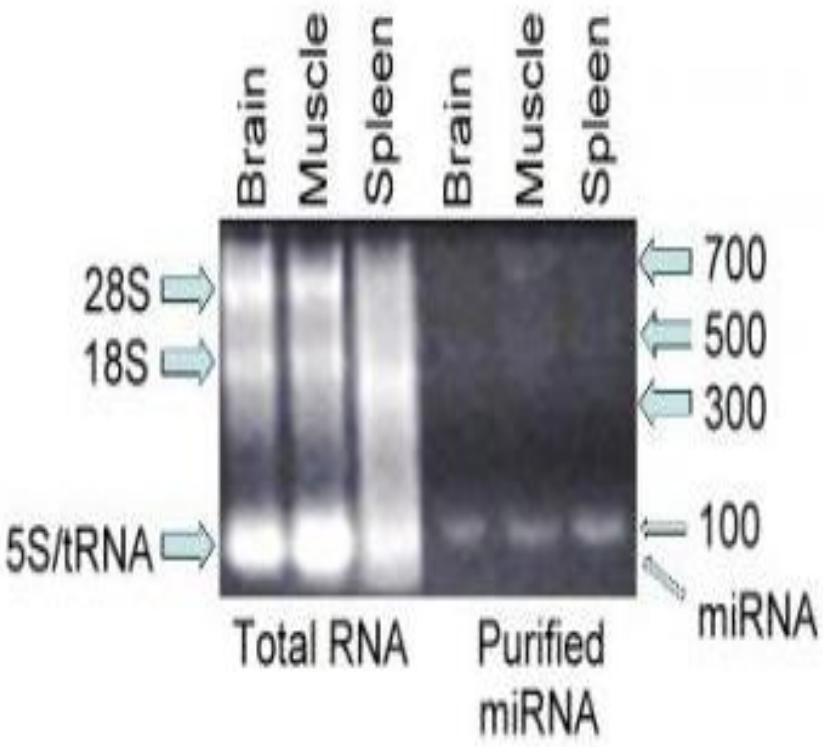


Figure 1. Total RNA from mouse tissue was isolated using a reagent system.10 µg of each RNA was subjected to miRNA isolation using the miRNA Isolation Kit. The purified miRNA was resolved in 50 µl of Release Buffer and a 1/10 volume aliquot (5 µl) was analyzed by electrophoresis on a 2% agarose gel.

Total RNA

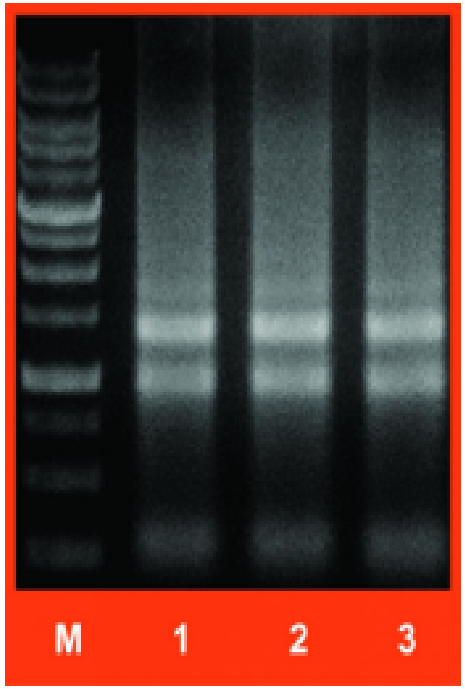


Figure 1. Total RNA was extracted using the Presto™ Mini RNA Yeast Kit. *Saccharomyces cerevisiae* (5×10^7) was harvested by centrifugation at 5,000 x g for 10 minutes. A 5 µl aliquot of purified RNA from a 50 µl eluate was analyzed by electrophoresis on a 0.8% agarose gel.
M = Geneaid 1 Kb DNA Ladder

Test	RNA Conc.	260/280	260/230	Yield
1	391.0 µg/ml	2.19	2.48	19.6 µg
2	389.9 µg/ml	2.19	2.51	19.5 µg
3	387.9 µg/ml	2.20	2.51	19.4 µg

Total RNA

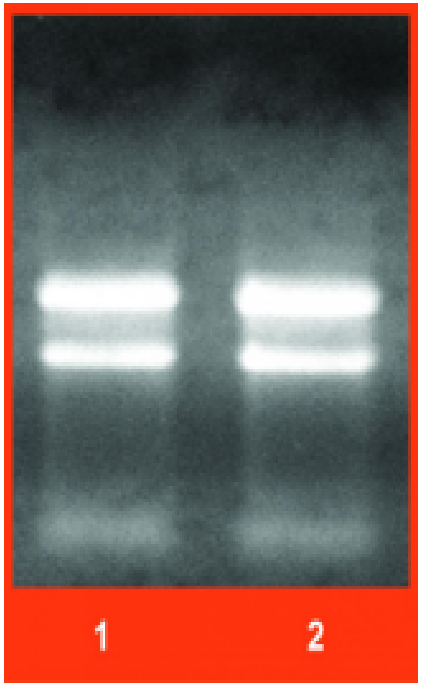


Figure 1. RNA was extracted using the Presto™ Mini RNA Bacteria Kit. An *Escherichia coli* (1×10^9) culture (OD600=1.3, 1 ml) was harvested by centrifugation at 16,000 x g for 1 minute. 10 µl from a 50 µl eluate of purified RNA was analyzed by electrophoresis on a 0.8% agarose gel.

Sample	Yield	260/280	260/230
1	41.56 µg	2.14	2.35
2	40.87 µg	2.15	2.32

Total RNA

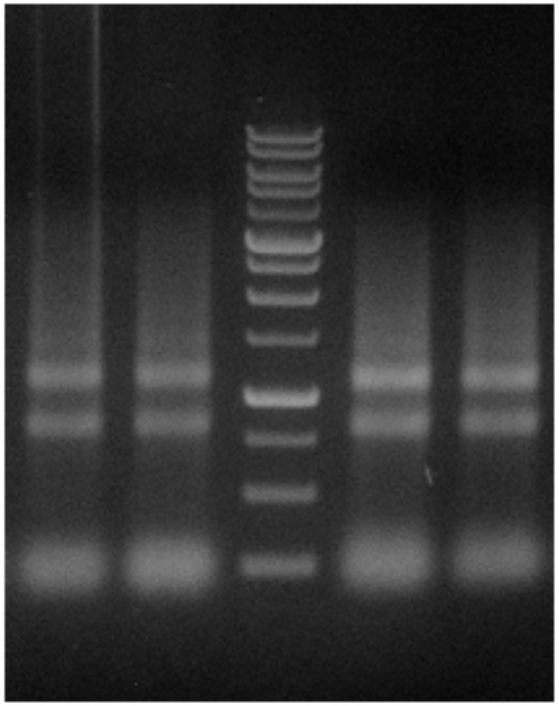


Figure 1. Bacterial RNA was extracted from 5 x 10^8 *E. coli* cells using our top competitor's TRI reagent and GENEzol™ Reagent. The *E. coli* cells were incubated with lysozyme for 5 minutes at room temperature. 1 ml of reagent was then added to the cell lysate. The RNA pellets were dissolved in 50 µl of RNase-free water.
TRI Reagent = 1, 2
GENEzol™ Reagent = 3, 4

Sample	ng/µl	260/280	260/230	Yield (µg)
1	241.3	1.77	0.66	12.1
2	260.2	1.83	0.85	13.0
3	315.6	1.78	0.75	15.8
4	293.4	1.81	0.80	14.7

Total RNA

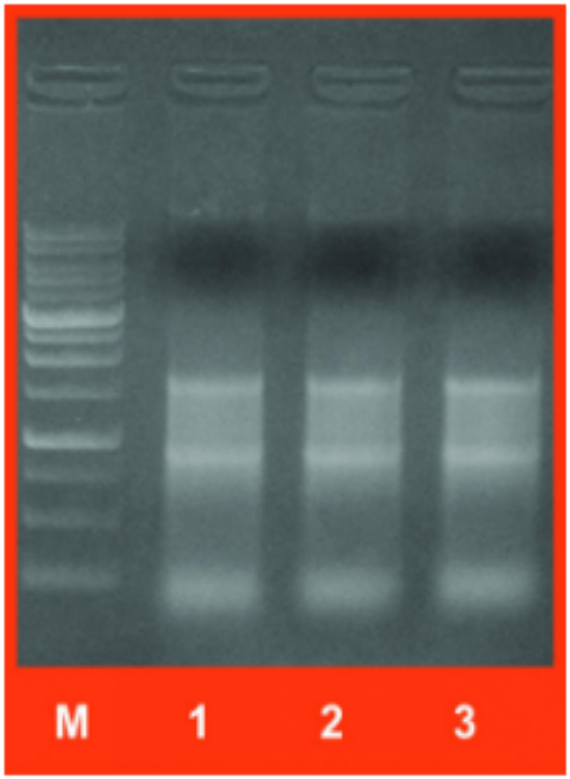


Figure 2. RNA from a 1 ml human blood sample was extracted using GENEzol™ Reagent. 10 µl from a 50 µl eluate of RNA was analyzed by electrophoresis on a 0.8% agarose gel. M = Geneaid 1 Kb DNA Ladder

Test	RNA Conc.	260/280	Yield
1	119.9 µg/ml	1.82	6.0 µg
2	135.5 µg/ml	1.76	6.8 µg
3	176.1 µg/ml	1.77	8.8 µg

Total RNA

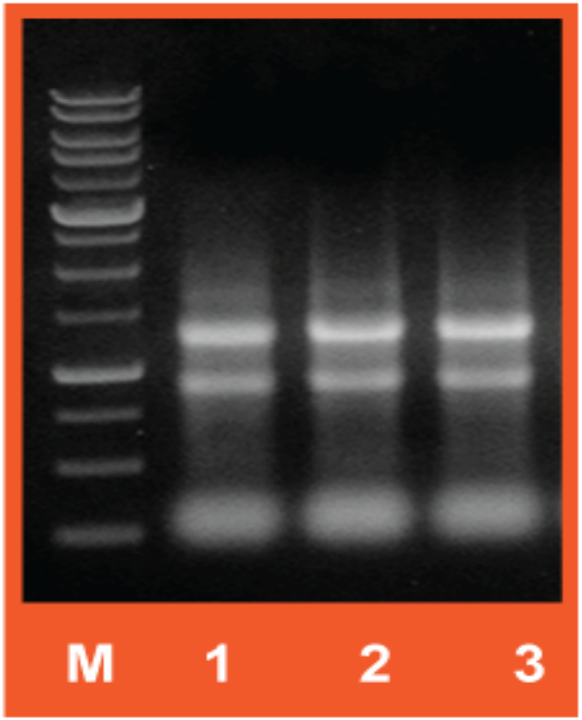


Figure 1. RNA was extracted using the GENEzol™ TriRNA Bacteria Kit. An *Escherichia coli* (1×10^9) culture (OD600=2, 1 ml) was harvested by centrifugation at 16,000 x g for 2 minutes, followed by RNA extraction. 5 µl from a 50 µl eluate of RNA was analyzed by electrophoresis on a 1% agarose gel.
M = Geneaid 1 Kb DNA Ladder

Test	RNA Concentration	260/280	260/230	Yield
1	502.6 µg/ml	2.06	2.18	25.13 µg
2	518.3 µg/ml	2.07	2.21	25.92 µg
3	506.0 µg/ml	2.08	2.24	25.30 µg

Total RNA

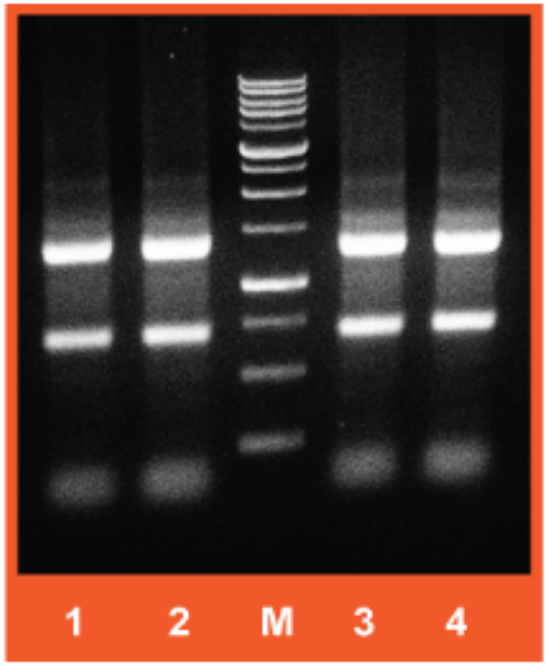


Figure 1. RNA was purified using the GENEzol™ TriRNA Pure Kit in parallel to the similar product from competitor Z. $5x10^5$ HeLa cells were homogenized using GENEzol™ Reagent and competitor Z tri reagent. RNA was then purified using the corresponing kits spin column procedure. 10 µl from a 50 µl eluate of purified RNA was analyzed by electrophoresis on a 0.8% agarose gel.

Test	RNA Conc.	260/280	260/230	Yield
1. Z	162.5 ng/µl	2.00	2.07	8.1 µg
2. Z	160.7 ng/µl	2.03	2.07	8.0 µg
3. Geneaid	164.0 ng/µl	2.00	2.07	8.2 µg
4. Geneaid	161.6 ng/µl	2.03	2.06	8.0 µg

Table 1. Total RNA purified using the GENEzol™ TriRNA Pure Kit and competitor Z.