

A simple, rapid and economic method of genomic DNA isolation

Manjusha Tyagi¹, Soni Devi, Anant Rai*

BTS Institute of Science & Technology, Mudiya Ahmadnagar, Bareilly-243122,UP, India

¹Sri Guru Ram Rai University, Dehradun

*Corresponding author: raia48@gmail.com

ABSTRACT

A simple, economic and rapid method of genomic DNA isolation from onion, brinjal, potato, lauki (Bottle gourd), banana, Colocasia root (Arvi) is described.

Keyword: DNA, genomic, isolation, vegetables

INTRODUCTION

Genomic DNA isolation from different sources has been described earlier (Sambrook and Russel, 2001) which needs many chemicals and reagents. A simple and economic method of genomic DNA isolation from onion has been described earlier which requires simple ingredients preset in household like detergent solution or powder, table salt and ethanol (Anon, 2003). In the present work, the method described has been further modified and applied to other soft tissue containing vegetables.

MATERIALS AND METHODS

Genomic DNA extraction

The method described by the Office of Biotechnology, Iowa State University, USA (Anon, 2003) was modified and used to isolate DNA from onion, banana, potato, bottle gourd, brinjal, colocasia root. A 10% solution of household detergent and a 10% solution of table salt (iodised or non-iodised) was prepared. Water bath was set up at 60°C. Took 2 ml detergent/surf solution in a tube, added 2 ml NaCl solution. Chopped 1/8 of peeled off onion and cut into small pieces and put into the solution above and kept the tube in water bath at 60°C for 15 min. During this time, pressed the chopped onion mixture against the side of the tube with the back of the spoon. Then filtered the mixture through a tea filter put on a small funnel placed in a transparent glass or plastic tube. In a fresh tube, placed about 1 cm of alcohol into bottom of the tube and added 2 ml onion solution. Let the solution stand for 3 min. DNA is not soluble in alcohol, the components of the mixture, except DNA, stay in solution while the white DNA precipitates out into the alcohol layer and it has the appearance of white mucus. All other samples were also processed using this method.

Assay of DNA

The DNA concentration and its purity was assayed in Eppendorf spectrophotometer with micro-cuvette using 1.5 µl DNA.

Agarose gel electrophoresis

The DNA samples were also run in 0.7% horizontal submarine agarose gel electrophoresis to check the DNA bands.

RESULTS AND DISCUSSION

The results obtained are presented in Table 1 and Fig 1 & 2. It is evident from Fig 1 that DNA were precipitated out in ethanol and appeared as a coil of DNA and as mucus. This method does not involve costly chemicals or equipments and is thus very suitable for use in ordinary laboratories, students practicals etc.

Table 1. Isolation of genomic DNA.

Sl No	Sample	DNA conc (µg/ml)	DNA purity A260/A280
1.	Lauki (Bottle gourd)	91.1	2.75
		106.4	1.69
2	Onion	19.5	3.29
		44.2	1.24
		17.8	4.21
3	Potato	66.8	2.04
		30.9	1.06
		15.2	0.5
4	Banana	37.7	3.77
		207.9	1.5
5	Brinjal	92.7	1.55
6	Colocasia root (Arvi)	85.2	1.44
		178.6	1.28

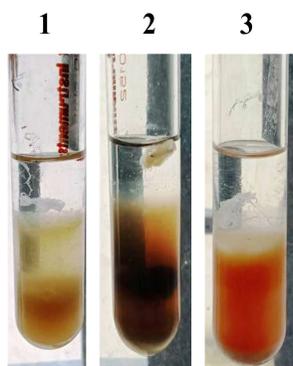


Fig.1. Genomic DNA isolated. Lane 1-banana, 2- potato, 3- arvi (Colocasia root).

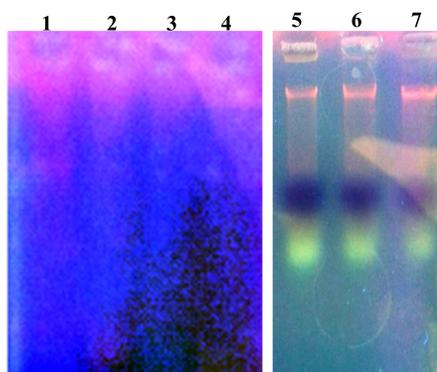


Fig.2 . Agarose gel electrophoresis of genomic DNA. Lane 1: onion, 2: potato, 3: banana, 4: arvi, 5: lauki (Bottle gourd), 6: brinjal, 7: onion

Genomic DNA from several vegetables were successfully isolated. Anon (2003) has already described that the detergent dissolves the fatty molecules that hold the cell membranes together, which releases the DNA into the solution. The detergent causes the cell membrane to break down by dissolving the lipids and proteins of the cell and disrupting the bonds that hold the cell membrane together. The detergent then forms complexes with these lipids and proteins, causing them to precipitate out of solution. The salt enables the DNA strands to come together, the salt shields the negative phosphate ends of DNA, which allows the ends to come closer so the DNA can precipitate out of a cold alcohol solution. An onion is used because it has a low starch content, which allows the DNA to be seen clearly. On the same principle, other vegetables or fruits with soft tissue can be used for DNA isolation.

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