

# This Week's Citation Classic™

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**Peacock A C & Dingman C W.** Molecular weight estimation and separation of ribonucleic acid by electrophoresis in agarose-acrylamide composite gels.

*Biochemistry—USA* 7:668-74, 1968.

[Chemistry Branch, Natl. Cancer Inst., Natl. Insts. Health, Bethesda, MD]

A composite gel of agarose and acrylamide was used for the electrophoretic analysis of RNA. In addition to affording high resolution of RNA mixtures, the molecular weight of each species could be estimated from its electrophoretic mobility. [The *SCI*<sup>®</sup> indicates that this paper has been cited in over 1,135 publications since 1968.]

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After our initial excitement over finding that acrylamide could be used as a solid support for the electrophoresis of RNA<sup>1</sup> wore off, we began to find that use of the low-percentage acrylamide gels required for the study of larger RNAs was cumbersome. Gels at 3 percent or less swelled during staining and became very difficult to handle. We wanted to strengthen the gels but keep the desirable resolution afforded by the acrylamide. A few years earlier, Uriel<sup>2,3</sup> had described the preparation of 3 to 7 percent acrylamide gels with added agarose. Once we hit on the importance of gelling the agarose first, gels composed of a mixture of agarose and low concentrations of acrylamide

were rather easily obtained. The remarkable toughness and strength of these gels, even though the separate constituents barely made a coherent gel, still surprise me. While studying the properties of the composite gels, we ran some without acrylamide. I believe these gels were the first to be used to separate DNA by electrophoresis on agarose. We did not, of course, realize the extent to which this kind of application would revolutionize molecular biology. In fact, we used DNase to get rid of the DNA.

The ease of handling and the dimensional stability of these composite gels made it very easy to make reliable measurements of migration distances. We found that useful estimates of molecular weights could be derived from the data. I believe that the ease with which these gels can be made and their wide range of application has led to the method being frequently used and cited.

The most valuable personal results of this work were my associations with Wes Dingman, who has since left the National Cancer Institute to practice psychiatry, and with Sylvia Bunting, my extremely competent technical collaborator over many years, who ran all the gels. Sadly, Bunting died unexpectedly, during the preparation of this note. Her booklet outlining details of our methods and her technical assistance to those who called or visited our laboratory have contributed to advances in knowledge and understanding of nucleic acids. The cited work is as much their contribution as it is mine.

1. Peacock A C & Dingman C W. Resolution of multiple ribonucleic acid species by polyacrylamide gel electrophoresis. *Biochemistry—USA* 6:1818-27, 1967. (Cited 830 times.)
2. Uriel J. Méthode d'électrophorèse dans des gels d'acrylamide-agarose. *Bull. Soc. Chim. Biol.* 48:969-82, 1966. (Cited 300 times.)
3. Uriel J & Berges J. Un nouveau support pour des séparations électrophorétiques: le gel mixte d'acrylamide-agarose. *CR Acad. Sci. Ser. C* 262:164-7, 1966. (Cited 20 times.)