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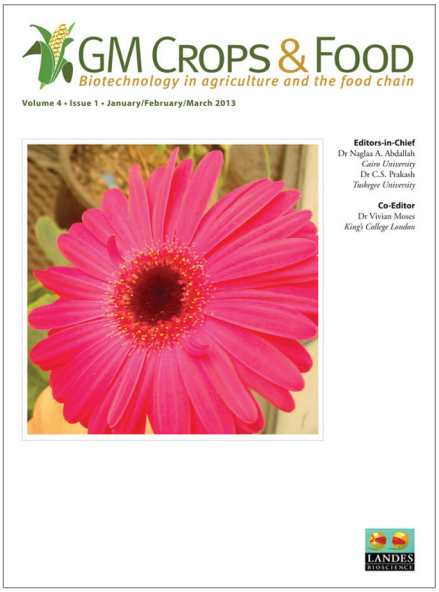
Landes Highlights

Ethiopias GM-law needs reform

Dr Adane Abraham of the Ethiopian Institute of Agricultural Research reviews the current Ethiopian regulations on genetically modified organisms. On September 9, 2009, Ethiopia had enacted a highly restrictive biosafety law firmly based on precautionary principles as a foundation for its GMO regulation system. Its drafting process, led by the country's Environmental Protection Authority, is judged as biased, focusing only on protecting the environment from perceived risks, giving little attention to the potential benefits of GMOs. Many of its provisions are very stringent, exceeding those of the Cartagena Protocol on Biosafety, while others cannot be fulfilled by applicants, collectively rendering the emerged biosafety system unworkable. These provisions include requirements for advance informed agreement and rigorous socioeconomic assessment in risk evaluation for all GMO transactions, including contained research use—which requires the head of the competent national authority of the exporting country to take full responsibility for GMO-related information provided—and stringent labeling, insurance and monitoring requirements for all GMO activities. Furthermore, there is no provision to establish an independent national biosafety decision-making body(ies). As a result, foreign technology owners that provide highly desirable technologies, like Bt cotton, declined to work with Ethiopia. There is a fear that the emerged biosafety system might also continue to suppress domestic genetic engineering research and development. Thus, to benefit from GMOs, Ethiopia has to revise its biosafety system, primarily by making changes to some provisions of the law in a way that balances its diverse interests of conserving biodiversity, protecting the environment and enhancing competition in agricultural and other economic sectors.



Reference

Abraham A. Toward a workable biosafety system for regulating genetically modified organisms in Ethiopia: Balancing conservation and competitiveness. GM Crops Food 2013; 4:28-35; PMID:23580251.

Bacteriophage protection against infection

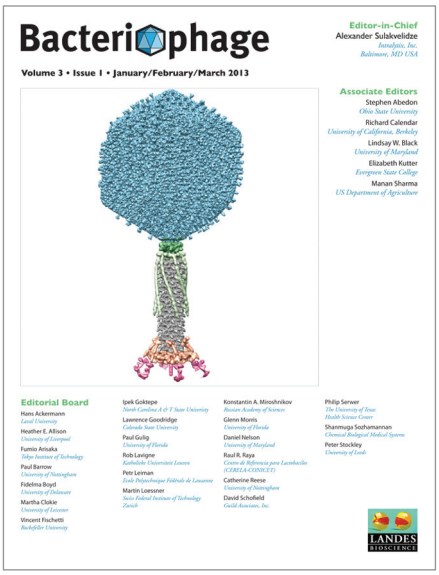
In the most recent issue of *Bacteriophage*, two research articles were published exploiting the potential protective mechanisms of phages against *E. coli* O157:H7.

In the first study, Manan Sharma and his colleagues from the United States Deprtment of Agriculture investigated the role of lytic bacteriophages in preventing cross contamination of produce.

A cocktail of three lytic phages specific for *E. coli* O157:H7 (EcoShield™) or a control was applied to lettuce by immersion of spray treatments. After immersion studies, lettuce was spot-inoculated with *E. coli* O157:H7. Phage-treated, inoculated lettuce pieces were stored at 4°C for and analyzed for *E. coli* O157:H7 populations for up to 7 d. Both immersion and spray treatments provided protection from *E. coli* O157:H7 contamination on lettuce, but spray application of lytic bacteriophages to lettuce was more effective in immediately reducing *E. coli* O157:H7 populations fresh cut lettuce.

In the second study, Ipek Goktepe and his colleagues investigated the effectiveness of the same EcoShield™ in controlling *E. coli* O157:H7 levels on leafy greens in combination with modified atmosphere packaging.[1]

The results of this study showed that bacteriophages were effective in reducing the levels of *E. coli* O157:H7 on fresh leafy produce, and that the reduction was further improved when produce was stored under modified atmosphere (5% O2/35% CO2/60% N2).[2]



References

1. Ferguson S, Roberts C, Handy E, Sharma M. Lytic bacteriophages reduce *E. coli* O157:H7 on fresh cut lettuce introduced through cross-contamination. Bacteriophage 2013; 3:e24323; http://dx.doi.org/10.4161/bact.24323

2. Boyacioglu O, Sharma M, Sulakvelidze A, Goktepe I. Biocontrol of *Escherichia coli* O157:H7 on fresh-cut leafy greens: Using a bacteriophage cocktail in combination with modified atmosphere packaging. Bacteriophage 2013; 3:e24620

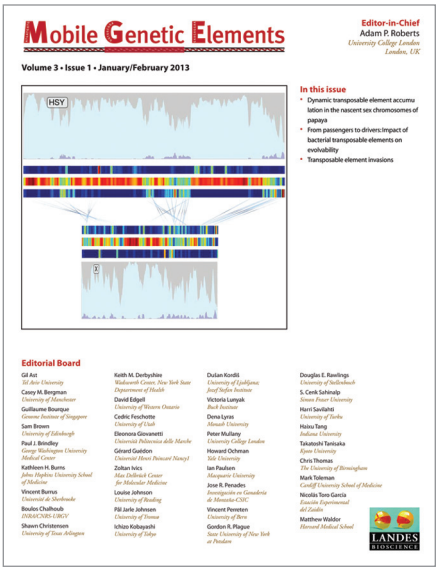
Horizontal transfer on 16S rRNA between species

In this mini-review, the authors discuss recent new insights into the potential for horizontal transfer of 16S rRNA sequence between bacterial species.

Current methods used for phylogenetic classification of prokaryotes largely rely on the sequences of 16S rRNA genes that are ubiquitously present in the cell. The theoretical basis of this methodology is based on the assumption that 16S rRNA genes are only vertically inherited and are thus indigenous to each species. However, microbial genomic analysis has revealed the existence of prokaryotic species containing two types of rRNA (rrn) operons of seemingly different origins. It has also been reported that some bacteria contain 16S rRNA that are mosaics of sequences from multiple species. This suggests that horizontal gene transfer (HGT) occurred for 16S rRNA genes.

In addition, a recent HGT experiment mimicking the natural HGT process has shown that a wide range of foreign 16S rRNA genes can be transferred into *E. coli*, including those from different phylogenetic classes

The authors argue that because it has been known that subtle alterations in ribosomal components can induce large phenotypic changes in bacteria, the 16S rRNA gene may be a promising target for molecular engineering to manipulate bacterial phenotypes.



Reference

Kitahara K, Miyazaki K. Revisiting bacterial phylogeny: Natural and experimental evidence for horizontal gene transfer of 16S rRNA. Mobile Genet Elements 2013; 3:e24210; http://dx.doi.org/10.4161/mge.24210