



**JOINT FAO/WHO FOOD STANDARDS PROGRAMME  
CODEX COMMITTEE ON PESTICIDE RESIDUES**

**49<sup>th</sup> Session**

**Beijing, P.R. China, 24-29 April 2017**

**MATTERS OF INTEREST ARISING FROM FAO AND WHO  
IN ADDITION TO THE 2016 JMPR ACTIVITIES**

**Update on FAO work on Antimicrobial Resistance with a focus on Antimicrobial Use in Horticulture**

(Prepared by FAO and WHO)

**Background**

1. Pesticides used in horticulture and ornamental plant production are valuable tools to prevent and treat a wide variety of diseases and plant pests, to improve quality, enhance yield, extend shelf-life, and increase profits. The loss of effectiveness of pesticides, due to decreased susceptibility or resistance of the pests, develops as a natural genetic process among weeds, insects, and microorganisms, but is paradoxically accelerated by the use of the product, chemical, antimicrobial agent itself. Thus, appropriate and prudent use of pesticides is critical in maintaining pesticide efficacy.
2. In regards specifically to the use of antimicrobial agents to treat bacterial and fungal plant diseases, antimicrobial resistance (AMR) is already common among plant pathogens. Some antimicrobial agents are no longer effective treatment options. For example, use of tetracyclines have increased for the treatment of fire blight, because of widespread streptomycin resistance among *Erwinia amylovora* as a result of extensive use. In a similar fashion, resistance to copper, in addition to streptomycin resistance, is reported in isolates of *Xanthomonas campestris* pv. *vesicatoria*, the causative agent of bacterial spot.
3. However, the concern about AMR in horticulture extends beyond AMR among phytopathogens and treatment failure: Antimicrobial resistance to streptomycin and to tetracyclines is common among epiphytic and soil bacteria recovered from farms. Thus, the concern is not only for resistance development in the target species but also among all the microorganisms in the farm environment, including human and animal pathogens. The problem is further exacerbated by the potential for multiple resistance genes to be genetically linked, and the ability of bacteria to exchange these genes with other bacteria, including those organisms infectious to animals and humans. For example, genetic components responsible for AMR emerging in *Salmonella* strains isolated from animals were indistinguishable from those previously only reported in plant pathogens. Several of the same antimicrobial drugs are used in horticulture, and in human and veterinary medicine. Use of these drugs in one sector can drive resistance in all sectors.
4. In light of the known role of antimicrobial use in the selection of AMR bacteria in human medicine and animal agriculture, the aforementioned examples of AMR in horticultural production systems raises questions about the potential for similar processes also occurring during plant production. AMR bacteria are also recovered from farms with limited history of antibiotic use. The extent to which antimicrobials (antimicrobial pesticides) are used in plant agriculture in different production systems and in different geographic areas to combat various phytopathogenic pressures are poorly documented. Additional data is required to evaluate the risk and benefits of the use of these products in horticulture and determine the extent to which their use in this capacity may contribute to AMR.

5. The 39<sup>th</sup> session of the Codex Alimentarius Commission established a new ad hoc Task Force on Antimicrobial Resistance. A first Codex working group meeting on this issue was held in London in December 2016. This meeting further refined the project documents which serve as the basis for the work of the ad hoc Task Force and also refined the request for scientific advice from FAO and WHO related to AMR in support of the work of the Task Force. As part of that request, the working group highlighted in particular the lack of information on antimicrobial use in the plant production sector and potential impact on foodborne AMR and indicated in Appendix 3 of [CX/CAC 17/40/12 Add.2](#)<sup>1</sup>
6. FAO and WHO are initiating their response to this request by collating existing information on foodborne AMR and potential contributors to this, including the use and potential impact (if any) of antimicrobial pesticides on foodborne AMR.

**For consideration by the Committee:**

7. In the context of this request for scientific advice Codex members and Delegates to the Codex Committee on Pesticide Residues are requested to consider supporting the scientific advice work on foodborne AMR by identifying sources of data on antimicrobial use in horticulture systems and supporting data collection efforts by responding where possible to the following questions related to antimicrobial use in plant production systems.
  - A. Are any of the following products used in your country or region to enhance plant health, treat or prevent plant diseases, or reduce post-harvest losses:
    - i. Copper-containing compounds
    - ii. Oxytetracycline
    - iii. Streptomycin
    - iv. Oxalinic Acid
    - v. Kaguamycin
    - vi. Colisitin
    - vii. Triazole fungicides
    - viii. Chitosan
    - ix. Please list other specific agents used for bacterial and fungal infections of plants
  - B. What crops/commodities are most frequently treated with these agents?
  - C. How frequently are the products applied? *E.g.* several times during the growing season? Only at harvest? To fields during the fallow period? Constantly in irrigation water? Other?
  - D. What is the dose most commonly used?
  - E. Is the sale of these products for horticultural use documented? By whom? Is it available??
  - F. What additional information do you know that is available about antimicrobial pesticide use in horticulture?

Queries and replies can be directed to Jeffrey LeJeune, Food Safety and Antimicrobial Resistance, FAO food Safety and Quality Unit at [Jeffrey.lejeune@fao.org](mailto:Jeffrey.lejeune@fao.org)

A further update on this work will be provided during the next session of the Codex Alimentarius Commission and further requests for data and information will be circulated to Codex Member countries in the coming months.

---

<sup>1</sup> A footnote in the Terms of Reference for the Provision of Scientific advice on Antimicrobial Resistance indicates “ As a result of relatively limited information on the link between the use of antimicrobials on crops and foodborne AMR, strong emphasis should be placed on developing scientific advice in this area. For example, antimicrobial resistant organisms/determinants due to antimicrobial use in crops, and antimicrobial resistant organisms/determinants in environment due to antimicrobial use in crops.”