PFAS Current Knowledge and Remediation Strategies for Agricultural Production: Livestock

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Per- and polyfluorinated substances (PFAS) are of growing concern in the agricultural community due to use of contaminated biosolids on agricultural fields and contaminated water from use of firefighting foams for irrigation and livestock watering. PFAS have been measured in livestock including chickens, pigs, goats, and cattle. Animal products such as eggs and milk have also been shown to contain PFAS compounds. Livestock are exposed to PFAS through contaminated water and feed including forage crops from pasture lands. Limited data exist on the bioavailability, absorption, accumulation, distribution, and excretion of PFAS in livestock species. There are a few studies on beef cattle, dairy cows, and poultry. Even fewer on turkeys, pigs, goats, sheep, and other minor species (i.e., rabbits, bison, ducks, geese) that are of significance to underrepresented populations. It is well established that perfluoro carboxylic acids do not readily accumulate in cattle (beef or dairy) however the perfluoro sulfonates have long half-lives in ruminants. In contrast to cattle, broiler chickens accumulate carboxylic acids and sulfonates in plasma during chronic exposure to contaminated water. Unfortunately, there are not many mitigation strategies available to remediate PFAS contamination in affected livestock. Depuration is one strategy, however clean feed and water need to be provided to livestock and this process might not be economically viable for longer lived species such as cattle.