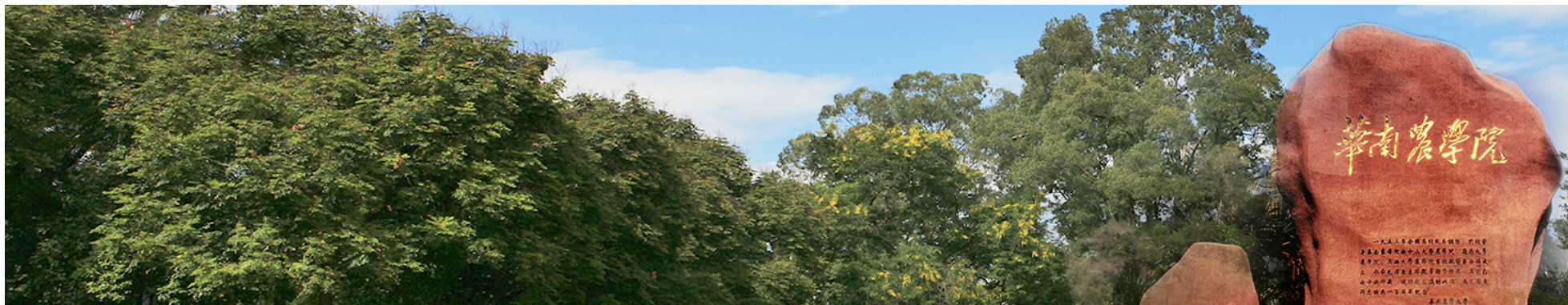


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唐湘如教授团队在水稻重金属铅和镉污染治理研究取得新进展

审核发布：宣传部 曾子焉 来源单位及审核人：农学院 发布时间：2020-07-20 浏览次数：2269

近日，我校农学院唐湘如教授团队在国际环境科学与生态学领域TOP期刊Chemosphere (IF2019=5.778) 上发表了两篇关于水稻植株中铅的积累和转运及钝化剂降低水稻糙米中镉含量的研究论文：“Application of inorganic passivators reduced Cd contents in brown rice in oilseed rape-rice rotation under Cd contaminated soil” (论文在线网址：<https://doi.org/10.1016/j.chemosphere.2020.127404>) 和 “Lead (Pb) distribution and accumulation in different plant parts and its associations with grain Pb contents in fragrant rice” (论文在线网址：<https://doi.org/10.1016/j.chemosphere.2020.126003>)。



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Application of inorganic passivators reduced Cd contents in brown rice in oilseed rape-rice rotation under Cd contaminated soil

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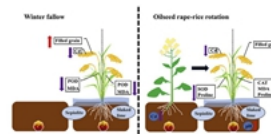
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HIGHLIGHTS

- Slaked lime and sepiolite application reduced the Cd contents in brown rice.
- Planting winter rape and passivator application increased soil pH.
- Antioxidant activities were regulated by passivator application under Cd stress.
- Rice sown after oilseed rape gave better yields than sown after fallow fields.

GRAPHICAL ABSTRACT



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Lead (Pb) distribution and accumulation in different plant parts and its associations with grain Pb contents in fragrant rice

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HIGHLIGHTS

- Pb accumulation in fragrant rice is concentration-dependent and genotype-specific.
- Grain Pb contents were associated with leaves and ear Pb contents.
- Grain Pb contents were related with translocation factor from leaves to ears at reproductive stage.
- Translocation of Pb to ears can be used an index to estimate the final grain Pb contents.

GRAPHICAL ABSTRACT



土壤中超过潜在限值的镉和铅浓度不仅会严重抑制水稻的正常生长，也会造成稻米重金属铅和镉超标的现象。为了减少在镉污染种植区水稻对镉的吸收，通过在油菜-水稻轮作体系中施用自己配制的钝化剂，用来改变土壤的pH及理化性质，从而降低糙米中Cd的含量。研究发现，在油稻轮作模式下，施加海泡石作为钝化剂显著提高土壤pH，抑制水稻根系吸收Cd离子，减少Cd在水稻体内的转运与积累，从而降低糙米中的Cd含量。此外，由于钝化剂减少Cd对水稻的毒害作用，抗氧化酶活性显著低于对照组，同时保证了稻米产量。土壤中的铅通过水稻根系吸收后在植株体内富集，并转运至水稻的籽粒。研究发现，不同香稻品种对铅的积累存在一定差异，水稻根系中积累的铅含量最高，籽粒中积累的铅含量最低，从茎到叶的转运系数大于根到茎、叶到籽粒的转运系数。成熟期籽粒铅含量与穗部铅含量、以及铅从叶片到

穗部的转运系数呈极显著正相关。而且，铅毒害会显著影响到香稻的产量。因此，抽穗期稻穗铅含量可作为预测成熟期籽粒最终铅含量重要指标。

论文的第一作者分别为唐湘如教授指导的2017届博士毕业生Umair Ashraf和农学院2018级在读博士研究生黄穗华，唐湘如教授均为通讯作者。本研究得到国家自然科学基金(31271646)、广东省水稻产业体系创新团队耕作与土肥岗位专家(2019KJ105)和世界银行贷款广东农业面源污染治理项目南方农田重金属污染防治研究与示范(07241510A08N3684)的资助。(文/图农学院 何隆鑫)

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