production workers can be exposed to inhalational hazards such as diacetyl and 2,3-pentanedione, which are associated with the development of occupational respiratory disease, including obliterative bronchiolitis, a rare and irreversible lung disease.

Objective Identify determinants contributing to task-based exposures to alpha-diketones, specifically diacetyl and 2,3-pentanedione, at 17 U.S. coffee roasting and packaging facilities.

Methods We collected 606 personal task samples including roasting (n=189), grinding (n=74), packaging (n=203), quality control (n=44), flavoring (n=15), and miscellaneous production/café (n=81). Samples were collected and analyzed according to the modified OSHA Method 1013/1016. Information on sample-level and process-level factors relating to production scale, sources of alpha-diketones, and engineering controls was collected during surveys. Bayesian mixed-effect regression models accounting for censored data were fit for overall data and specific tasks including roasting, grinding, packaging, quality control, and flavoring. Significant determinants were used in multiple regression models using variable selection or model averaging Bayesian methods.

Results Task-based sample durations ranged from 2–86 minutes. Total number of alpha-diketone sources, sum of all open storage sources, average roasted coffee production per day, average percent of production as ground coffee, flavoring during survey, and number of grinders all resulted in increased exposures for at least one task category. General exhaust ventilation (GEV) with natural ventilation, supply air turned on, and GEV turned on resulted in lowered exposures for at least one task category.

Conclusions GEV and supply air turned on and natural ventilation were identified in most models as determinants which reduced exposures. Open storage of roasted coffee and flavoring during survey were significant in most models contributing to higher task exposures and can be targeted for exposure mitigation to reduce short-term and full-shift exposures and minimize risks for respiratory disease.

0-137 ASSESSMENT OF MULTIPLE EXPOSURES TO CHEMICAL AGENTS IN FRENCH WORKPLACES: FINDINGS FROM TWO EXPOSURE DATABASES

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10.1136/OEM-2021-EPI.45

Background National surveys of the French working population estimate that approximately 15% of all workers are exposed to at least three different chemical agents at work. However, the most prevalent coexposure situations and their associated health risks remain relatively understudied.

Objective To characterize occupational coexposure situations in France using available data from two occupational exposure databases.

Methods We extracted personal measurement data from the Colchic and Scola databases for the period 2010–2019. We selected 118 chemical agents that had ≥ 100 measurements with detected concentrations, including 31 carcinogens (IARC groups 1, 2A, and 2B). We grouped measurements by work situation (WS, combination of sector, occupation, task, and

year). We characterized the mixtures across WS using frequent itemset mining methods.

Results We retained 275,213 samples from 32,670 WS, encompassing 4,692 unique mixtures. Workers in thirty-two percent of all WS were exposed to ≥ 2 agents (median 3 agents/WS, interquartile interval 2–5) and 13% of all WS contained ≥ 2 carcinogens (median 2 carcinogens/WS, maximum 14). The most frequent coexposures across all agents were ethylbenzene-xylene (1,550 WS), quartz-cristobalite (1,417 WS), and toluene-xylene (1,305 WS). Prevalent combinations of carcinogens also included hexavalent chromium-lead (368 WS) and benzene-ethylbenzene (314 WS). Agents with the lowest proportions of coexposure were wood dust (6% of WS exposed to at least one other agent) and asbestos (8%). Tasks with the highest proportions of coexposure to carcinogens include electric arc welding (37% of WS with coexposure), polymerization and distillation (34%), construction drilling and excavating (34%), and water collection and treatment (32%).

Conclusion Coexposure to multiple chemical agents, including carcinogens, was highly prevalent in the databases, and should be taken into account when assessing exposure risks in the workplace. However, these databases do not necessarily represent a random sample of the working population, thereby limiting the generalizability of our findings.

0-156 PESTICIDE EXPOSURE IN FRUIT GROWERS: COMPARISON OF LEVELS AND DETERMINANTS FROM THE CANEPA FIELD STUDY AND FROM THE 'AGRICULTURAL OPERATOR EXPOSURE MODEL' (AOEM) PREDICTIONS

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10.1136/OEM-2021-EPI.46

Introduction Pesticide exposures increase the risk of chronic diseases in farmers. Knowledge of exposure levels are needed for epidemiological studies and for regulation. In pesticide registration process, operator's exposure is predicted by the AOEM, set up in 2014 by the European Food Safety Authority, based on thirty studies conducted by the pesticide industry. To date, we are not aware of any field study comparing predicted data with those measured under real working conditions.

Objective We aimed to compare operators' exposures during treatment days in apple-growing under non-controlled conditions of work and values predicted by AOEM.

Methods Thirty apple growers from the French CANEPA study, were observed applying two fungicides (captan/dithianon) in 2016–2017. Dermal exposure was measured by body patches and cotton gloves. Detailed parameters about the farm, operator, application day, spraying equipment and personal protective equipment (PPE) used were recorded. For each observation, the corresponding exposure was calculated by the AOEM, using these parameters. The relationship between measured and calculated exposures was studied by linear regression.

Results Significant linear correlation was observed between calculated and measured daily exposures. Overall, the model