INTRODUCTION AND AIMS: Chronic kidney disease (CKD) is characterized by accumulation of uremic toxins especially, some protein-bound uremic toxins as p-cre-shaped glycine which are considered to be associated with an increase of cardiovascular (CV) disease and mortality. 3-Carboxy-4-methyl-5-propyl-2-furanpropionic acid (CMPF) is a metabolite of furan fatty acid and is increased in patients consuming fish oil. Blood CMPF levels are elevated in CKD stage 3 and 4 and are poorly removed by haemodialysis (HD). CMPF interacts with free oxygen radicals, which can induce cell damage. Therefore, CMPF has been reported to inhibit erythropoietin and contribute to the development of thyroid abnormalities which improved neurological function. The role of CMPF in beta-cell dysfunction and metabolic syndrome in still under debate. This work aims to investigate the potential association between CMPF levels and (i) biochemical and nutritional parameters that are disturbed in HD, (ii) CV events and (iii) mortality.

METHODS: 252 patients undergoing maintenance HD in Lyon, France, were included. 14 patients were excluded because of a lack of serum. At the inclusion, we performed a dosage of serum CMPF by HPLC-UV technique and routine clinical biochemistry tests. Body composition parameters including the lean tissue index (LTI, kg/m²) and fat tissue index (FTI, kg/m²) were measured using a bioimpedance spectroscopy method (BCM®, Fresenius Medical Care, Germany). The enrolled patients were correspondently monitored for CV events and mortality. During the mean study period of 937 days, 48 patients died and 56 suffered a CV event.

RESULTS: Median of serum CMPF was 2.55 mg/l (1.00-5.23). Kaplan-Meier analysis showed no significant correlation between elevated serum CMPF and an increase of all-mortality risk (log rank, p = 0.41). Spearman correlation analysis revealed a positive correlation between high serum CMPF and albumin (r = 0.20 [0.07-0.32], p = 0.003), prealbumin (r = 0.16 [0.02 to 0.29], p = 0.02), creatinine (r = 0.18 [0.05 to 0.30], p = 0.004), body mass index (BMI) (r = 0.16 [0.03 to 0.29], p = 0.01) and LTI (r = 0.33 [0.09 to 0.54], p = 0.007). Subsequently, CMPF was negatively correlated to protein energy wasting (PEW) criteria (r = -0.18 [-0.30 to -0.05], p = 0.006). There was no association between CMPF and metabolic parameters such as glycemia, HbA1C, cholesterol or triglycerides. CMPF levels were not higher in type 2 diabetes patients (p = 0.21). As expected, higher CMPF was positively correlated to dialysis vintage (r = 0.16 [0.03 - 0.29], p = 0.01).

CONCLUSIONS: This is the first largest prospective cohort of serum CMPF dosage in HD patients. Our data suggest that CMPF accumulation is not associated to CV risk in this population. Moreover, in this study, CMPF accumulation is not associated with metabolic disturbances. However surprisingly, CMPF is associated with a better nutritional status, consistent with the hypothesis that CMPF would be a marker of healthy diet and omega 3 intakes. Further studies are needed to understand the role of CMPF in CKD and HD.