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Sensory metabolites profiling in *Myristica fragrans* (Nutmeg) organs and in response to roasting as analyzed *via* chemometric tools

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1 **For submission to:** *LWT Food Science & Technology*

2 **Sensory metabolites profiling in *Myristica fragrans* (Nutmeg) organs and in response to**
3 **roasting as analyzed via chemometric tools**

4 **Running Title:** *Nutmeg aroma & flavour metabolomics*

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13 **Abstract**

14 *Nutmeg* is a plant grown in tropical region for its seeds distinct flavor, nutritive value
15 and health benefits. Despite extensive studies on *nutmeg* seed metabolites composition, much
16 less is known regarding volatiles composition in the seed outgrowth mace and fruit and or
17 roasting impact on its flavor. A volatile extraction method was applied for the first time to
18 reveal for nutmeg distinct aroma using headspace solid-phase microextraction (SPME)
19 coupled to mass spectrometry. A total of 53 volatiles were identified belonging to various
20 classes *viz.*, aromatic ethers, monoterpenes and sesquiterpenes. Compared to seeds and mace
21 tissue, fruit was found more enriched in the key flavor “myristicin” 40 %. In contrast,
22 monoterpene hydrocarbons amounted as major volatile forms in seeds. Compared to *nutmeg*
23 fruit, roasted seeds showed a distinct aroma composed of (*E*)-isoeugenol 16 % and
24 methoxyeugenol 11 % not detected in fresh seed concurrent with lower anti-nutrient alkaloid
25 levels. GC–MS was further utilized to localize primary metabolites (*i.e.*, sugars and organic
26 acids) and revealing for free sugars abundance in seeds at 47 % versus enrichment of organic
27 acids 58 % *viz.* malic acid in fruit, and accounting for the later less palatable taste. This study
28 provides the most comprehensive map for sensory metabolites distribution in nutmeg.

29

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