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Xiaogen Yang and Max L. Deinzer
Department of Agricultural Chemistry
Oregon State University, Corvallis, Oregon 97331

Humulene monoepoxides exist in hop essential oil and were suggested as one of the important contributors of hop flavor to fermented malt beverages [1-3]. However, it is more possible that the “noble hop” aroma compounds are produced from certain hop components during the brewing process, because the “noble hop” aroma is distinct from “dry hop” aroma. The aging of hops, during which the amount of oxidation products of humulene increases

[4], is also necessary to develop the “noble hop” aroma. One approach to find out the flavor compounds and their origin is to examine the brewing products of the oxygenated sesquiterpenes. The reactions of the brewing process can be simplified to hydrolyzation and fermentation as the first step. We have been investigated the hydrolysis of humulene monoepoxides.

To simulate the hydrolyzation effect in the “late hop” brewing process, humulene monoepoxides were boiled in water at pH 4 for 10 minutes. After boiling, a large amount of the epoxides remain unreacted. When the solution was kept at ambient temperature for several weeks, humulene epoxides were then almost completely hydrolyzed. To accelerate the hydrolysis process, humulene epoxides were suspended in a aqueous solution buffered at pH 4 and boiled for three hours under reflux. All three humulene monoepoxides produced a complex mixture after the reaction (Figure 1). The hydrolysis products can be easily separated into two groups by extraction with pentane and dichloromethane subsequently. The pentane extracts are less polar, more volatile and smell stronger than the dichloromethane extracts. Sensory evaluation of the hydrolysis products of humulene epoxide II and III by sniffing gas chromatography effluent indicates that some of the compounds have the flavor notes which are close to the “noble hop” aroma character described as “spicy, citrus, floral” (Table 1).