

CHARACTERIZATION OF LIGNIN IN BOURBON BARRELS

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Kentucky Straight Bourbon whiskeys are aged for at least 2 years in newly charred barrels made from American White Oak (*Quercus alba*). Bourbon production both the grain mash that is fermented and then distilled and in the staves of the barrel than contain lignin is the source of many of these phenolic compounds, which have desirable aromas and flavors. In this study, we investigated the staves of Bourbon barrels to find how lignin content and composition is altered by whiskey maturation and how variation in distillate could interact with oak lignin in alter extractable lignin moieties from the barrel. We found that the C layer (the layer of the stave in the interior of the barrel which has been charred) had a higher proportion of lignin than the outer layers of the stave and was increased further in staves from barrels that had been used to age Bourbon. Lignin is a complex biopolymer with many connections motifs we found difference in linkages the lignin linkages present in the C layer were also different from the outer layers of the barrel but were similar across barrels. The same pattern was observed in the aromatic compounds were present at higher levels in the C layers of each barrel. The results presented here show that this charring may have dramatic effects on the lignin in the staves, which could have a strong influence on the flavor of the spirit aged in the barrel.