

Too much water can make whiskies taste the same

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While adding a little water is popularly thought to "open up" the flavor of whisky, a Washington State University-led study indicates there's a point at which it becomes too much: about 20%.

Researchers chemically analyzed how volatile compounds in a set of 25 whiskies responded to the addition of [water](#), including bourbons, ryes, Irish whiskeys and both single malt and blended Scotches. They also had a trained sensory panel assess six of those whiskies, three Scotches and three bourbons.

Both tests found that adding a little water could change how the whiskies smelled, but after 20%, they may start to have the same [aroma](#). Since smell and taste are often closely linked, this likely affected the spirit's flavor as well.

"If you want to enjoy a specific [whisky](#), this suggests that you don't want to dilute it by more than about 20%," said Tom Collins, a WSU assistant professor and senior author on the study in the [journal *Foods*](#). "By the time you get to 60/40 whisky to water, the whiskies are not differentiated by the panelists; they begin to smell the same, and that's not really what you're looking for."

Working with Elizabeth Tomasino at Oregon State University to run the sensory panel, the researchers found that at 100% whisky, the panelists could easily tell all the whiskies apart from each other. At 80/20 whisky to water, they could still differentiate whiskies within each group, but after more water was added, that changed.

While within each style of whisky the aromas became more similar, the larger grouping of Scotches, both single malts and blended, remained distinct from the American bourbons and ryes.

The chemical analysis revealed similar results showing the changes in [volatile compounds](#) that entered the "headspace," or the area above the liquid, when water was added.

Whisky is a mix of compounds that run the scale from hydrophilic to

hydrophobic, in other words, ones that are attracted to water and others that are repelled by it. The addition of water sends the whisky's hydrophobic compounds into that headspace and leaves the hydrophilic ones behind, changing the aroma of the liquid.

The researchers found that the [chemical analysis](#) matched the impressions of the educated panel. For instance, many of the Scotch whiskies started out with a smoky, "peat" aroma, but as they were diluted, they moved toward a fruitier aroma known as "pome."

"This happens because of the way dilution affects what's in the headspace," said Collins. "The compounds that are associated with smoky aromas dissipate, and they were replaced by compounds that are associated with fruity aromas."

Likewise, the American bourbons were mostly associated with vanilla and oak scents at first, but as more water was added, they took on more aromas of the corn and grains used to make them.

The findings can help whisky makers better understand how their customers will experience the drink if they chose to add water or have it "on the rocks."

It also gives some backing to the practice of serving whisky with a single, large ice cube.

"This study helps to understand why those large, square ice cubes have become so popular because you can actually enjoy the whisky before it gets diluted to the point that it's not the same whisky," said Collins.

Collins and his colleagues are currently further investigating the compounds that give Scotch whiskies their smoky aroma. They plan to present that ongoing work as well as this study at the Worldwide

Distilled Spirits Conference in Edinburgh, Scotland taking place May 9-11.

In addition to Collins and Tomasino, co-authors on this study include Aubrey DuBois of Michigan State University as well as first author P. Layton Ashmore and James Harbertson of WSU.

More information: P. Layton Ashmore et al, Impact of Dilution on Whisky Aroma: A Sensory and Volatile Composition Analysis, *Foods* (2023). [DOI: 10.3390/foods12061276](https://doi.org/10.3390/foods12061276)

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