

Mixology and molecular mastery at the Edinburgh International Science Festival



The Edinburgh International Science Festival always seeks to answer the deep questions about our place in the universe. But more importantly, it helps us to develop the perfect cocktail. As part of the ever popular gastrofest stream, Chemist Professor Andrea Sella teams up with drinks developers, Max Venning and Zoe Burgess. They use their molecular mastery to explain how they mix the most exciting, most innovative cocktails the world of science has ever tasted.

The audience was made up of gleefully irresponsible adults drinking cocktails in the middle of the day in the name of science. It is a festival after all, and everyone knows at festivals the social norms of drinking don't apply.

Professor Sella advises the audience: "Peer into your glass; this is a view of all kinds of profound mysteries about ourselves and the universe." Indeed the drinking of alcohol has a long and chequered past, so closely woven within our culture and society it seems impossible to regard it as mere chemistry.

Max and Zoe from the Drinks Factory agree. The drinking of cocktails is a sensory experience, using far more than just our sense of taste. They discuss how our sense of smell is vital to our appreciation of taste. To demonstrate this, the air becomes heavy with the scent of aniseed, as the audience collectively partakes of an Americano cocktail, the clattering

of ice in glasses almost drowning out the lively chatter.

We explore the body's ability to detect bitterness, and how this can vary hugely between individuals. The alcohol begins to work its alchemic magic as a social lubricant, and there are many willing volunteers to join our mixologists on stage for a demonstration. Each are given a small sample of the same substance to taste, but the reactions differ widely. Some shrug nonchalantly, hardly registering the taste, while others screw their faces up in repulsion. So it seems what tastes good to you may not taste good to me, and why mixing cocktails will always have an element of individual preference and, yes, mystery.

The history of the Americano cocktail currently being enjoyed is explored and we learn its Italian heritage and the vast array of botanicals that gives it its distinctive aniseed flavour.

Now it's time for the audience to start experimenting. They note the taste of their cocktail and add salt solution to their cocktail. Again the variation in the human palate is illustrated as some commented "It tastes nicer with the salt added", while some registered no difference.

The answer, it seems, is the reason why you need salt and lime to drink bad tequila. Andrea Sella explains that the salt interferes with the body's bitter receptors, and reduces the amount of bitterness you can detect. Max pointed out: "If you add salt, some people think things taste sweeter. In fact, the salt just reduces the intensity of the bitterness and allows other flavours to come through."

The questions and answers come fast and lively, and we learn why it's impossible to obtain 100% pure alcohol by distillation, the difference in flavour obtained by maceration versus distillation and why the drinks industry has much in common with the perfume industry.

Before the audience become too tipsy to follow the science, Sella explains the importance of the Super Critical Fluid Phase, illustrated here in the phase diagram of water. We learn about the science that is now allowing the super-extraction of botanicals at high pressures and temperatures to give the most intense flavours, and the promise of extraordinary cocktails to come.

We also get the opportunity to explore the phenomenon of Louching. Finally we find out why Ouzo and Pastis turn cloudy when we add water. It turns out there are lots of complex molecules happily and invisibly dissolved in the alcohol. But since they're not soluble in water, the mixing of the water causes them to emulsify in little droplets and cause the drink to morph from clear to cloudy.

The drinks Factory Mixologists explain some of the mind-boggling array of cocktails that have been created specifically to trigger memories. The association of smell and memory is a deep and profound one, and explains why certain drinks can trigger powerful emotional responses as they tap into our feelings of nostalgia.

The audience end the afternoon far jollier and better informed than when they arrived. The enthusiasm and expertise of the presenters keeps them engaged, the cocktails keep them merry, and the science gives them food (and drink) for thought. Far from encouraging excessive and irresponsible drinking, this fascinating event encourages us to better appreciate the flavours and complexities of our favourite drinks, and perhaps to experiment with new favours to stimulate our taste buds.

I'll drink to that.