

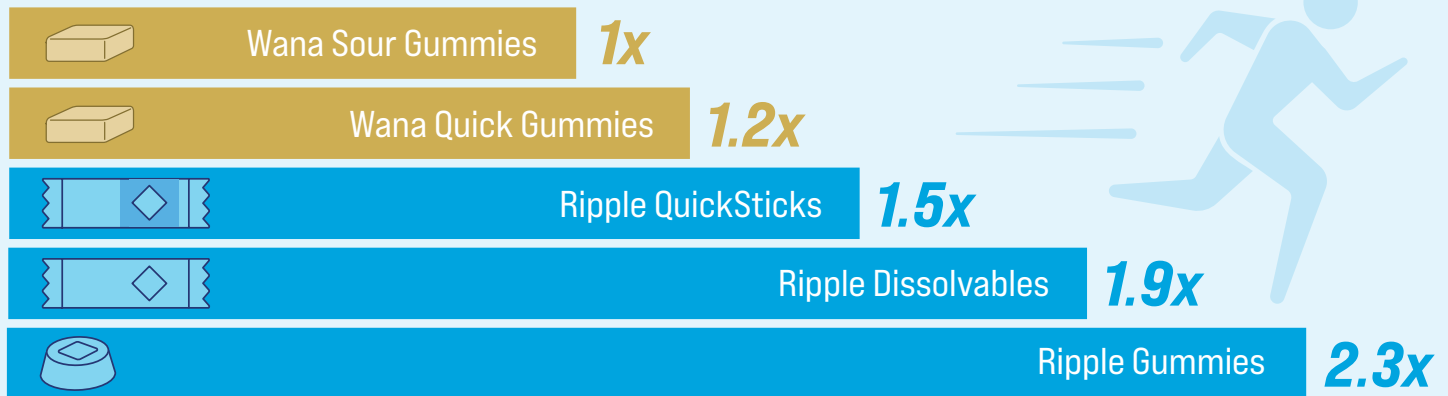
RIPPLE

# 2X FASTER

Not just talk. Real proof, in real people.

Findings from a 2021 Colorado State University study<sup>1</sup>

Ripple products hit **significantly faster** than the market-leading gummies.<sup>2</sup> Even the “quick” ones.



With Ripple products, you absorb more of the THC you pay for. That makes them a **better value overall**.



COST SAVINGS<sup>3</sup>  
 X  
 BETTER ABSORPTION<sup>4</sup>  
 =  
 MORE FOR YOUR MONEY  
*(savings per mg THC absorbed)*

Ripple Gummies vs.		
	Wana Sour Gummies	Wana Quick Gummies
	4%	25%
	31%	17%
	37%	46%

### WHY WE INVESTED IN THE RESEARCH

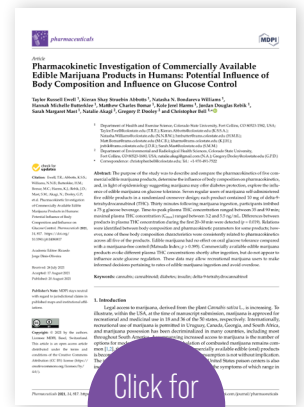
They say science doesn't sell. Maybe so, but it still matters. We wouldn't call our products 'fast-acting' if we didn't have the research to back it up. And not just any research—**credible** research. That means: **human subjects, real-world products, academic clinicians, and results published in peer-reviewed journals.**

We wanted to understand how Ripple products perform in the wild, and we wanted to know the truth. The science confirms: **Ripple products are all substantially faster than the leading 'Quick' gummy.**

As for our competitors' claims? \\_(ツ)\_/

1. 2021 Colorado State University Study, *Pharmaceuticals*. DOI: 10.3390/ph14080817  
 2. Based on observed THC blood levels 20 minutes after ingestion.  
 3. Based on LeafLink average wholesale prices per 100mg THC from January through July 2021.  
 4. Based on calculated AUC 4 hrs after ingestion.

# ABOUT THE STUDY



## Was the study published?

Yes! The study represents the **first published, peer-reviewed clinical research using commercially available THC products in the country**. The results were published in *Pharmaceuticals*, a well-regarded, peer-reviewed, open-access scientific journal, in a special issue devoted to cutting-edge research on [Pharmacokinetics and Pharmacodynamics of Psychoactive Substances](#).

## What is “pharmacokinetics”?

[Pharmacokinetics](#), sometimes described as the study of what the body does to a drug, refers to the movement of drug into, through, and out of the body—the time course of its absorption, bioavailability, distribution, metabolism, and excretion. It answers questions like “how fast will this hit me?” and “how long will this last?”

## Who performed the research?

The study was designed and led by the Director of CSU's [Integrative Biology Lab](#), Dr. Christopher Bell. Dr. Bell maintained full control over the collection of data, as well as the analysis and publication of the results.

## How was the study designed?

The study was designed in accordance with FDA guidance on pharmacokinetic research and utilized a randomized, placebo-controlled, crossover design. The [crossover design](#), whereby each participant participated in each leg of the study, **allowed for robust, statistically significant results even from a relatively small sample size (n of 7)**. Specifically, the methods of measurement, in combination with the study design, delivered results that are statistically significant at  $p < 0.05$ .

## Are the results statistically significant? An n of 7 seems low.

Yes! In high school stats class, we all learned that you need something like 30 responses for the results to be significant, but that's polling. Biostatistics is different. Crossover studies remove between-person variability by having participants perform every leg of the study, and then analyzing within-person differences to interpret the results. Relying on quantitative analysis of THC blood levels also contributes to the statistical power since it avoids reporting bias (“I feel high now” is subjective, whereas 4.5 ng/ml of THC at 20 minutes is objective). **At the end of the day, the study would not have passed peer review and been published if its results were not statistically significant. This is good science!**

## What did the subjects consume?

Each subject consumed 10 mg of THC in 5 different formats (plus placebo) over 6 weeks: Ripple Gummies, Ripple Dissolvables, Ripple QuickSticks, Wana Quick Gummies, Wana Sour Gummies, and a THC-free placebo candy.

## What data was collected?

The study relied on **quantitative analysis of THC blood levels** rather than subjective experience reports (e.g., “I feel high now”). Blood THC concentrations were measured at 10, 20, 30, 45, 60, 75, 90, 120, 180, & 240 minutes after ingestion using an Ultra High Pressure Liquid Chromatography (UHPLC) assay. Notably, this measurement method prevents reporting biases from skewing the results. **Blood levels are what they are.**