Authors	Sugiyama [15]	Brighenti [14]	Ebihara [13]	Ebihara [13]	Johnston [18]	Johnston[18]	White [17]	Johnston [16]
Date	2003	1995		1988	2004	2004	2007	2005
Design Study	Crossover RCT	Crossover RCT	Uncontrolled experiment	Animal experiment	Crossover RCT		Crossover RCT	Crossover RCT
Country	Japan	Italy	Japan	Japan	United States		United States	United States
Study Population	Healthy	Healthy	Healthy	Rats	Healthy		well-controlled DM2	Healthy
Sample size	n=58:38F, 20M	n=5: 4M 1F	n=7: 6M 1F	n=12	n=8		n=11: 4M 7F	n=11: 1M 10F
Mean Age+/- SE	37+/-10	37+/-3 yrs	27-56	N/A	n/a		40-72	27.9+/-2.9
Mean BMI +/- SE	22+/-2.7	n/a	n/a	4%+/- average BMI	n/a		29.1+/-1.2	22.7+/-1
Mean HbA1c%							6.7%+/-0.2%	
Vinegar	Vinegar (11g/portion)and pickled cucumber (15g/portion)	20mL Allen's Pure White Vinegar (16mmol)	60ml Strawberry vinegar 5% acetic acid	50g of sucrose and 50ml of strawberry vinegar (5% acetic acid)	20g apple cider vinegar, 40g water, 1tsp saccharine		2 tbsp of apple cider vinegar	20gApple cider vinegar 5%acetic acid+40g distilled h20+1tsp saccharine
Snack	50g carbohydrates of white rice	10g olive oil+ 2X0.5cm lettuce strip, 50g carbohydrates of white bread	50g sucrose in 300ml of H_2O	100mg corn starch/100g weight	Bagel + butter+ orange juice (87g carbohydrates)		2Tbsp Apple Cider Vinegar+1oz cheese (8gprotein,1gcarbohydrate,1.5gfat)	Bagel + butter+ Orange juice (98g carbohydrates+18g fat+12gprotein) or chicken+ rice+ vegetables (52gcarbohydrates+23gfat+21gprotein)
Time frame	0-120min	0-90min	0-150min	0-150min	0-60min		2 days	0-60min
Postprandial BG reduction	20-35% (GI not BG)	31.4% in mean glucose incremental area under the curve	Comparable glycemic response, but delayed max glycemic response	Delayed and decreased BG concentrations	Decreased			54% (50% for the chicken)
P value	<0.05	<0.05	<0.05	<0.05	p=0.117		n/a	<0.05
Insulin response reduction			20%		Decreased			28% (estimated since only provided in graphic form)
P value			<0.05		p=0.020	IR<0.01, DM2 p<0.07		<0.05
Fasting blood glucose reduction							4% *Morning	
P value							p=0.033	
Gastric emptying rate		No difference between AcOH and AcNa p>0.05						
P value								
Satiety								Reduction of 200-275kcal/day
P value								p=0.111
Glycogen repletion								
P value								
Carbohydrate digestion								
P value								

Authors	Hlebowicz [20]	Mitrou [19]	Johnston [18]	Johnston [18]	Johnston [23]	Johnston [23]	Fushimi [22]	Ogawa [21]
Date	2007	2010	2004	2004	2010	2010	2001	2000
Design Study	Crossover RCT	Crossover RCT	Crossover RCT	Crossover RCT	Crossover RCT		Animal experiment	Experiment
Country	Sweden	Greece	United States	United States	United States		Japan	Japan
Study Population	DM1 with gastroparesis Swedish	DM1	DM2	Insulin resistant	Trial 1 Healthy		Rats	Caco-2 cells
Sample size	n=10: 10M	n=10: 10M	n=10	n=11	n=10 4M6F		n=25	n/a
Mean Age+/- SE	67.9+/-8	32+/-3	n/a	n/a	35+/-4		5 wks	N/A
Mean BMI +/- SE	25.4+/-2.9	24+/-1	n/a	n/a	27.5+/-1.2		161+/-2g	n/a
Mean HbA1c%	8.3+/-0.7	6.7+/-2%						
Vinegar	30ml Apple cider vinegar+200ml water	30ml vinegar+20ml water	20g apple cider vinegar, 40g water, 1tsp saccharine	20g apple cider vinegar, 40g water, 1tsp saccharine	20g apple cider vinegar (1g AcOH) vs 10g (05gAcOH) vs 2g (0.1AcOH) vs placebo	vinegar 5% acetic acid was added to 40g water, 1tsp saccharine, 1 drop food coloring	0,0.1,0.2,0.4g acetic acid/100g diet	5mmol/L acetic acid
Snack	300mg rice pudding	Bread +juice +butter + cereal Bar (75gcarbohydrates, 26g protein, 6g fat)	Bagel + butter+ orange juice (87g carbohydrates)	bagel+ butter + orange juice (87g carbohydrates)	white bagel, 20g butter, 200gjuice (approx 75g of carbohydrates)		2g of diet (62.2g glucose/100g of diet)	
Time frame	0-90min	0-240min	0-60min	0-60min	0-120min			
Postprandial BG reduction	20-35% (GI not BG)	20%	Decreased	Decreased	23-28% 0.5g acetic acid compared to 0.1 and placebo			
P value	p<0.05	<0.01	p=0.149	p=0.014	p<0.05		not provided	p<0.01
Insulin response reduction		none	19%	34%				
P value		not provided	p=0.169	p=0.002				
Fasting blood glucose reduction								
P value								
Gastric emptying rate	17% with vinegar vs. 27%control							
P value	p<0.05							
Satiety								
P value								
Glycogen repletion							60% greater	
P value							p<0.05	
Carbohydrate digestion								
P value								

Authors	Ostman [24]	Johnston [23]	Johnston [23]	Johnston [23]	Fushimi [27]	Johnston [26]	Liljeberg [25]
Date	2005	2010	2010	2010	2002	2013	1998
Design Study	Crossover RCT	Crossover RCT	Crossover RCT	Crossover RCT	Animal experiment	Crossover RCT	Crossover RCT
Country	Sweden	United States	United States	United States	Japan	United States	Sweden
Study Population	Healthy	Trial 4 DM2	Trial 3 Healthy	Trial 2 Healthy	Rats	High risk for D2M American	Healthy
Sample size	n=12 2M 10F	n=9 4M5F	n=10 2M8F	n=9 2M7F	n=20 5M	n=14 1M 13F	n=10 3M 7F
Mean Age+/- SE	22.9 +/- 0.5	69+/-2	38+/-4	50+/-5	5 weeks	46.0+/-3.9	22-51
Mean BMI +/- SE	21.4 +/-0.7	31.4+/-1.4	26.3+/-1	33.7+/-2.3		28.5+/-1.4	23.1+/-2.0
Mean HbA1c%	8.3+/-0.7	6.7+/-2%					
Vinegar	18,23,28 g vinegar 6% acetic acid	20g apple cider vinegar (1gAcOH) vs 1g acetate vs placebo	20g apple cider vinegar (1gAcOH) vs placebo	20g raspberry vinegar (1gAcOH) 2min prior to meal versus 20g (10gAcOH) vinegar 5h before test meal vs placebo	2ml of 0.4% acetic acid and 30%glucose versus just glucose	2 Tbsp (1.5gAcOH) or 2 vinegar pills (0.08g AcOH) 1 before lunch and dinner	20 g white vinegar (18 mmol AcOH)
Snack	50g carbohydrates white bread	white bagel, 20g butter, 200gjuice (approx 75g of carbohydrates)	dextrose (75 g glucose)	white bagel, 20g butter, 200gjuice (approx 75g of carbohydrates)		Lunch or dinner	White wheat bread with 1 g paracetamol per test meal+ 8g olive oil, 23g cheese +tea/coffee (50.0g starch, 15.3 protein, 12.0g fat)
Time frame	0-120min	0-120min	0-120min	0-120min		120min	0-120min
Postprandial BG reduction	Decreased @ 30 min and 45 at the higher level	13-17% compared to AcNa and placebo	90% higher*	19% but no reduction if ingested 5h before meal		minus 7.7+/-6.9 vs 3.3+/-5.4mg/dl (vinegar versus acetate)	Decreased @30-70min
P value	p<0.05	<0.097	P<0.059	p=0.169		P=0.259 not significant	p<0.05
Insulin response reduction	Decreased @15min and 30min for higher dose						Decreased 45min post ingestion
P value	p<0.05						P<0.05
Fasting blood glucose reduction						minus 16.3+/-4.9 mg/dl	
P value						p=0.05	
Gastric emptying rate	17% with vinegar vs. 27%control						20% Reduction
P value	p<0.05						p<0.05
Satiety	Dose/linear relationship r=0.41						
P value	p<0.004						
Glycogen repletion					47% increase in glycogen content with acetic acid +glucose vs 38% with glucose		
P value					p<0.05		
Carbohydrate digestion			No effect on glucose digestion				
P value			p<0.59				

Table 1: Published studies exploring the hypoglycemic effects of vinegar.