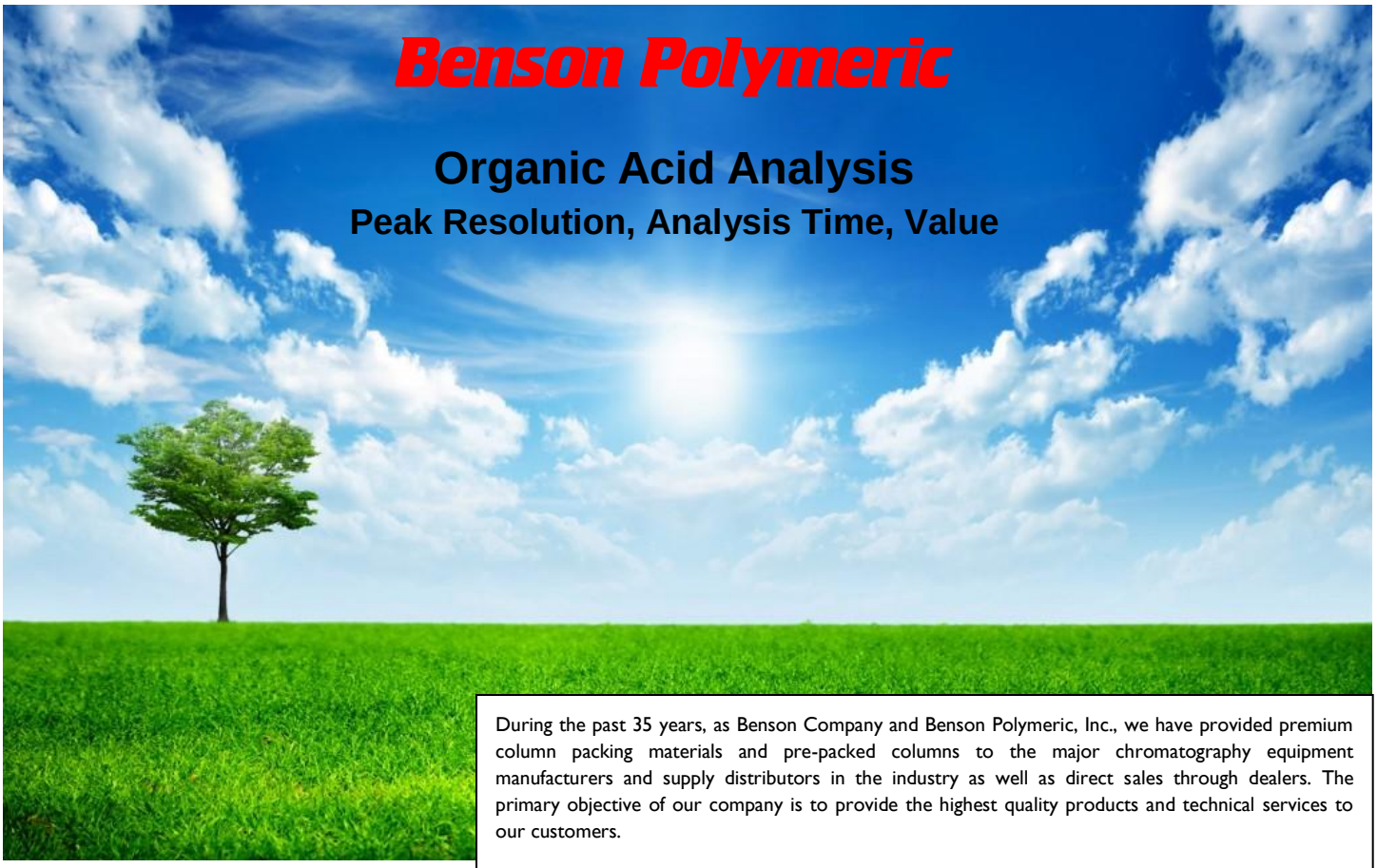


Benson Polymeric

Organic Acid Analysis

Peak Resolution, Analysis Time, Value

During the past 35 years, as Benson Company and Benson Polymeric, Inc., we have provided premium column packing materials and pre-packed columns to the major chromatography equipment manufacturers and supply distributors in the industry as well as direct sales through dealers. The primary objective of our company is to provide the highest quality products and technical services to our customers.

Benson's sole focus is to provide high quality polymeric product for HPLC. We are able to offer a complete line of columns at competitive pricing. Not only can we reduce your analysis costs, we also provide quick and knowledgeable service to our customers.

Applications: *The chart below lists the typical types of standards that can be separated on Benson Polymeric columns. For specific recommendations on the column and method best suited to maximize the separation of your particular sample please contact our customer support staff at Benson Polymeric.*

Benson Column Description	Benson Part Number	Typical Applications
BP-OA	2030-0	USP analysis of citric, lactic and acetic acid
BP-OA	2020-0	Rapid screening of fruit samples such as grape must, ethanol, acetic acid, glycerol, fructose, glucose
BP-OA	2000-0	Organic acids in dairy products, food additives, flavor indicators, food stability, vitamin content, ascorbic acid, and nutritional analysis
BP-100 H	1100-0	Organic acids in dairy products, food additives, flavor indicators, food stability, vitamin content, ascorbic acid, and nutritional analysis
BP-RA	2200-0	Rapid screening of fruit samples such as grape must, ethanol, acetic acid, glycerol, fructose, glucose

Column Comparison Chart: *Benson Polymeric offers a complete line of high quality and cost effective columns for analysis of organic acids. The chart below lists our recommended replacement columns for polymeric columns offered by other suppliers. For specific recommendations on the column and method best suited to maximize the separation of your particular sample please do not hesitate to contact the support staff at Benson Polymeric.*

Benson Column Description	*Benson Part Number*	*Bio-Rad (Aminex) Part Number*	*Phenomenex (Rezex) Part Number*	*Varian (Metacarb) Part Number*	*Dionex Part Number*	*Transgenomic Part Number*	*Waters/ Hamilton Part Number*	*Shodex Part Number*	*Alltech Part Number*
BP-OA	2030-0				064198	ICE-99-8461	79476		
BP-OA	2020-0	125-0100	00D-0223-KO	A5059		ICE-99-5861			
BP-OA	2000-0	125-0140	00H-0132-KO 00H-3252-KO	A5210	043197	ICE-99-9861 ICE-99-9810	79544	F6378100 F6378030	
BP-100 H	1100-0			A5215		ICE-99-9850			9646
BP-RA	2200-0	125-0100	00D-0223-KO	A5059		ICE-99-5861			
BP-100 H Guard	1100-2			A5211 A5216	067842	CHO-99-3561			
BP-OA Guard	2000-2			A5211 A5216	067842	CHO-99-3561			

Column Selection:

Benson Polymeric offers a wide variety of columns for the analysis of organic acids. All of our columns are packed with polymeric materials specifically designed to maximize your separation needs. Benson Polymeric organic acid analysis columns primarily utilize ion exclusion as the separation mechanism. Using a simple acid mobile phase (typically dilute sulfuric acid), a wide variety of organic acids can be separated without the need of a gradient. By altering the concentration of the acid mobile phase, organic acid separations can be maximized for your particular sample.

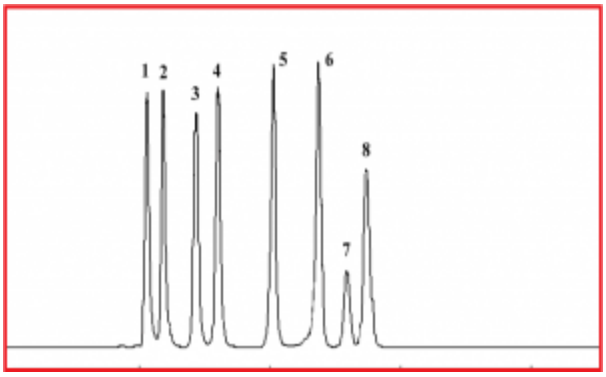
Another technique Benson Polymeric uses to maximize your separation is to offer two types of cross-linked polymers (see below). The degree of cross-linkage determines the porosity of the polymers which can be used to enhance certain separations. Benson Polymeric also recommends using column ovens in combination with our columns since the best separations are usually obtained at elevated temperatures (typical range 30 – 80^{o} Celsius).

By combining eluent strength, temperature and cross-linkage, Benson Polymeric organic acids analysis columns can separate a wide range of samples (see Retention Times Chart). Please contact technical support at Benson Polymeric and we will help you choose a column for your particular sample.

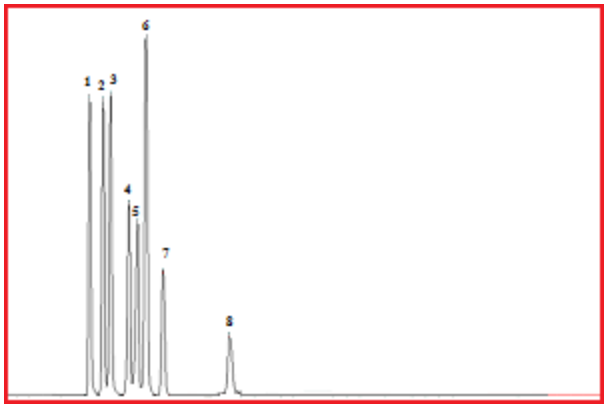
Retention Times:

The retention times chart is a partial listing of the retention times of common organic acids tested on Benson Polymeric columns using typical test conditions (0.6 ml/min, 60o Celsius, 0.01 N sulfuric acid). The retention time of organic acids can be influenced using acid strength, temperature, and column choice. By choosing the proper combination of the test conditions and column, your sample separation will be optimized. For specific recommendations on the column and test conditions best suited to maximize your particular sample please do not hesitate to contact the support staff at Benson Polymeric.

Compound	BP-OA Part No. 2000-0	BP-100 H Part No. 1100-0
CITRIC	7.5	8.6
TARTARIC	8.0	9.5
MALEIC	8.2	9.0
ACONITIC	8.6	10.7
MALIC	8.8	10.3
GLYCOXYLIC	9.2	10.3
PYRUVIC	9.2	9.9
MALONIC	9.3	10.7
SUCCINIC	10.4	12.2
SHIKIMIC	10.5	12.9
GLYCEROL	11.4	12.9
FUMARIC	11.5	14.7
LACTIC	11.9	11.6
ADIPIC	12.5	15.8
FORMIC	12.9	13.9
ACETIC	13.8	14.9
PROPIONIC	15.8	17.4
METHANOL	18.7	18.7
ETHANOL	21.4	20.6
PROPANOL	25.9	22.2
BUTANOL	32.9	25.2



Part No.:	1100-0	1 – Maltotriose
Eluent:	DI H2O	2 – Maltose
Flow Rate:	0.4 ml/min	3 – Glucose
Detection:	RI	4 – Fructose
Temperature:	Ambient	5 – Glycerol
Sample Size:	20 ul, 30 mg/ml	6 – Acetic Acid
Column Size:	300 x 7.8 mm	7 – Methanol
		8 – Ethanol



Part No.:	2010-0	1 – Maltose
Eluent:	0.5 mM H2SO4	2 – Glucose
Flow Rate:	0.6 ml/min	3 – Fructose
Detection:	RI	4 – Succinic Acid
Temperature:	50 C	5 – Lactic Acid
Sample Size:	20 ul, 30 mg/ml	6 – Glycerol
Column Size:	250 x 7.8 mm	7 – Acetic Acid
		8 – Ethanol

Visit our Web Site for more column options!

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We understand choosing a column can be a difficult decision based on your unique sample, and we will take the steps necessary to guarantee a column will meet your specific needs.

Benson Polymeric offers several types of polymeric based columns for the analysis of carbohydrates, organic acids, and alcohols. The optimum choice of column is typically a combination of ***Peak Resolution***, ***Analysis Time*** *and* ***Value***.

We can help you choose a replacement column for your application, or recommend a column for a new assay. Please do not hesitate to contact us in regards to your specific separation needs.