

## Culinary Food Application for Hielscher Ultrasonic Processors in the Gourmet Kitchen

- **Ultrasonic Effects:** Extraction, Mass Transfer, Homogenizing, Emulsifying, Modification
- Ultrasound produces stable emulsions
- By sonication cell disruption, better mass transfer and the extraction of intracellular material can be achieved leading to improved extraction results such as more intensive flavors, colors and a finer texture
- To achieve optimal results food should be macerated before sonication
- Ultrasonic dispersing is a proven method to produce very fine and even mixtures

Food/ Product	Application/ Recipe	Equipment & Parameters	Achievements
Vinaigrette (Vinegar in oil) to accentuate the oil taste	For 400mL: Add the vinagre gradually to the oil (e.g. ratio 1:3). Sonicate the mixture approx. 20-40 sec. An ice bath for cooling is recommended.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 20-40 sec. for 400mL	Stable emulsion
Vinaigrette (Oil in vinegar) to accentuate the taste of the vinegar	For 400mL: Add the oil gradually to the vinagre (e.g. ratio 1:2). Sonicate the mixture approx. 20-40 sec. An ice bath for cooling is recommended	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 20-40 sec. for 400mL	Stable emulsion
Tomato	Sonicate puréed tomatos (approx. 500gr, raw or cooked) for 30-60 sec. Move the vessel to process all material. The sonicated tomatoes are an ideal base for sauces and soups.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 30-60 sec. for 500gr	More intensive taste and thicker texture due to the extraction of the intracellular material (e.g. fruit sugar)



Food/ Product	Application/ Recipe	Equipment & Parameters	Achievements
Pumpkin Soup	Puree 500gr of roasted pumpkin and add 500mL of vegetable broth, 2 tblsp of cream and some condiments. Sonicate the mixture for 3-4 min. For an even sonication and a high release of gustatory substances, gentle stirring is recommended.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 3-4 min. for 500gr of pumpkin in 500mL broth	More intensive taste and thicker texture due to the extraction of the intracellular material
Carrot Soup	Puree 300gr of carrots and add approx. 200mL of vegetable broth, 2 tblsp of olive oil and some condiments (e.g. ginger, pepper, salt). Sonicate the formulation for approx. 2-3 min. For an even sonication, gentle stirring is recommended.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 2-3 min. for 300gr of carrots in 300mL broth.	More intensive taste and thicker texture due to the extraction of the intracellular material
Shrimp Stock	Sonicate 150 gr of baked, chopped shrimps, 500mL water, tomato puree, a diced carrot and salt for approx. 3-4 min. to achieve an intensive shrimp stock. Mix, strain and reduce to the desired consistency.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 3-4 min. for 0.5L of shrimp stock	Intensive shrimp stock for sauces
Flavouring of vodka with coconut rasper	Add 2 tblsp. of coconut rasper to 200mL of vodka. Sonicate the alcoholic beverage for 60 sec. An ice bath for cooling is recommended. Afterwards, strain the coconut particles.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 60 sec.	Flavored vodka due to the ultrasonically induced release of coconut extract

Food/ Product	Application/ Recipe	Equipment & Parameters	Achievements
Potatoes	Mash 500gr. of cooked potatoes and add approx. 400mL water. Sonicate the mixture for 1½ -2 min. to achieve a puree with a more intensive potato flavor. For an even sonication, gentle stirring is needed.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 1½ -2 min. for 500gr	More intensive taste and thicker texture due to the extraction of the intracellular material
Mayonnaise	Mix 1 egg yolk with a pinch of salt, add 1 tsp. of mustard. Sonicate the mixture and add slowly 8 tblsp. of oil, 1 tblsp. of lemon juice, some herbs and pepper. An ice bath for cooling and slight stirring are recommended for an even result.	UIP500, sonotrode BS2d22L2B, amplitude 100%	Stable, creamy emulsion
Vinegar, Balsamic	By ultrasonication, a smoother, rounder vinegar flavor can be achieved. The required sonication time depends on the vinegar quality (acidity). For 500mL, a sonication time of approx. 2-4 min. will show the desired results. An water bath for cooling is recommended.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 2-4 min. for 500mL	Smoother, rounder flavour, less acid taste
Orange dressing	Sonicate a mixture of 125mL of sun flower oil, 125mL of fresh orange juice, 1 tsp. of lemon juice, 1 tblsp. of raspberry vinegar and a pinch of pepper and salt for approx. 10-20 sec.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 10-20 sec. for 250mL	Stable emulsion

Food/ Product	Application/ Recipe	Equipment & Parameters	Achievements
Oil, flavored by herbs	Add approx. 2-4 tbsp of minced herbs (e.g. basil, parsley ) into 500mL edible oil (e.g. olive oil). Sonicate for approx. 40-70 sec. During the sonication gentle stirring is recommended. Afterwards, the plant parts can be strained.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 40-70 sec. for 400mL	Flavored oil with herb extracts
Oil, flavored by hot peppers	Put 3-4 finely minced hot peppers into 500mL oil (e.g. olive oil). Sonicate for approx. 1-1,5 min., accordingly the desired heat. During the sonication gentle stirring is recommended. Afterwards, the plant parts can be strained.	UIP500, sonotrode BS2d22L2B, amplitude 100%, approx. 1-1,5 min. for 400mL	Flavored oil with hot pepper extracts
Marinating meat	To marinate a steak, coat the meat slightly with the marinade. Then, press the steak gently to the sonotrode and move the steak with approx. 1" per sec. along the surface. Treat both sides of the meat.	UIP500, sonotrode BS2d22L2B, 50% amplitude	The marinade penetrates the meat; the steak absorbs more taste
Tenderizing meat	To tenderize a steak, press the steak gently to the sonotrode and move the steak with approx. 1" per sec. along the surface. Treat both sides of the meat.	UIP500, sonotrode BS2d22L2B, 50% amplitude	