Coherent sound field generated by an airborne power ultrasonic transducer with rectangular plate radiator for food dehydration purposes.

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Introduction: The use of airborne power ultrasonic transducers (APUT) for food dehydration processes may carry important advantages regarding energy consumption, processing time and quality of the final product. The high intensity acoustic field generated by the transducer, and propagated along the processing chamber provokes the desired effects in the samples located strategically in some points of the near field. Therefore, the main goal when designing an ultrasonic technology is that the system generates a coherent acoustic field in free field with a directive behavior.

The ultrasonic system considered for this purpose consists of an APUT with rectangular plate radiator working at a flexural mode with twelve nodal lines (12NL) around 21 kHz, and a set of reflectors to put in phase the ultrasonic waves in order the generate the required coherent field.

This work presents the acoustical effects provoked by the set of reflectors in terms of ultrasonic field and directivity, obtained by experimental methods.

Conclusion: This work has proved that the use of a reflectors system enables the generation of a directive ultrasonic field with higher acoustic pressure because the energy of both faces of the radiator is used in a coherent field, obtaining a most efficient system for food dehydration processes.

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