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Study of the cheese salting process by dielectric properties at microwave frequencies

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1 **STUDY OF THE CHEESE SALTING PROCESS BY DIELECTRIC**
2 **PROPERTIES AT MICROWAVE FREQUENCIES**

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10

11 **Abstract**

12 The salting process involves complex phenomena that affect the overall quality of
13 cheese due to its effect on water activity and induced biochemical changes. The
14 permittivity of cheese was analysed throughout the cheese salting treatment in order to
15 relate it to water and salt transport. The salting treatment was carried out using 25%
16 (w/w) sodium chloride brine at 4°C. The samples were immersed in a vessel containing
17 the osmotic solution with continuous stirring, for 0, 10, 20, 30, 40, 50, 60, 90, 120, 180,
18 240, 360, 480, 720, 900 and 1440 min. Samples were subsequently equilibrated in an
19 isothermal chamber at 4°C for 24 hours. Mass, volume, surface water activity, moisture,
20 ion content and permittivity were determined in fresh and salted samples. Permittivity
21 was measured from 500 MHz to 20 GHz, using an open-ended coaxial probe connected
22 to a Vector Network Analyzer. The results showed that measurements at 20 GHz
23 explain the water loss and water flux in the overall product. The state of the electrolytes
24 in cheese can be followed using the ionic conductivity at 500 MHz. A coupled
25 measurement of permittivity at 20 GHz and 500 MHz can predict the chemical species

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