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**Laboratory Investigation of Manual Dishwashing
Habits and its Resource Consumptions: A Study of
Consumer Panels in Seven Global Regions**

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Abstract

Dishwashing is a mundane household task which needs to be done by consumers around the world on a daily basis. As such, it demands the usage of resources like water and energy. Thereby, the intensity of resource consumption very much depends on individual consumer habits. In order to achieve an effective saving of resource demand in the domestic sector, primarily one needs to understand consumer behaviour first. The aim of the present research is to contribute to a better understanding of global manual dishwashing habits.

Within a laboratory study, the resource consumption and cleaning results of manual dishwashing was compared with automatic dishwashing. Furthermore, consumers' manual and automatic dishwashing behaviour and attitudes were analysed and effects of specific manual dishwashing practices on the resource consumption and the cleaning result were determined. A consumer panel with participants from 29 different countries was analysed. Each consumer had to wash up twelve soiled place settings based on both international and local performance test standards for automatic dishwashing. In order to replicate household conditions, country-specific aspects such as tableware, food residues, variations of different washing-up utensils and hand dishwashing liquids were considered. For each trial, resource consumption data were recorded and cleaning results were assessed visually. Individual consumer habits and attitudes on manual and automatic dishwashing were captured both by a written questionnaire and on video records in a non-participating observation. In parallel, six country-specific dishwasher models were tested in three programmes with the same soiled dish samples as used in the consumer study.

The study concludes that automatic dishwashing achieves a clear optimisation of the dishwashing process under the chosen test conditions with regard to a more efficient resource usage and an improvement in cleaning performance. Depending on the programme, highest gains in efficiency are achieved in total water usage per item by up to 87% followed by total corrected energy consumption per item with savings up to 58%. Cleaning results are improved by up to 36%. The questionnaire reveals differences in attitudes and habits towards manual and automatic dishwashing between

the countries. A lack of knowledge about the benefits of automatic dishwashing can be identified. Furthermore, washing up in a filled sink is determined as the most resource saving manual dishwashing practice by achieving a similar cleaning result compared to other hand dishwashing practices.