Hygiene changes adopted by society and the food industry to control COVID-19: Are there any other benefits?

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Background

Like all key industries that have remained in production during the COVID-19 pandemic, the food industry has had to undertake additional hygiene measures, primarily during production periods, to help manage coronavirus. These have primarily consisted of:-

1. social distancing, provision of screens between employees
2. additional ventilation of the workplace if possible
3. the increased undertaking of hand washing and the use of hand hygiene products (including a potential increase in hand hygiene monitoring),
4. additional disinfection of environmental human touch points (e.g. door handles, switches, stop/start buttons, HMI screens, handrails, keyboards, hand soap and towel dispensers)
5. additional disinfection of environmental surfaces in which SARS-CoV-2 could accumulate via droplets expressed through the mouth and nose (e.g. floors in heavy trafficked areas).

Hopefully, these practices, designed to reduce the number of viruses on the hands and in the food processing environment have helped in their intended COVID-19 control.

However, these changes which have reduced the chance of person-to-person cross-infection and enhanced both personal hygiene and cleaning and disinfection, are perhaps the biggest single change in such hygiene practices within society and the food industry for many years. Is it possible that these changes could also have brought additional benefits in terms of food safety or personal health?

Whilst intending to control coronavirus, these hygiene changes are likely to also control a wide range of other microorganisms. Fewer microorganisms in the food process environment might lead to reduced levels of general microorganism indicators (TVC, Enterobacteriaceae) and reduced levels of environmental pathogens, particularly Listeria. This could reduce levels of microorganisms on vectors of cross-contamination from the environment to the food product. In particular, and via the additional hand hygiene controls, a reduced number of microorganisms on the hands could lead to reduced food product cross-contamination, particularly for those foods for which handling cannot be excluded.

Fewer other, non-SARS-CoV-2, respiratory viruses and other infectious microorganisms on the hands, together with enhanced social distancing, could also lead to fewer cases of respiratory (colds and flu) and other infectious diseases, resulting in less absenteeism.

In essence: -

Fewer microorganisms on the hands and on environmental surfaces;

Will lead to reduced microorganisms on product cross-contamination vectors (especially food handling);

Resulting in the food showing lower counts of general microorganism indicators (TVC, Enterobacteriaceae); and potentially lower pathogen detections e.g. *S. aureus*;

Which could result in increased food quality and safety and/or longer shelf-life;

And fewer customer complaints and recalls.

And: -

Fewer microorganisms on the hands of food workers together with increased social distancing

Will result in reduced person-to-person contact and fewer opportunities for cross-infection

Resulting in less infectious disease and corresponding less absenteeism

Is there any evidence for enhanced food safety in the UK?

In talking to Holchem customers there is anecdotal evidence of lower Listeria incidence in the environment and in the finished product.

In the wider community in the UK, where Holchem has many customers and we can equate to both the guidance given on undertaking additional hygiene procedures and the increase is sales of hand hygiene and disinfectant products, Public Health England (NOIDS[1]) published cumulative data up to week 51 for food poisoning cases in 2018, 2019 and 2020 (Table 1)

Statutory notifications	**Weeks 1-51 2018**	**Weeks 1-51 2019**	**Weeks 1-51 2020**
Food Poisoning	10910	8756	4684

Table 1 - Statutory notifications of infectious diseases in the current year compared with corresponding periods for the preceding two years

Table 1 shows that the general incidence of food poisoning has reduced by over a half during the period of the COVID-19 pandemic. Similarly, the number of Listeria recalls alerted by the FSA in the period January to August for 2018, 2019 and 2020 is shown in

Number of Listeria recalls	**2018**	**2019**	**2020**
	14	7	6

Table 2 – FSA Listeria recalls, January – August 2018, 2019, 2020

Table 2. Listeria incidence, the organism most likely to be controlled by frequent environmental disinfection in food factories, was also much reduced in 2020.

Is there any evidence for enhanced food safety in other countries?

This position is not unique to the UK and other countries have also shown a reduction in pathogen incidence in the community, e.g.in Finland (Anon 2020a, 2021f), the USA (Anon 2020b), Spain (de Miguel Buckley et.al. 2020), Israel (Basal et. al. 2021), France (Anon 2021b), Germany (Anon 2021a), Sweden (Anon 2021e), Denmark (Anon 2021g, i), Australia (2021h), Switzerland (Anon 2021j) and Europe generally (Anon 2021c, d)

What about respiratory or other infectious diseases?

It has been widely quoted in the media that cases of flu have been significantly less in 2020/2021 (CDC 2020), presumably due to all the measures that nations have put in place to control COVID-19. Measures put in place within food processing establishments to control COVID-19 may be a significant part of this reduction for food operatives, as the workplace will likely be the environment

in which most food operatives come across, and come into contact with, large numbers of people (to allow the cross infection).

Similar reductions in other respiratory diseases transmitted by person-to-person contact may also be likely. For example, notifiable infectious diseases have declined in Australia (Bright *et. al*. 2020), Germany (Ullricha et. al. 2021) and Taiwan (Lai, C-C. et. al. 2021)

Could there be other causes for reduced food poisoning statistics and infectious diseases?

It is likely that any reduction in food poisoning specifically will be complex and not simply reflective of additional hygiene measures taken during food manufacturing. With respect to the public, on the positive side: -

- peoples' behaviour may have changed via a focus on hand hygiene to control COVID-19, to making home food preparation and cooking more hygienic
- peoples' eating habits may have changed so that they are more likely to eat perceived safer foods (for fear of having to go to hospital during the pandemic if they were sick)
- consumers purchased more pre-packed foods during the pandemic, potentially because they were safer as they would be touched less, and were more likely to check 'use by' dates (EIT Food, 2021)?

On the negative side: -

- people who have mild illness from food poisoning are not reporting it as they may think public health authorities are overstretched
- people who have mild illness from food poisoning are not reporting it as they may not be able to gain access to a health practitioner
- people are not eating out as food service establishments are closed or have restrictions (eating outdoors only or fewer tables available due to social distancing requirements). Note: - food service has traditionally been perceived as a higher risk for food poisoning than eating at home.
- people are not travelling outside their own countries. Food poisoning cases are often reported as being sourced from out of the country, when people had returned from foreign visits (holidays, business etc.).

With respect to the food manufacturer, on the positive side: -

- manufacturers may have reduced food product volumes and/or fewer product SKUs, which may have led to longer hygiene windows to enable enhanced cleaning.
- operatives may have adopted additional PPE such as face masks or more use of gloves, which could reduce their interaction with food products

On the negative side: -

- Equally the opposite may be true, with food manufacturers increasing production, particularly at the start of the pandemic, with additional staff, and with an increased pressure on maintaining hygiene windows to allow adequate cleaning.

For infectious diseases in general, enhanced social distancing as the major COVID-19 control is likely to be the prime driver in reduced infections, though other aspects such as underreporting of disease, as noted above for food poisoning, is also likely to be influential. There may be some similar reduced infection effects for workers in the food industry (who have maintained their work during the pandemic), if they primarily socialise at work, and if social distance controls were enforced in the workplace.

Ultimately, only time will allow us to look at all factors relating to current reduced food poisoning and infectious disease incidents and come to a more considered conclusion, but in the interim, we must assume that the enhanced hygiene procedures due to COVID-19 in food processing establishments is at least partially responsible for the reduction in food poisoning cases in the general public and the reduction of infectious disease in food workers.

It would be very useful, therefore, for both individual food manufacturers and the industry at large, to try and gain evidence from food industry data to see if this major change in food hygiene practices has had additional benefits to food safety or personal health.

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Appendix A

How can Kersia gather evidence to show the benefits of enhanced personal hygiene and additional environmental surface disinfection?

To undertake this factory-based study, firstly, three key criteria are required: -

1. The factory must have used more hand hygiene products and/or undertaken enhanced environmental disinfection during production periods during the pandemic. This could be evidenced by: -
    a. Hand hygiene product and disinfectant usage figures
    b. Holchem's (Kersia's) help in developing CICs for environmental disinfection of operative's contact points or additional hand hygiene facilities.
2. The factory has been producing the same product range, using the same manufacturing process, with the same number of staff, for several years. This may allow the comparison of data recorded in 2020 with that of 2019 and perhaps 2018 (or longer).
3. There are no, or few, other factors involved that could account for differences in food product or environmental microbiological populations

What sectors of the food industry might benefit most?

The food manufacturers who are most likely to benefit from enhanced product food safety (and those most likely to provide records of it) are those in the RTE sector, and in particular, those that produce food products for which food handling is a key part of the manufacturing process. All the food industry may benefit from reduced absenteeism.

What information is needed?

- Evidence for compliance with the above three key criteria.
- Microbiological data - primarily beginning of life and end of life figures, generic microbial levels (e.g. TVC), pathogen incidence likely to be associated with cross-contamination from hands (e.g. *S. aureus*) or the environment (e.g. Listeria).
- Environmental microbiological data - generic microbial levels (e.g. TVC) and pathogen incidence (e.g. Listeria) as appropriate.
- Complaint's data (if this is likely to show micro issues).
- Absenteeism data from HR.
- Ideally the data should be from the start of lockdown in March through to the current month for 2020 and 2019 (and ideally 2018 if possible). Data for 2021 may also be useful
- If required, Holchem (Kersia) can offer to analyse this data, e.g. via regional or national Technical Support services

Overall goal of the work

If individual food manufacturers, or the industry at large, could show that a small change in hygiene practices influence product quality/safety and personal health then this both: -

- reiterates the need for good hand hygiene and cleaning and disinfection practices and

- establishes what best practice looks like for product quality and safety related to the influence of food operatives' personal practices and cleaning programme design.