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**ORIGINAL PAPER** 



#### Chemophobia versus the identity of chemists: heroes of chemistry as an effective communication strategy

Radek Chalupa<sup>1,2</sup> · Karel Nesměrák<sup>3</sup>

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#### Abstract

Abstract Decades of chemophobia are taking a high toll on chemistry. As current surveys suggest, people are displaying an irrational desire to live in a world without chemistry, but at the same time are unable to answer trivial chemistry questions. Constant questioning of the importance of chemistry induced by chemophobia leads to a weakening of the identity of chemists and can have negative consequences on the reproduction of chemistry. The need for the support of a positive perception of the chemical profession and an offer of positive examples for self-identification is the result. Everyday communication thus becomes the background on which the determination of the identity of the chemist takes place. The new communication strategy, which we call "heroes of chemistry", aims not only to add a much-needed human touch to chemistry communications, but also to create the conditions for strengthening the identity of the chemist.

#### Graphic abstract



Keywords Ban of chemistry · Communication strategy · Didactics of chemistry · Fears of chemistry · Identity of chemist · Public image of chemistry

#### Introduction

Chemophobia continues to surprise us with the irrationality of its manifestations. At the same time, a recent survey [1] shows that the ability of chemophobia to influence the way the public perceives chemistry is not declining, but remains stable at a high level. This development takes place

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against the background of the trivialization of public discourse, which goes hand in hand with the proliferation of false prophets. Traditional media continues to recede into the background as digital media supplies grow. However, the growth in supply is far from copying the growth in quality, and this creates further challenges for chemistry communications. One prerequisite for dialogue with the public and its chemical education, which is necessary for the public to be able to responsibly play the role of a democratic sovereign, is to gain its attention. The key to the public's attention is the ability to capture its imagination. As a possible solution, we propose the idea of "heroes of chemistry." By focusing

(Treatise on poisons found in the mineral, vegetable, and animal kingdoms, or general toxicology), which has been used as a basic text for decades. The book is a landmark in not only toxicology but in scientific history [55].

In 1818, Orfila published a book for the general public Secours à donner aux personnes empois ées et asphyxiées (A popular treatise on the remedies to be employed in cases of poisoning and apparent death), which became very popular and has been translated into a number of foreign anguages [56]. In the book, Orfila criticized not only popular ideas and misconceptions on poisons and antidotes, but also the practices of quacks; very similar to today, when chemophobia is the result of ignorance in chemistry and the intervention of various activists.

#### Case 3

One of the heroes of chemistry in the Middle Ages was Johannes de Rupescissa, whose writings were extr widely circulated and copied in his days, and thus had a sig-nificant impact [57]. He was born around 1310 in Auverge, central France. In 1332, he joined the Franciscan order, some 5 years after he began his studies at the University of Toulouse. Rupescissa died between 1366 and 1370, probably at Avignon.

In his time, part of Christendom expected an impending apocalypse associated with hardship, disasters, and diseases (resembling today's COVID-19 situation), Rupescissa tried to find a solution to this situation by using (al-) chemical knowledge and methods. Basically, the same as we do today, when we use chemistry to ensure humanity's prosperity Rupescissa, of course, wrote his works using the language and expressions of his time, but formulated his firm conviction that when facing disasters, chemistry is able come them and has a central role in to help humankind ov the wake of the world. In his Liber Lucis (Book of light) from 1350, he proposed the possibility of making artificial gold by transmutation. Although we know that chemical transmutation of base metals into gold is not possible, we can perceive this Rupescissa's effort as a metaphor for creating new materials that are indispensable to our modern technologies. In his later work, De consideratione auintae essentia m rerum (On the consideration of the fifth essence of all things), he is one of the first to discuss the possibility of using chemistry in a new area-medicine [58, 59]. In this work, Rupescissa proposed a plan for humankind to escape disease, ageing, and even death through alchemy, i.e. chemistry. The task of chemistry is simply to prepare chemical medicines and medicaments that can restore lost health and improve human bodies to the point of near-immortality. Therefore, Rupescissa made chemical preparations a key part of medical practice; ever since his times, chemistry

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is regarded as the founder of medicinal chemistry [58]. According to Rupescissa, the study of chemistry is legitimized by the fact that chemistry plays such a crucial role for humankind [57]. He was likely the first chemist to assert that by using chemistry, human beings could correct and trans form the world, fight catastrophes, and enjoy an improved and high-quality society. He points to chemistry as a solution to all crises that seems to be apocalyptic. In short, chemists and chemistry can actively change the course of human history.

would forever after be closely linked to medicine. Now, he

#### Conclusions

Willingness to go against the flow, a readiness to look for unusual solutions, and a possession of what we could call scientific or civic courage, these traits connect the heroes of chemistry Zafra M. Lerman, Mathieu Orfila, and Joha

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