NAUKI INŻYNIERSKIE I TECHNOLOGIE ENGINEERING SCIENCES AND TECHNOLOGIES
nr 37 • 2021

ISSN 2080-5985
e-ISSN 2449-9773

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GRAPHIC ABSTRACT AS A REQUIRED ELEMENT IN MANUSCRIPT SUBMISSION AND ACCEPTANCE

ABSTRAKT GRAFICZNY JAKO ELEMENT WYMAGANY PRZY SKŁADANIU I AKCEPTACJI MANUSKRYPTU

DOI: 10.15611/nit.2021.37.06
JEL Classification: Q19

Abstract: An increasing number of international journals in food science, technology, and nutrition require authors to include an illustrative and pictorial graphical abstract to concisely capture the essence of the study reported in the submitted manuscript. Numerous journals across different publishers implement this trending mandate. A typical graphical abstract consists of several individual graphs, pictures, or drawings, which are not necessarily derived from the experimental data collected, and the text should be kept very minimal. The images should clearly represent the work described in the paper. The graphical abstract is to be submitted as a separate file. Failure to include a graphical abstract at the time of manuscript submission will result in the automatic rejection of the paper, that is, the manuscript is deemed incomplete and thus will not be entered in the peer-review process.

Keywords: graphical abstract, images, graphs, concise summary.

Streszczenie: Coraz więcej międzynarodowych czasopism z dziedziny nauk o żywności, technologii i żywienia wymaga od autorów zamieszczania ilustrowanego i obrazowego abstraktu graficznego, który w zwięzły sposób oddaje istotę badań przedstawionych w manuskrypcie. Ten wymóg jest realizowany przez wiele czasopism różnych wydawców. Typowy abstrakt graficzny składa się z kilku pojedynczych wykresów, zdjęć lub rysunków, które niekoniecznie muszą się opierać na zebranych danych doświadczalnych. Należy również pamiętać, że tekst powinien być bardzo ograniczony. Obrazy powinny jasno przedstawiać treść opisaną w pracy. Abstrakt graficzny należy przesłać jako osobny plik. Niedołączenie abstraktu graficznego w momencie składania manuskryptu spowoduje automatyczne jego odrzucenie – manuskrypt zostanie uznany za niekompletny i nie będzie brał udziału w procesie recenzji.

Słowa kluczowe: abstrakt graficzny, obrazy, wykresy, zwięzłe streszczenie.

1. Introduction

There are a host of conditions under which to accept manuscripts by expert reviewers (Lesiow, Xiong, and Chin, 2019). One of them is to write an abstract/summary that comprises the following elements: background (why the research was done), aim/purpose (what question or questions were answered), methods used (how was the experiment done), main results (the most important data and its correlations), conclusions (significance and relevance of the study), and comments to the hypothesis. Moreover, the summarising text must meet the editorial requirements for a given journal, such as the character limit. Non-essential words or phrases that do not add general information and detailed descriptions of the used methods should be avoided. The summary should be a condensed version of the paper, defining the most important points and encouraging to read the rest (*Ten steps*..., n.d.). To stress the importance of the abstract in constructing the remaining paragraphs of the manuscript, is should be presented in the form of the text together with its graphical counterpart.

Therefore, it is essential to have an idea of the problem addressed in the manuscript, and simultaneously, have its graphical representation. The purpose of this paper is to provide potential authors with some relevant suggestions for preparing an acceptable graphical abstract when writing their manuscript for submission and expert review.

2. Materials and methods

The article presents examples of graphical abstracts that have appeared in recent scientific publications. The obligatory elements, namely research ideas, experimental approach, and key (or simulated) results obtained, can be seen in these examples. The authors also include their advice as to the proper way to prepare an informative graphical abstract.

3. Results and discussion

Example 1

The first example of graphical abstracts concerns water-holding capacity (WHC) in meat

From the graphical abstract (see Figure 1), the materials under study were turkey and pork meat, the method used to measure WHC was filter-paper press, and the representative result obtained was shown (Szmańko, Lesiów, and Górecka, 2021). The aim of this study was to develop a precise method to express loosely bound water in meat, and, therefore, enable the objective determination of WHC in any type of raw meat. Four slightly different analytical procedures and corresponding formulas were applied. They were tested on various types of meat with different physicochemical and functional properties (fresh, frozen, with defects PSE or DFD, stored for 42 days, and with different fat contents, including cases with fat released from the samples on filter paper). As a result, it was proved that expressing WHC in relation to the ffDM (the content of the fat-free dry matter) components of meat (WHC_3) ensured absolute precision in determining WHC (Szmańko et al., 2021).

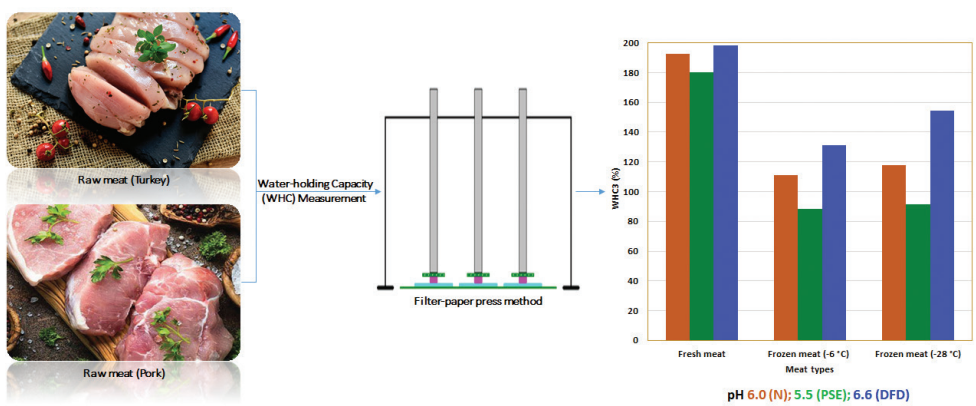

Fig. 1. Graphical abstract expressing WHC as WHC_3 ensured absolute precision in determining WHC
Source: (Szmańko, Lesiów, and Górecka, 2021).

Graphical abstract presented in Figure 1 could be improved by adding some more results confirming that WHC_3 is the best method in determining meat WHC.

Example 2

The second example concerns CRISPR-Cas12-based rapid authentication of halal food

The halal food market is globally growing along with the increased risk of adulteration; To ensure halal food authenticity, the study aimed to develop an amplification-free

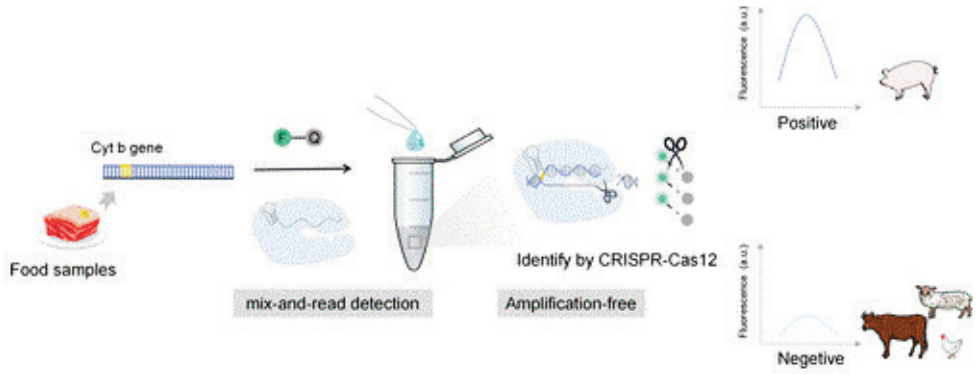

Fig. 2. Graphical abstract for CRISPR-Cas12-based rapid authentication of halal food

Source: (Wu et al., 2021).

and mix-to-read CRISPR-Cas12-based nucleic acid method for the analysis of pork components (Figure 2). The guide RNA (gRNA) was optimised targeting the pork cytochrome b (Cyt b) gene, and the presence of the pork Cyt b gene can be mix-and--read and only one-step-detected, which may indicate the risk of halal food adulteration. The method allowed for the specific differentiation of pork meat from beef, mutton, and chicken. The CRISPR-Cas12-based nucleic acid test strategy is promising for rapid food authentication (Wu et al., 2021).

Example 3

Example 3 concerns the role of trace organic minerals (OTM) vs. inorganic minerals (ITM) in swine diet for the activation of muscle cellular antioxidative enzymes to improve water binding, reduce drip loss, and inhibit lipid oxidation in fresh pork during storage

The suppression of lipid oxidation and mitigation of exudation in fresh pork from pigs fed OTM diets suggest that organic minerals offer stronger protection than inorganic minerals for fresh pork quality (Figure 3). The tendency to activate antioxidant enzymes, notably superoxide dismutase (SOD) and catalase (CAT), is a possible cause for the meat quality improvement by OTM treatment. While both forms of minerals contribute to oxidative stability (reduced lipid oxidation, OTM was more effective than ITM. Increased SOD activity appears to have a most pronounced effect on both drip loss reduction and lipid oxidation inhibition (Jiang, Jin, Lin, and Xiong, 2021).

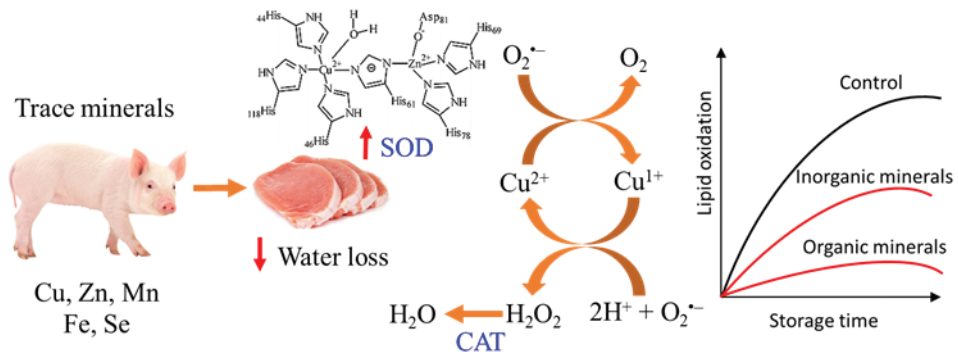

Fig. 3. The graphical abstract indicates the efficacy of dietary peptide-chelated trace minerals as inorganic mineral substitutes to modulate cellular enzyme activity and improve pork quality

Source: (Jiang et al., 2021).

Example 4

Example 4 was a Ratiometric G-quadruplex assay for lead detection in food samples

Lead (Pb^{2+}) pollution is a serious food safety issue, hence, rapid detection of Pb^{2+} residues in food is critical to the assurance of food safety (Figure 4).The objective of the study was to develop ratiometric aptamer probes for the identification of Pb^{2+} in fresh eggs and tap water samples. Pb^{2+} specific aptamer can bolster a transition of G-quadruplex structural response to Pb^{2+}. The utilisation of G-quadruplex specific dye and terminal-labelled fluorophore allowed to endue ratiometric signal outputs towards Pb^{2+} (Liu et al., 2021).

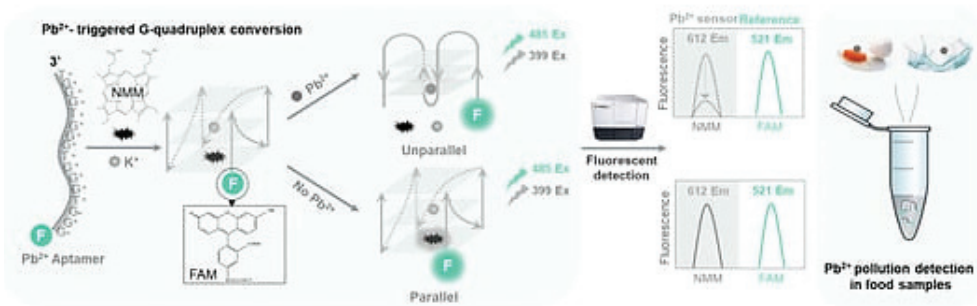

Fig. 4. Ratiometric G-quadruplex assay for robust lead detection in food samples

Source: (Liu et al., 2021).

Example 5

The fifth example concerns G-quadruplex-probing CRISPR-Cas12

Foodborne pathogen infection is a key issue of food safety (Figure 5). The aim was to develop a label-free assay for *Salmonella enterica* (*S. enterica*) detection based on the G-quadruplex-probing CRISPR-Cas12 system (G-CRISPR-Cas) for the detection of *S. enterica* in chickens. G-CRISPR-Cas assay can detect *S. enterica* as low as 20 CFU. The analysis of extracted DNA from the pathogen was carried out with this method, and a high level of sensitivity was obtained (Xia et al., 2021).

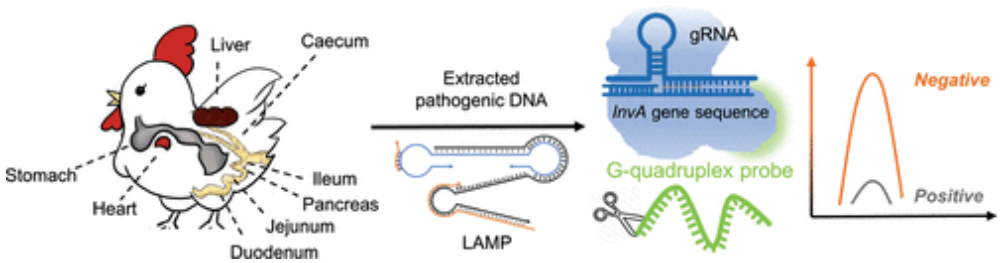

Fig. 5. G-Quadruplex-Probing CRISPR-Cas12 assay for label-free analysis of foodborne pathogens and their colonisation in vivo

Source: (Xia et al., 2021).

Example 6

The sixth example is the analysis of carcinogenic heterocyclic amines in cooked shrimp

Heterocyclic amines (HAs) carcinogens were studied in cooked shrimp using different cooking methods. Representative HAs, including IQ, MeIQx, 4,8-DiMeIQx, PhIP, DMIP, Harman and Norharman, were detected in all stir-fried and broiled shrimp samples. These detected and several undatable HAs were presented in the graphical abstract. Brown shrimp (stir-fried) appeared to be more contaminated, followed by pink tiger, and white. Creatine and glucose were found at higher brown shrimp concentrations, generating high amounts of HAs (Khan and Azam, 2021).

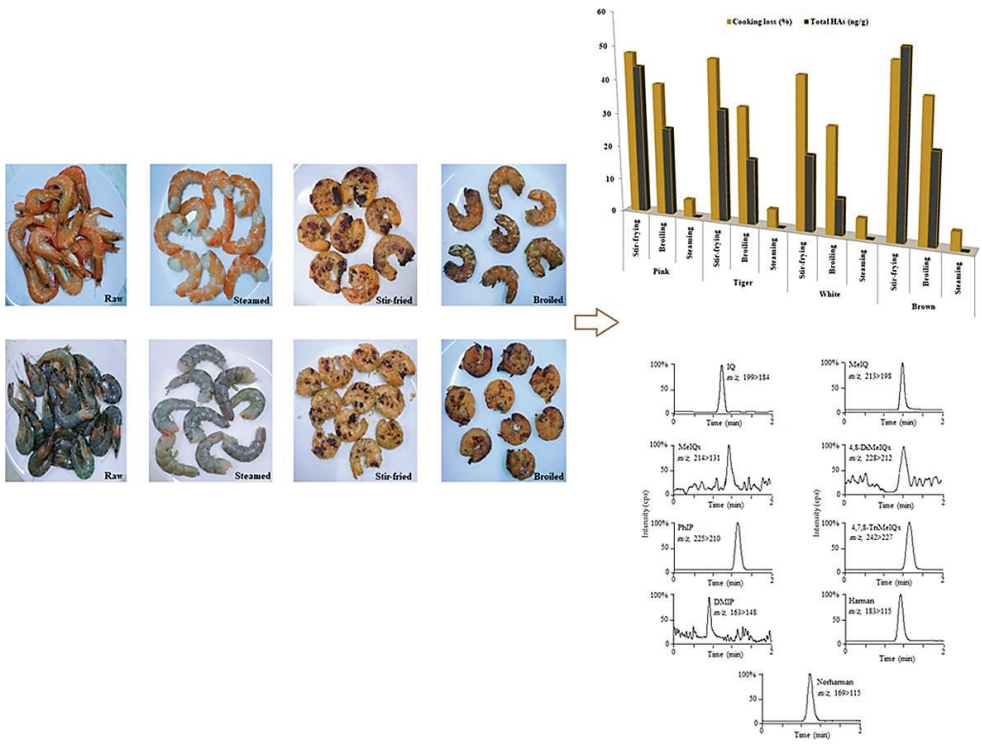

Fig. 6. Shrimp as a substantial source of carcinogenic heterocyclic amines

Source: (Khan and Azam, 2021).

Example 7

The seventh and final example illustrates the collection of necessary information on any subject as a map of valuable knowledge useful in scientific and educational work with students

The crane is a bird with a slender body (Figure 7). It has long legs and enormous wings. It is 130 cm tall and weighs 6 kg. The crane likes to eat cranberries and that is where its name comes from. In addition, there is a red spot on its head, resembling a cranberry fruit in color and shape. The crane comes to Poland) in spring for the breeding season, and afterwards flies away to the wintering grounds in autumn. The cranes build their nests near scrub, and a pair of cranes take turns for 30 days to brood two blue-green eggs. Cranes are very picky; they feed on invertebrates, snails, earthworms, shoots of young plants, seeds, and cranberries. Cranes are a symbol of nobility and fidelity.

Fig. 7. The easiest way to prepare the graphical form for the abstract translation of words: żuraw – crane, symbol – symbol, szlachetność – nobility, wierność – fidelity

Source: authors own study.

4. Advice for the preparation of a graphical abstract

A simple procedure to prepare the graphical abstract is:

1. Introduce the background of the research in a concise and illustrative way (drawing, lines, words, etc.).
2. Display the research methodology. Key words and terms, and graphical pictures of the instruments are helpful.
3. Describe the main results of the research. Only present the most important and key findings.

As an example, the following graphical abstract illustrates the formation of heterocyclic amines in cooked meat (Figure 8).

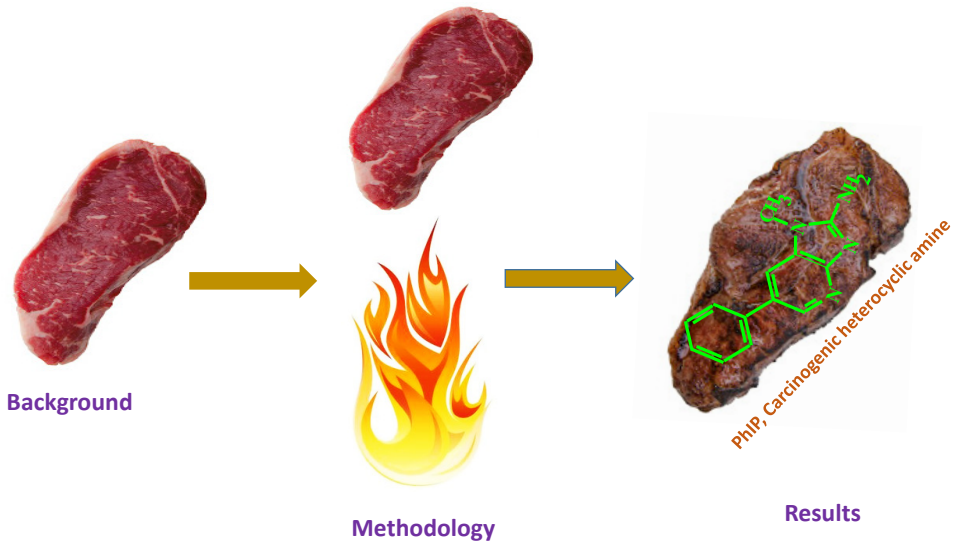

Fig. 8. The easiest way to prepare the graphical form for an abstract

Source: own study.

When one has in mind elements for what should be included in the graphical abstract and the journal to which the manuscript will be submitted, one can begin to craft the ideas. Remember, as a beginner, it is necessary to create a graphical abstract with the help of experienced colleagues, the Internet, graphic programs, and, above all, your imagination.

4. Conclusion

A graphical abstract is a substantive collection of key ideas and points of your research presented in the manuscript. It is like a map of knowledge drawn after the authors have carefully re-evaluated the results and their relevance, as well as significance. In its preparation, the prospective authors will also need to rethink the concept of the experiment, the problem(s) addressed, and the answers obtained. A concise but informative graphical abstract will greatly benefit the readers by capturing the essence of the study at a glimpse of the graphical presentation. To sum up, a graphical abstract is one of the essential elements for many scientific journals, which introduces the study to the expert reviewers and encourages them to read it and offer constructive comments, suggestions, and advice.

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