

Attached to test report №8497 28/10/2021  
Client: FIN. OPERA. S.r.l.  
Via Ennio, 14 20137 Milano (MI)

**Objective: Evaluation of Data Presented in R.d.P. 8497.2021**

At the request of the client, an assessment of the data presented in test report No. 8497 dated October 28, 2021 in accordance with the standards specified by the ISO 3632-1 / 2011 "Spices - Saffron (*Crocus Sativus* L.) - Part 1: "Specification" is limited to parameters. Reference is made to Table 2 "Chemical characteristics of saffron threads, cut threads and powder forms" in clause 6 "Test methods" of the aforementioned Standard. The reference values for the specified parameters are shown in Table 1 of this report.

**Table 1 - Reference values given in Table 2, Clause 6 of ISO 3632-1 / 2011 for the specified parameters.**

Parameters	Specific Categories as a Function of the Parameters		
	Category I	Category II	Category III
Degree of Taste (eg. picrocrocin) $A_{1\text{ cm}}^{1\%} \lambda 257\text{nm} / \text{S.S.}$	Saffron threads or powder min. 70	Saffron threads or powder min. 55	Saffron threads or powder min. 40
Degree of Aroma (eg. Safranal) $A_{1\text{ cm}}^{1\%} \lambda 330\text{nm} / \text{S.S.}$	Saffron threads or powder min. 20 max. 50	Saffron threads or powder min. 20 max. 50	Saffron threads or powder min. 20 max. 50
Degree of Color (eg. Crocin) $A_{1\text{ cm}}^{1\%} \lambda 440\text{nm} / \text{S.S.}$	Saffron threads or powder min. 200	Saffron threads or powder min. 170	Saffron threads or powder min. 120

These parameters were aimed at characterizing the product for three compounds that determine the organoleptic properties of the spice (picrocrocin for taste, safranal for flavor and crocin for color) compared to the used extract tested at specific UV / visible wavelengths (see. table 1) with a decrease in product characteristics from I to III.

As indicated in test report n. **8497.2021** on a sample of saffron threads n. **13057.2021** with the inscription: "**Saffron threads - Lot 152154W**", the results presented in Table 2 were obtained. The same table indicates the corresponding category for each parameter according to the specifications given in table 1.

**Table 2 - Data obtained, test sample and applicable categories**

Parameters	Measured values and applicable categories		
	Measured values	Measurement error (k=2) <sup>Note 1</sup>	Applicable categories
Degree of Taste (eg. picrocrocin) $A_{1\text{ cm}}^{1\%} \lambda 257\text{nm} / \text{S.S.}$	<b>102</b>	±7	Category I
Degree of Aroma (eg. Safranal) $A_{1\text{ cm}}^{1\%} \lambda 330\text{nm} / \text{S.S.}$	<b>37</b>	±2	Category I, II e III
Degree of Color (eg. Crocin) $A_{1\text{ cm}}^{1\%} \lambda 440\text{nm} / \text{S.S.}$	<b>275</b>	±18	Category I

Note 1: ISO 3632-1 / 2011 and ISO 3632-2 / 2010 do not provide explicit guidance on the interpretation of measurement uncertainty. The ISO 3632-1 / 2011 standard states: "If necessary, additional analysis can be carried out if sufficient sample remains." Therefore, if deemed necessary, additional in-depth tests can be carried out..

Based on the values of the measurements carried out and limited by the parameters defined for the test sample, the following is assigned: **CATEGORY I**

The above considerations and data presented are only for the tested sample. Cassano Magnago, 28 October 2021



McCORMICK

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Test report n°: P- 230859

Release date: 10 March 2023

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<b>Customer information:</b> R&D Carpentras		<b>Sample reception date:</b> 01 March 2023
<b>- Sample identification:</b> SAFRAN FIL G1 BO		<b>Analysis beginning date:</b> 06 March 2023
<b>- Sample reference:</b> RD1-210223		<b>Product:</b> Saffron
<b>Mass receipt (g):</b> 15		<b>Category:</b> SPICES
<b>Method:</b> DCQI223 version V : Full Screening quantitation by GC-MS-MS and LC-MS-MS		<b>EU Code number:</b> .0860010
		<b>Analysis Request:</b> QUALITY

**1513041 SAFRAN FIL G1 BO, supplier 230860 MG Harvest 2022**

Vendor name **BMB SHIFO (BMB ZA'FARON)** - compliant only for micro and chemical analysis.

Désignation caractéristiqu...	Spécifications	à contrôler	Contrôlé	Val...	Résultat	Valeur d'orig.	Val..
ESCHERICHIA COLI	<= 9 cfu/g	1	1		= <9	<9	✓
SALMONELLA DANS 1g	Pathogens or Harmful Subst	1	1		ND Non dét...		✓
Désignation caractéristiqu...	Spécifications	à contrôler	Contrôlé	Val...	Résultat	Valeur d'orig.	Val..
TENEUR EN AW	0,000 .. 0,650 %	1	1		= 0,350	0.35	✓
TENEUR EN EAU METHODE	0,0 .. 12,0 %	1	1		= 6,3	6.3	✓
TENEUR EN CENDRES	0,0 .. 8,0 %	1	1		= 6,3	6.3	✓
PICROCROCINE	70 .. 1000 %	1	1		= 104	104	✓
SAFRANAL	20 .. 50 %	1	1		= 33	33	✓
CROCINE	200 .. 1000 %	1	1		= 309	309	✓
CCM SAFRAN nb analyses v	Nombre d'unités défectueus	1	1		Σ- 0		✓
COLORANTS ILLEGAUX nb	Nombre d'unités défectueus	1	1		Σ- 0		✓
EXTR DE GARDENIA (DOSA	Pathogens or Harmful Subst	1	1		ND Non dét...		✓
EXAMEN MICROSCOPIQUE	Nombre d'unités défectueus	1	1		Σ- 0		✓
PESTICIDES	Nombre d'unités défectueus	1	1		Σ- 0		✓
CDR INSOLUBLES DANS L'	0,0 .. 1,0 %	1	1		= 0,8	0.77	✓

Electronic Validation Report validated by:  
Maryline BRUN - Pesticide Technical Manager

Signature:

# 샤프란 2종 기능성 비교

샤프란(Yellow) VS 샤프란(Red)

항산화 및 항염 활성 테스트

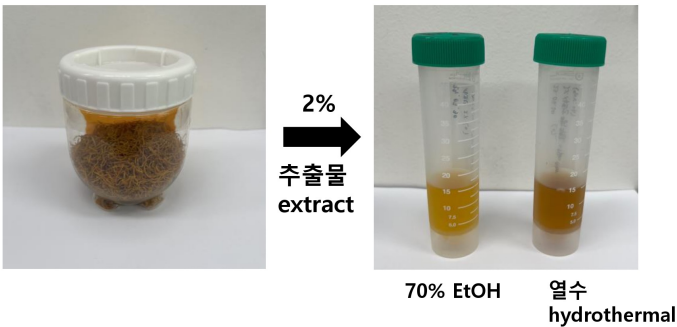
Antioxidant and anti-inflammatory activity test

2023.04.05.

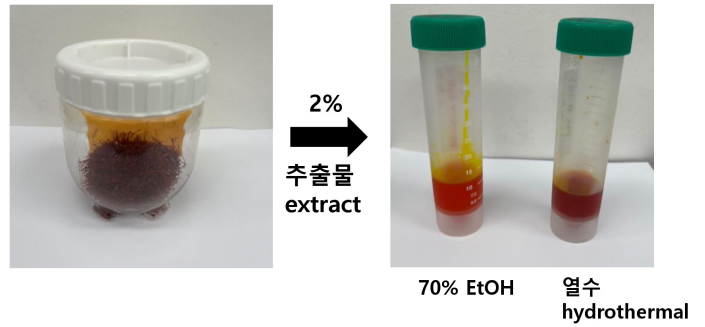
연구개발팀

## ✓ 샘플 정보

샤프란(Old) : 노란색



샤프란(New) : 빨간색

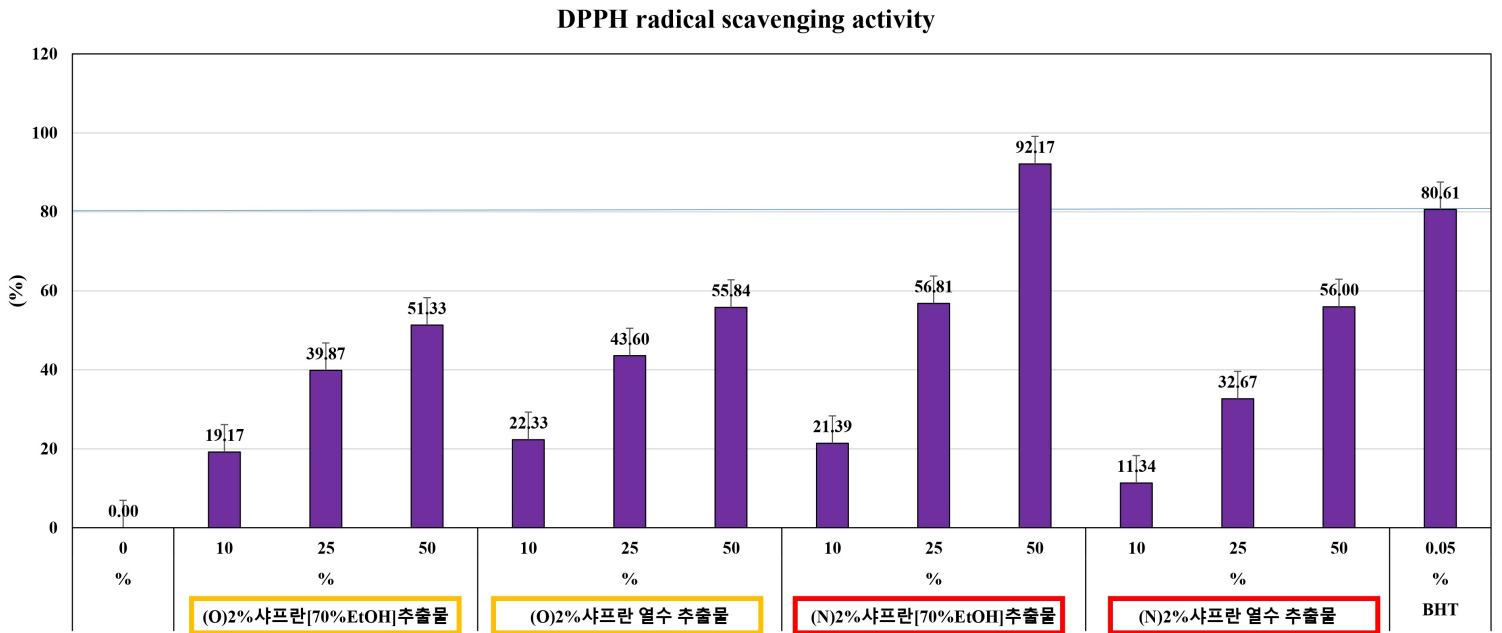


## ✓ 샤프란 2종 전처리 방법

1. 2%(v/v) 열수 추출 : 90°C, 2H (in DW) 추출
  2. 2%(v/v) 주정 [70% 에탄올] 추출 : 상온, 24H 추출
- } 0.45 $\mu$ m filter 후 실험에 사용

→ 2% 샤프란 추출물(열수, 70%EtOH)을 원물(100%)로 하여 실험에 사용함.

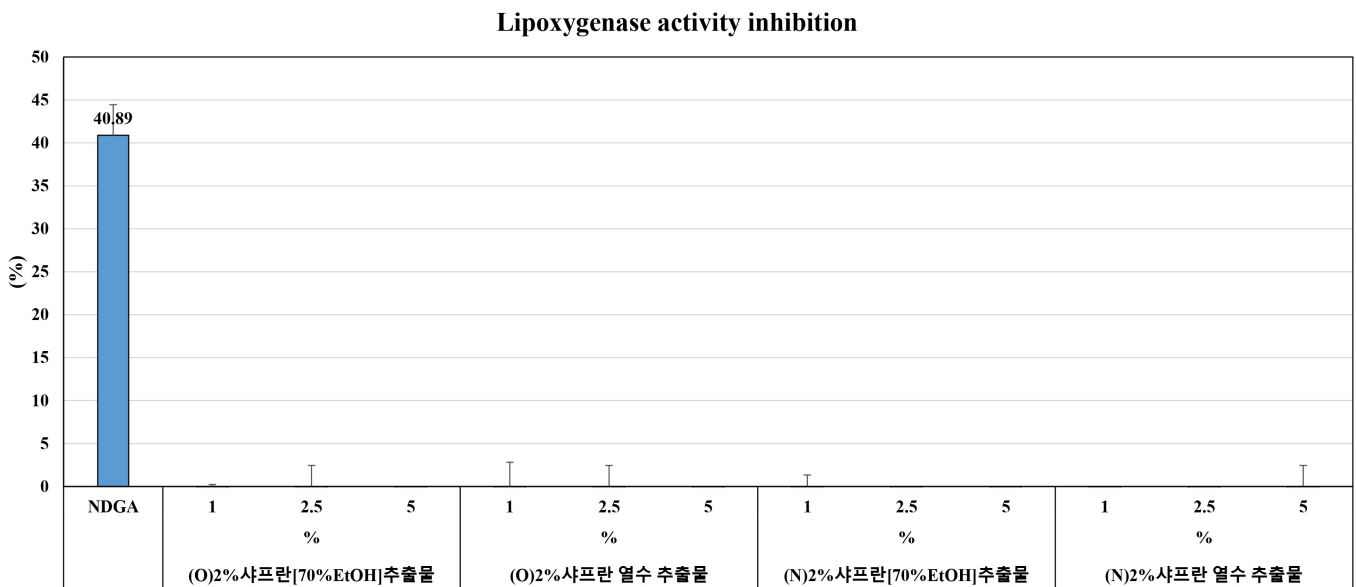
✓ 항산화 활성 측정 결과



\* BHT : Positive control

- 샤프란(Old) 보다 샤프란(New)의 항산화 활성이 더 우수함을 확인함.
- 샤프란(Old)의 경우 추출 용매별 항산화 활성 차이는 없으나, 샤프란(New)의 경우 70%에탄올 추출물이 열수 추출물 보다 항산화 활성이 더 우수함을 알 수 있음.

✓ 항염 활성 측정 결과



\* NDGA : Positive control

- 샤프란(Old) 및 샤프란(New)는 항염 활성을 나타내지 않음을 확인함.

## <결론 및 고찰> Conclusion and Consideration

- ❖ 샤프란(Old) 보다 샤프란(New)의 항산화 활성이 더 우수함을 확인하였으며, 샤프란(New)의 경우, 열수 추출물보다 70% 에탄올 추출물의 항산화 활성이 더 우수함을 확인함.
- ❖ 샤프란(Old) 및 샤프란(New)는 항염 활성을 나타내지 않음을 확인함.
- ❖ It was confirmed that the antioxidant activity of saffron (Red) was better than that of saffron (Yellow). In the case of saffron (Red), it was confirmed that the antioxidant activity of the 70% ethanol extract was better than that of the hot water extract.
- ❖ Confirmed that saffron (Yellow) and saffron (Red) did not exhibit anti-inflammatory activity.