APISARA

FRAGRANCE IN SOAPMAKING

Essential oils, fragrance oils, dosage, scent retention, behaviour and safety

PURPOSE OF THIS GUIDE

To understand fragrancing as a genuine formulation operation: selecting a fragrance material suitable for soap, calculating its concentration, anticipating its behaviour in the batter, improving reproducibility, and integrating safety and regulatory requirements.

Audience: beginners, artisans, professionals, trainers and self-learners.

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Eric Bertrand for Apisara

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DISCLAIMER

> This guide is an educational resource. It does not replace laboratory analysis, a Safety Data Sheet (SDS), supplier specifications, the applicable IFRA certificate or documentation for the fragrance used, a cosmetic safety assessment, or the regulatory obligations applicable to the product and country concerned.

1. Fragrancing soap: much more than adding a scent

Fragrance is one of the most technically demanding ingredients in soap. It shapes the sensory experience, but it may also alter trace speed, temperature, fluidity, colour and sometimes batter stability. Two fragrances used at the same percentage can behave very differently.

The professional question is therefore not simply “how much fragrance?”, but: which fragrance material, at what concentration in the finished product, with which documentation, what manufacturing behaviour, and what performance after cure?

APISARA RULE

Never choose a dosage simply because an online recipe uses “3%” or “30 g/kg”. The safe maximum depends on the fragrance composition, the product type and the applicable safety and regulatory documentation.

2. Essential oils and fragrance oils: useful differences

Criterion	Essential oils (EOs)	Fragrance oils / fragrance compounds
Origin	Volatile mixtures obtained from botanical materials	Fragrance mixtures formulated from natural and/or synthetic substances
Composition	Complex and variable by species, origin, batch and extraction	Designed for a defined scent profile and performance
Performance in soap	Highly variable; some notes fade rapidly	May be designed for soap, but performance still depends on formula
Safety	Allergenic constituents, restrictions; phototoxicity possible for some materials	Restrictions and limits arising from constituents in the composition
Documentation	SDS, specifications, allergen and regulatory data	SDS, technical sheet, allergen declaration, appropriate IFRA certificate/document

A fragrance oil is not necessarily “less safe” because it contains synthetic substances, and an essential oil is not automatically safe because it is natural. Safety is assessed from composition, exposure and applicable restrictions.

3. Building a scent: top, heart and base notes

The classification into top, heart and base notes is a useful perfumery tool, but it does not perfectly predict behaviour in soap. Highly volatile notes, often perceived first, may decrease substantially during manufacture and cure; less volatile materials may contribute more to persistence.

Olfactory role	General tendency	In soapmaking
Top notes	Fresh, light, volatile	Often the most fragile during cure and storage
Heart notes	Main body of the accord	Can provide continuity to the scent
Base notes	Less volatile, persistent	May support retention, but do not guarantee “fixation” by themselves

A balanced accord is not created by mechanically applying a top/heart/base ratio. The blend must be tested in the actual soap formula.

4. Why fragrance changes during manufacture and cure

Fragrance encounters a demanding environment: strong alkalinity, possible heat from gel phase, mechanical mixing, volatilisation and then several weeks of curing. Some constituents withstand these conditions well; others evaporate, react or become less perceptible.

The final perception also depends on the fat blend, superfat, water content, manufacturing temperature, curing conditions, packaging and storage time.

ESSENTIAL POINT

Smelling a fragrance in the bottle cannot accurately predict its odour in finished soap. Validation should always include assessment after manufacture and after a representative cure.

5. Dosage: calculate on the right basis

Dosage must be expressed unambiguously. In a workshop, “3%” may mean 3% of oil weight or 3% of finished-product weight: these are different quantities.

For safety and regulatory assessment, the relevant concentration is generally the fragrance material concentration in the finished product. For manufacturing recipes, many soapmakers still use oil weight as a practical basis. The calculation basis must therefore be stated explicitly.

Notation	Meaning	Good documentation practice
% of oils	Fragrance mass / oil mass × 100	Useful for recipe work, but insufficient by itself to verify a regulatory limit
% finished product	Fragrance mass / finished-product mass × 100	Appropriate basis for exposure assessment and applicable limits
g/kg	Grams of fragrance per kilogram of reference mass	Always state: kg of oils or kg of finished product

> NO UNIVERSAL DOSAGE There is no single percentage that is valid for every essential oil and every fragrance compound. The applicable limit may be lower than the amount you would prefer to use for a stronger scent.

6. IFRA: product category and use level

IFRA Standards establish prohibitions, restrictions or specifications for certain fragrance ingredients based on safety assessment. The applicable level depends in particular on the product category.

In current IFRA guidance, bar soap (toilet soap) is a primarily rinse-off product in Category 9. An IFRA certificate or statement prepared for another category must not automatically be transferred to bar soap.

CHECK FOR EVERY FRAGRANCE

1) exact fragrance identity and supplier; 2) version of the IFRA document; 3) category corresponding to the soap; 4) stated maximum concentration; 5) any additional restrictions; 6) contributions of the same restricted constituent from other sources in the formula.

An IFRA certificate is not a general market authorisation and does not replace the safety assessment of the finished cosmetic product.

7. Essential oils: natural does not mean risk-free

An essential oil is a mixture of many molecules. Some may be sensitising, irritating or subject to restrictions. Certain expressed citrus oils may also raise phototoxicity concerns depending on composition and extraction method.

Composition may vary with botanical species, chemotype, geographical origin, season, plant part and extraction process. In professional production, a commercial label such as “lemon EO” or “lavender EO” is not enough: botanical identity and batch documentation matter.

COMMON ERROR

Combining several essential oils that are “each below their own limit” does not automatically make the blend compliant. Several EOs may contribute the same regulated or allergenic constituents.

8. Acceleration, seizing, separation and other interactions

Some fragrance compounds accelerate trace; others may cause almost immediate thickening or “seizing”, lumps, or more rarely contribute to separation in a difficult formula. Behaviour depends on both the fragrance and the recipe.

Observation	Possible factors	Trial response
Very fast trace	Reactive fragrance, high temperature, formula rich in saturated fatty acids	Work cooler, reduce stick blending, simplify design, test a small batch
Immediate seizing	Strong fragrance/formula interaction	Do not keep stick blending; test another fragrance or process
Separation / free oil	Weak emulsion, interaction, temperature, weighing error	Secure batch; check calculations and procedure before correction
Overheating	Fragrance + sugars/additives + insulation	Adjust temperature and insulation

Supplier information may report acceleration or discolouration observed in testing, but it cannot replace a trial in your own formula.

9. Discolouration and visual changes

Some fragrances colour the batter directly; others darken during cure. Fragrance compounds containing certain aromatic constituents, particularly vanilla-related materials, are well known for potentially producing beige-to-brown discolouration, although the intensity depends on the product.

Essential oils can also affect colour directly or through changes in their constituents. Soap colourants may mask, amplify or visually modify this effect.

PRODUCT DESIGN

A fragrance that causes browning is not necessarily unusable. The effect can be incorporated into the design provided that it is reproducible and compatible with the intended appearance.

10. Incorporation methods

In cold-process soapmaking, fragrance is generally incorporated once an emulsion has formed, often at light trace, to limit mixing time after addition. A fragrance known to accelerate strongly may require a specific procedure.

In hot process, later incorporation at a controlled temperature may reduce some volatile losses, but it does not guarantee complete fragrance retention. The mixture must remain homogeneous.

Good practice	Why it matters
Weigh fragrance in advance	Avoids improvisation during a rapidly advancing trace
Use a compatible, identified container	Reduces errors, contamination and losses
Incorporate homogeneously	Avoids over- or under-dosed zones
Limit unnecessary mixing after addition	May help when fragrance accelerates
Record temperature and addition point	Allows reproduction and diagnosis

11. Improving scent retention

Retention does not depend on a “miracle fixative”. It results from fragrance composition, constituent volatility, compatibility with soap, process, cure and storage.

A rational strategy is to select materials known to withstand the soap environment, balance the fragrance accord, avoid unnecessary overheating, limit prolonged air exposure after cure and test the packaging.

Clays and other powders are sometimes described as “fixatives”. They may alter fragrance distribution or perception in some formulas, but their presence does not guarantee better retention. Any benefit should be demonstrated by comparison.

SIMPLE TEST

Make a control batch and a variant claimed to improve scent retention at the same time. Evaluate them blind after cure and again after several weeks or months. Without a control, perceived “better fixation” is difficult to attribute reliably.

12. Comparative trials and sensory evaluation

A fragrance should be assessed at several stages: raw material, fresh batter, soap at day 1, end of cure and during storage. A simple “I like it / I don’t like it” judgment is not enough for product development.

Criterion	Example internal scale
Intensity	0 = imperceptible; 5 = very strong
Fidelity to initial accord	0 = very different; 5 = very close
Balance	Does one note dominate excessively?
Off-odour	Rancid, burnt, chemical, earthy, other
Persistence in use	Perception dry, during washing and after rinsing

When comparing trials, use coded samples and, where possible, several assessors. Keep curing and storage conditions identical.

13. Fragrance allergens and labelling

In the European Union, certain allergenic fragrance substances must be individually named in the ingredient list when their concentration exceeds the applicable regulatory threshold. Regulation (EU) 2023/1545 expanded and updated the rules for fragrance-allergen labelling.

For a rinse-off product such as soap, the general individual-labelling threshold established by this regulation is 0.01% in the finished product for the fragrance allergens concerned. The substances that must be declared must be determined from the actual formula and the supplier’s composition/allergen data.

DO NOT CONFUSE THE DOCUMENTS

An allergen declaration, SDS, technical data sheet and IFRA certificate/document serve different purposes. None of them, on its own, replaces the complete regulatory file or finished-product safety assessment.

Transition periods and applicable entries must be checked against the legislation in force when a commercial product is assessed and labelled.

14. Supplier documents and traceability

Document / data	Purpose
Technical data sheet	Identity, characteristics, conditions of use and practical information
SDS	Raw-material hazards, handling, storage and first aid
IFRA certificate / statement	Conformity of the fragrance compound with IFRA Standards for the stated categories
Allergen declaration	Supports labelling calculations and identifies relevant constituent contributions
Supplier / batch number	Traceability and management of raw-material changes
Document date/version	Prevents reliance on superseded information

A supplier may reformulate a fragrance while keeping the same commercial name. Professional control therefore requires tracking document versions and material batches.

15. Diagnosing common problems

Problem	Possible causes	Approach
Very weak scent after cure	Volatile materials, limited dosage, overheating, low-retention accord	Compare another composition, process and storage; never exceed the safe limit
Odour differs from bottle	Alkaline environment, heat, evolution of the accord	Validate only in finished soap
Uncontrollable trace	Fragrance + formula + temperature	Small trial, cooler process, simpler design

Problem	Possible causes	Approach
Browning	Colour-forming constituents / fragrance evolution	Anticipate in design or choose another fragrance
Batch-to-batch variability	Material change, variable EO, process variation	Strengthen specifications, traceability and process controls
Suspected irritation / non-compliance	Dosage, allergens, unsuitable material	Stop use and review documentation/safety assessment

16. Professional validation method

1. Define the scent profile and intended users.
2. Obtain current supplier documentation.
3. Identify the use category and applicable limit.
4. Calculate finished-product dosage and allergens requiring declaration.
5. Make a small batch in the actual formula.
6. Record temperature, trace, colour and incidents.
7. Evaluate after cure and during storage.
8. Validate the formula within the applicable safety-assessment and regulatory framework.
9. Establish a master formula and raw-material specifications.

CHANGE = REVALIDATION

Changing supplier, fragrance reference, concentration or sometimes the batch of a natural material may require renewed technical and documentary checks. Validation belongs to a specific formula, not simply to a fragrance name.

17. Key points

- A pleasant scent in the bottle does not predict performance in soap.
- Essential oils and fragrance compounds must both be assessed by composition, exposure and restrictions.
- There is no universal fragrance dosage.
- Regulatory calculations use concentration in the finished product.
- Bar soap is Category 9 in current IFRA guidance.
- Fragrance can accelerate trace, alter colour and change during cure.
- Scent retention should be demonstrated by comparative testing; no “fixative” should be assumed effective without evidence.
- Allergen data, IFRA documentation, SDSs and safety assessment are complementary but distinct.

THE RIGHT QUESTION

Do not ask only: “How much fragrance can I add?” Ask: “What concentration is safe, compliant, technically compatible with my formula and sufficiently effective after cure?”

References and resources

• International Fragrance Association (IFRA) — Standards, guidance for use and product-category classification.

• IFRA/RIFM — QRA guidance and fragrance exposure assessment documentation.

• European Union — Regulation (EC) No 1223/2009 on cosmetic products and Commission Regulation (EU) 2023/1545 on

fragrance-allergen labelling.

• Technical data sheets, SDSs, allergen declarations and IFRA documentation supplied for each fragrance material.

APISARA RESOURCES

In addition to the saponification calculator, Apisara provides technical guides and reference sheets as well as educational articles published on Facebook and Substack. The collection is designed for self-learning, training and professional practice.

apisara.org • Substack • Facebook

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