INNOVATIONS IMPROVE PORE SIZE AND SKIN TEXTURE

MORE THAN SKIN DEEP

A SCIENCE WRITER'S GUIDE
GLOBAL SKIN CONCERN TODAY

ENLARGED PORES

Trends in skin care have evolved dramatically in recent years. Thanks to advances in technology, new products deliver unprecedented anti-aging and skin refining benefits. In particular, researchers are employing increasingly sophisticated techniques to gain a drastically improved understanding of skin biology. These approaches are leading to the development of new products that offer revolutionary improvements to some of the greatest consumer concerns about their skin.

As the needs of consumers continue to evolve, research trends are following closely. For example, consumers around the world increasingly cite enlarged pores as a primary personal skin concern. According to three recent studies (among consumers 20 to 50 years old in the United States, Japan, Germany and Korea), women ranked the appearance of enlarged, visible pores and the perception of uneven texture as major personal care concerns.¹

Both biologically and cosmetically, pore size and its associated textural imperfections are complicated and difficult to treat. Today, researchers are leveraging a large body of evidence from years of research to deliver new, effective solutions, including the use of natural extracts, such as Java tea, star fruit, oat extract and lentil seed.

This guide considers the biological factors influencing pore size and outlines the research underway to deliver a solution that offers consumers instant and lasting benefits.

AMID THE ESCALATION OF REQUESTS FOR INTERVENTIONS TO REDUCE SKIN IMPERFECTIONS, SOME DERMATOLOGISTS HAVE EVEN COINED THE TERM “POREXIA” TO DEFINE A NEAR “OBSESSION” WITH PORE SIZE.²

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Very small channels on the skin surface called pores appear all over the body and play an important role in supporting skin health. These microscopic channels are responsible for excreting bodily fluids, such as perspiration and oil. There are more than four million pores on the skin tissue throughout the body, with roughly 20,000 on facial skin alone.

Certain pores, called Eccrine pores, regulate the body’s temperature through perspiration and are most dominant on the palms, soles, forehead, arm pits and groin. Except during active perspiration, these cells are not normally visible.

The other primary type of pores is sebaceous pores, rooted by sacs called the sebaceous glands. These pores produce sebum, an oily substance that helps lubricate the hair and soften skin tissue. These pores are dominant on the face, scalp, back, chest and groin. While normally visible, they are very small.

Pores change in both appearance and size over time. Intrinsic factors, such as genetics, hormonal changes and stress, as well as extrinsic factors, such as environmental exposure, play a role in these changes. Scientific research implicates two primary factors in the enlargement of facial pores over time: aging and excess sebum production.

According to research, aging is a primary contributor to increases in pore size and changes in skin appearance over time. A study published in the Journal of Dermatological Science in 2008 evaluated age-related changes in the skin architecture, focusing specifically on the facial pores. The study found that among study participants, the total quantity and average area of detectable pores progressively increased with age.
As part of the aging process, visible pores have a tendency to stretch and elongate. This shift from cylindrical to elliptical structure is due to a weakening of the surrounding tissue in the dermis, which contributes to the slackening of the pore walls. Further, accumulated sun exposure over time contributes to degrading within the inner layers of the skin, often described as the “mattress” for our skin. The increasingly uneven texture of the skin further exacerbates the appearance of enlarged pores. This undesirable phenomenon relates to the slowing of epidermal cellular renewal over time. The skin’s outermost layer, the stratum corneum, is responsible for providing a barrier to environmental effects and regulates the intake and release of water. This layer continually renews itself, replacing older skin cells with younger cells over a two-to-four week cycle. As the skin ages, however, the renewal process slows to approximately four weeks, leaving older cells on the skin surface and creating an uneven surface appearance.1

Skin attributes and corresponding aging-related considerations are the foundation of ongoing skin health research at the Amway labs. To support its research programs, Amway researchers employ an exclusive, automated digital facial imaging system known as F.A.C.E.S. (Facial Analysis and Computer Evaluation System). Through advanced photographic technology, the system captures and analyzes intricate skin features, such as textural heterogeneity, shine, pore size and discolorations. With images of more than 26,000 subjects analyzed, these insights demonstrate clear changes in the skin over time.1

According to ongoing studies of the skin tissue, for every 10 years of life beyond age 20, the dermis layer becomes 6 percent thinner, and reduces in elasticity by 3 percent.1

AGING

IMPORTANT FINDINGS THAT CORROBORATE EXTERNAL INDEPENDENT STUDIES INCLUDE:

1. **DIRECT CORRELATIONS BETWEEN AGE AND VISIBLE PORE COUNT ON THE FACE**

   ![Graph showing the relationship between age and visible pore count.](image)

   (Analysis from a selection of among approximately 1,100 Asian females aged 20-60 years)

2. **LINEAR CORRELATIONS BETWEEN AGE AND THE TOTAL PORE AREA ON THE FACE**

   ![Graph showing the relationship between age and total pore area.](image)

3. **EFFECT OF AGE ON THE UNIFORMITY OF SKIN TEXTURE**

   ![Graph showing the effect of age on skin texture uniformity.](image)

Beyond undesirable skin attributes associated with aging, the increased production of sebum within the skin also plays a significant role in the visibility of facial pores.

A range of factors can regulate sebum production within the sebaceous glands. Intrinsic influencers include hormonal fluctuations and stress, while extrinsic, or environmental factors, may include sun exposure and changes in humidity levels. Since elevated sebum production increases pore visibility, studies suggest that suppressing production may help reduce total sebum output and, as a result, decrease pore size.

A prospective, randomized study published in the British Journal of Dermatology in 2006 evaluated the relationship between sebum output, age, sex, hormonal factors and pore size. The results identified a direct relationship between enlarged pores and increased sebum output. Men had the strongest correlation between sebum output and pore size, while hormonal factors also influenced pore size in women.

KEY INFLUENCER:

**SEBUM PRODUCTION**
Studies indicate a direct correlation between oil production and average pore size. Using research that clarifies the biological events driving skin changes related to aging and sebum production, new solutions are in development to inhibit these events.

**Multi-Faceted Pore Management**

Remedies currently available for enlarged pores vary in their therapeutic approach. Some aim to firm the skin to minimize textural heterogeneity, while others contain ingredients that cover the skin’s surface to create a uniform appearance. However, because enlarged pores have multiple contributing causes, an effective solution must deliver improvements both within the pore and throughout its surrounding areas.

Amway researchers have evaluated a multi-dimensional biomechanistic approach to skin smoothing, which targets multiple areas on the surface of the skin down to the base of the pore.
DEDICATED LABORATORY AND CLINICAL RESEARCH IN PORE REFINEMENT HAS CONCENTRATED ON FIVE PRIMARY FOCAL POINTS:

1. On the skin’s surface
Researchers have used digital imaging analysis to evaluate a tri-optic particle system, which contains three types of light-diffusing particles and elastomers to create a fine, microscopic layer of translucent particles on the surface of the skin. The light-diffusing particles and elastomers “flexibly” fill into pores and imperfections while providing sustained absorption of excess oil. Instantly upon application, the particles deliver a visible and tactile improvement in skin texture.1

2. Within the surface
The outermost surface of skin, known as the stratum corneum, is an important therapeutic target because it regulates the overall appearance of the skin. Amway researchers have extensively tested a patented oat extract (in combination with Natural Moisturizing Factor sugars) that provides gentle non-acid exfoliation of pore-clogging, dead skin surface cells. This unique combination of powerful ingredients removes dead cells while assisting the natural renewal process of the skin’s epidermis.1

3. In the wall lining
Throughout aging, cellular growth patterns in the pore lining change relative to the surrounding skin tissue. During this process, the cells multiply more rapidly within the pore walls, compared to the outside tissue, causing them to build up on the outermost surface perimeter. This imbalance in cellular growth creates a visible “hollowing” effect. To combat this phenomenon, the Amway research team evaluated the use of lentil seed extract, which helps balance cellular growth in pore linings by aiding in the production of a protein that regulates cell division. This normalization reduces the “hollowing” effect and improves the appearance of pores.1

CLINICAL RESULTS:
USE OF LENTIL SEED EXTRACT CREATED A 62 PERCENT IMPROVEMENT IN VISIBLE APPEARANCE OF PORES WITHIN FOUR WEEKS.1

From: Sugiyama-Nakagiri Y, et al. 2010
4. At the “core of the pore”

At the very bottom, or “core of the pore,” are sebaceous glands that produce, or over produce, sebum. Researchers evaluated the use of Java tea extract, which was clinically tested to help suppress excess sebum while significantly reducing visible pore size and imperfections. This antioxidant-rich extract was determined to suppress the production of sebum by slowing the cell signaling activities that trigger production in the sebaceous glands.¹

5. Outside of the pore

Amway scientists have also investigated ways to strengthen the areas of skin surrounding the pores. Photoaging weakens the tissue in the subsurface layers of the skin, leading to visible slackening and dilation. By boosting the dermal structure around the pores, researchers believe they can better protect the pores.

A series of ingredient tests on skin cells led to the development of an exclusive combination of extracts, including star fruit, lentil, Java tea and allantoin. Used together, these ingredients help to reinforce the outside area of the pore structure to reduce slackening, visibly tightening pores for a more even skin texture.¹

**SYNERGISTIC QUALITIES,**

**ENHANCED RESULTS**

This holistic approach to treating enlarged pores targets a range of mechanisms in the skin. The extensively tested combination of powerful natural extracts work synergistically to deliver clinically meaningful improvements in pore size and overall skin appearance. The final benefits are comparable to professional laser treatments, which are immediately apparent and last for a significant period of time.*¹

**FIVE DISTINCTIVE BIOLOGICAL TARGETS CREATE NOTICEABLE IMPROVEMENTS:**

1. **OPTICAL DIFFUSERS**—melt and smooth the skin’s surface for a soft-focus appearance

2. **PATENTED OAT EXTRACT AND NMF SUGARS**—exfoliate the skin’s surface area to unclog pores and smooth away roughness

3. **ANTIOXIDANT-RICH LENTIL SEED EXTRACT**—counters the hollowing effect in the wall lining of the pore for a reduced appearance of pores

4. **JAVA TEA EXTRACT**—suppresses excess sebum production, down to the core of the pore

5. **STAR FRUIT EXTRACT**—reinforces the outside area of the pore’s structure to help reduce slackening, visibly tightening pores for an even texture

(*Results not equivalent to surgical/cosmetic procedures.)

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Extensive research has validated this approach and confirmed an optimized ratio of ingredients. Scientists have conducted more than 200 experiments, including in vitro screenings, aesthetic/tactile evaluations, formula compounding and quantitative measurement of skin penetration, to confirm both safety and performance. In addition, the results of six independent safety and clinical studies have validated the safety, effectiveness and consumer appeal of the approach. Dermatologists conduct these clinical tests with volunteers in order to demonstrate the biological mechanisms of novel skin care technologies in an objective manner.

Results of this testing found that the synergistic qualities created immediate and sustained clinical improvements, such as:

### Clinical Improvements from Holistic Combination of Ingredients

<table>
<thead>
<tr>
<th>Clinical Grading Improvements</th>
<th>After a single use</th>
<th>After six weeks of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pore Size</td>
<td>76%</td>
<td>94%</td>
</tr>
<tr>
<td>Skin Texture</td>
<td>82%</td>
<td>98%</td>
</tr>
</tbody>
</table>

### Consumer Perceived Improvements

(Percentage of Panelists Agreed)

<table>
<thead>
<tr>
<th>Perception Improvements</th>
<th>After a single use</th>
<th>After six weeks of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improves Texture</td>
<td>76%</td>
<td>92%</td>
</tr>
</tbody>
</table>

With a keen understanding of the skin’s biology and the expertise to apply naturally powerful extracts, Amway scientists have sought to create the right combination that addresses primary contributors to unsightly pores and textural heterogeneity. This extensively studied and clinically validated approach results in notable improvements to the skin.

The skin health innovations pioneered by dedicated Amway scientists are creating revolutionary results to address some of the greatest skin care concerns by consumers worldwide.
GLOSSARY

ANTIOXIDANTS  Substances that protect cells from damage caused by unstable molecules known as free radicals.

CELL RENEWAL  Replacement of older skin cells on the outer most surface layer of the skin by newer, fresher cells.

ECCRINE GLANDS  Glands distributed throughout the skin that allow for perspiration.

ELASTOMERS  Flexible ingredients that fill into skin imperfections to produce a smoother appearance.

IN VITRO  A method to test the efficacy of a product or ingredient using representative cells or tissues outside the body in an artificial environment.

SEBACEOUS GLANDS  Microscopic glands in the skin that secrete oily/waxy matter, called sebum. These glands reside at the bottom of the visible pore canal predominately on the face, chest, scalp, and upper back.

SEBUM  An oily/waxy substance secreted near the skin surface, hydrating and softening the skin.

STRATUM CORNEUM  The outermost surface layers/barrier of the skin, which serve as the top layers of the epidermis. This barrier helps to reduce exposure to outside elements, such as pollutants or excessive temperature shifts resulting in dehydration and germs.

REFERENCES

1. Amway, Data on File.