

SSEF Newsletter May 2010

Trade Alert: "Keshi" cultured pearls are entering the natural pearl trade

by Dr. Michael S. Krzemnicki, gemlab@ssef.ch

The Swiss Gemmological Institute SSEF has been receiving large quantities of saltwater pearls for certification in recent weeks. These pearls are generally characterised by an almost perfect appearance. The pearls are often accompanied with reports describing them as natural pearls, but their appearance has raised doubt amongst many natural pearl dealers.



Fig 1: Necklace of beadless cultured pearls with an almost perfect and appealing appearance, tested recently at SSEF. © SSEF 2010

Having tested these pearls with the most advanced technology, including X-ray radiography, X-ray luminescence, X-ray micro tomography and radiocarbon age dating (see Krzemnicki et al. 2009; or SSEF Facette No. 17, www.ssef.ch, news section), we see that many of these pearls are actually beadless cultured pearls.

The arrival of large quantities of these 'new' saltwater pearls, whose quality is far better than that of many natural pearls treasured since centuries, represents a great danger to the natural pearl market. This especially because we have reliable information, that some individuals are purposely selecting those cultured pearls with the most intriguing and potentially confusing internal structures (using radiography) from the large stocks they purchase from pearl farms, so as to later introduce them onto the natural pearl market.



*Fig. 2: Typical selection of these beadless cultured pearls from the *Pinctada maxima* (South Sea). © SSEF 2010*

What kind of pearls are these, and how do they form?

The cultured pearls in question are a by-product of beaded cultured pearl production (e.g. South Sea cultured pearls in *Pinctada maxima* oysters) and sometimes described as “Keshi” cultured pearls in the trade. Originally, the trade term Keshi was applied to small pearls found as a by-product of Akoya pearl farming (in the mantle tissue of the oyster). This term has subsequently also been applied to large beadless cultured pearls formed in the gonads of *Pinctada maxima* (South Sea) or *Pinctada margaritifera* (Tahiti) and others. As the definition of “Keshi” is not clear and often misleading, the SSEF does not apply this term but only uses the term **beadless cultured pearl** on its reports.

How do these problematic beadless cultured pearls form?

A possibility, but not the only one, is that they form when the bead is rejected after insertion in the oyster (normally in the gonads). As the tissue (or pearl sac) is still in place, the resulting product is a beadless cultured pearl instead of a beaded cultured pearl. Another possibility is that they form as a by-product due to accidentally resulting injuries during the grafting surgery procedure at a pearl farm. A common characteristic of all these pearls is that they formed in oysters at a pearl farm, benefiting from the meticulous care and intervention of pearl farmers.



Fig. 3: Cross sections through different kinds of saltwater beadless cultured pearls.
 © H.A. Hänni, SSEF

SSEF has adapted the definition of natural pearl and cultured pearl to the new situation:

As the trade is currently overflowing with these beadless cultured pearls, the SSEF has taken measures to protect the natural pearl market from this threat. A first step is the use of more rigorous and specified definitions for natural and cultured pearls:

A **natural pearl** is a pearl which formed in a wild oyster (mussel) living in its natural habitat. It formed without any human intervention. Any pearl stemming from a pearl cultivation farm is a **cultured pearl**. The SSEF considers that pearl farming constitutes a human intervention.

By elucidating these terms, the SSEF relates to the original definition of natural pearls, as they have been known and understood for centuries. That of any historic natural pearl formed in a wild animal (e.g. *Pinctada radiata* oyster), living in its natural habitat, such as for example a pearl bank in the shallow waters of the Persian Gulf.

What are the characteristics of these beadless cultured pearls?

Although these pearls do not show one distinct feature that explicitly characterises them as cultured, it is the combination of internal and external structures, which enable an identification of this material. The pearls are often either button-, oval- to drop-shaped, or baroque. Perfectly round or barrel-shaped beadless cultured pearls are rare.



Fig. 4: Typical shape (button) of a beadless cultured pearl from the *Pinctada maxima* (Gold-lipped oyster). © M.S. Krzemnicki, SSEF

The most common internal feature (radiography) of beadless cultured pearls is a small curved dark line (Fig 5) or a larger curved cavity (Fig 6) at the centre of the pearl. This feature is well-known and described in literature (Farn 1980; Hänni 2006; Sturman 2009). Another common feature of these problematic beadless cultured pearls, so far not described in literature, consists of a round dark core made of fine circular conchiolin layers, often with one or more small nacre points in the centre (Fig. 7). It is this last feature, which may be misinterpreted as an indicator for natural growth, and lead to the wrong conclusion that the pearl is natural.

As these pearls are often specifically (and often intentionally) drilled so as to hide internal structures, only careful radiography and X-ray tomography analysis may reveal the true nature of these pearls.

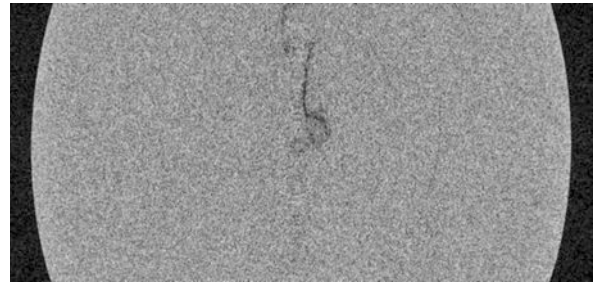


Fig. 5: Small curved dark line (cavity) in a beadless cultured pearl ("Keshi"). Micro X-ray tomography section. © M.S. Krzemnicki

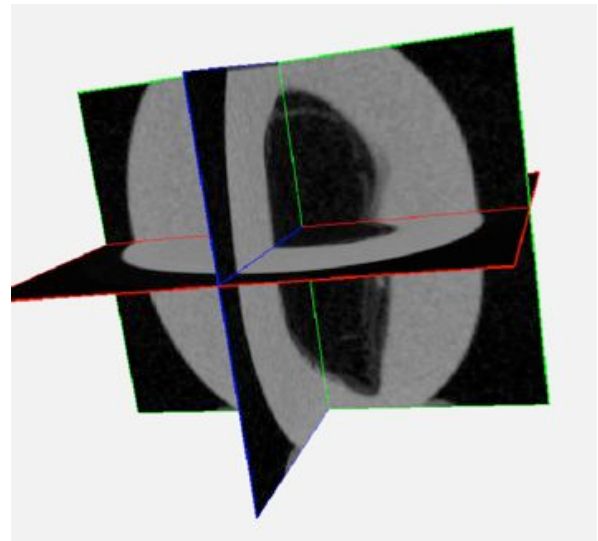


Fig. 6: Large curved dark cavity in a beadless cultured pearl ("Keshi"). Three dimensional view of micro X-ray tomography sections. © M.S. Krzemnicki, 2010

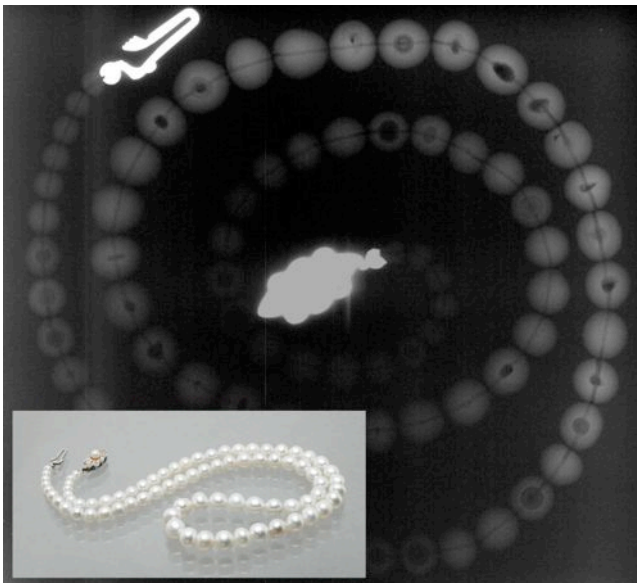


Fig. 8: Radiography of a necklace with beadless cultured pearls, showing structures mentioned in the text. © M.S. Krzemnicki, 2010

The radiography of the necklace of white pearls (see above Fig 8) exhibits most characteristic internal structures (curved dark lines and cavities) that are typical of beadless cultured pearls. However, in some pearls these structures can only be traced using micro X-ray tomography. The uniformity in colour and surface condition of these white pearls are a strong indication that they all originate from the same cultured pearl production.

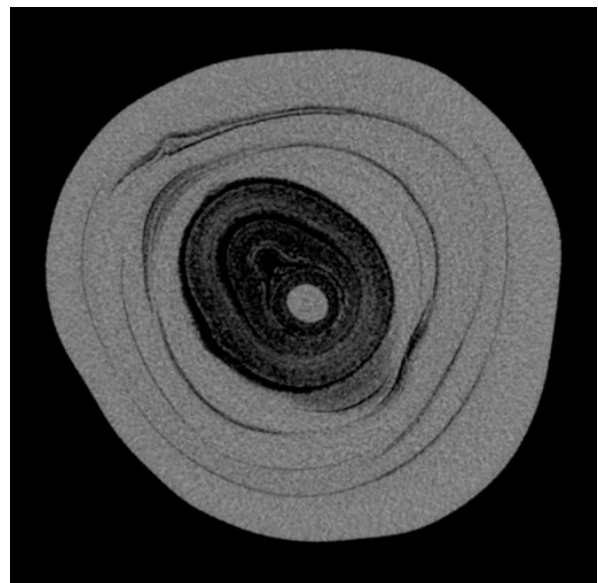


Fig. 7: Dark centre with circular conchioline layers in a beadless cultured pearl (micro X-ray tomography section). © M.S. Krzemnicki, 2010

What is SSEF doing to protect the natural pearl trade:

The Swiss Gemmological Institute SSEF has been closely following the developments of the cultured pearl industry for years, especially concerning beadless saltwater cultured pearls ("Keshi" cultured pearls). We have committed extensive research to these developments and introduced new analytical techniques to our offer of pearl testing services (e.g. micro-X-ray tomography in August 2009). With the sudden increase in presence of this material on the market, we have chosen to adapt our pearl certification policy to this new situation, with the aim of protecting the natural pearl trade.

We differentiate between two cases:

Single pearl testing:

In cases where traditional radiography is not concluding (natural or cultured), the SSEF offers the client micro X-ray tomography as an additional service for an extra fee. This method significantly enhances our capacity to conclusively identify a pearl's origin, especially when radiography results are inconclusive. In this case, a SSEF pearl report is only issued after this additional analysis has been carried out.

Pearls in a necklace or batches of loose pearls with highly matching visual appearance:

In cases where an important part of submitted pearls show radiographic features identifying them as cultured pearls (see previous section), the SSEF report will state that the necklace / batch contains **CULTURED PEARLS**. The SSEF does not sort out these pearls.



This applies only in the above mentioned case of necklaces/batches of strikingly similar pearls. In all other cases, including natural pearl necklaces containing one or several evident cultured pearls (e.g. Akoya cultured pearls), it is the SSEF's continuing policy to sort out these pearls and mention these with their exact position in the necklace.

By applying this adapted pearl certification policy and promoting transparent standards, our main target is to **protect the natural pearl trade** from these beadless cultured pearls ("Keshi") and to keep these out of the natural pearl market.

The SSEF is working on different levels with international trade organisations and other laboratories on this topic so as to harmonize pearl testing standards now and in future. Furthermore, the SSEF offers a highly specialized pearl course, where you can learn in detail how natural pearls and cultured pearls form and how they can be separated from each other using all current analytical tools, including radiography and micro X-ray tomography. For any further information, please contact SSEF at gemlab@ssef.ch or by phone +41 61 262 06 40.

See also the **addendum** on beaded cultured pearls with **new bead materials!**
www.ssef.ch/en/news/news_pdf/newsletter_pearl_2010May_add.pdf

References:

Farn A.E. (1980) Notes from the laboratory (on non-nucleated cultured pearls). *Journal of Gemmology*, Vol. 17, No. 4, pp. 223-229

Krzemnicki M.S., Friess S.D., Chalus P., Hajdas I., Hänni H.A. (2009) New developments in pearl analysis: X-ray micro tomography and radiocarbon age dating. *Journal of the Gemm. Assoc. Hong Kong*, Vol. 30, pp. 43-45

Sturman, N. (2009) The Microradiographic Structures of Non-Bead Cultured Pearls. *GIA Lab Notes 20th August 2009*, <http://www.giathai.net/lab.php>

Hänni H.A. (2006) A short review of the use of 'keshi' as a term to describe pearls. *Journal of Gemmology*, Vol. 30, No. 1/2, pp. 52-58