ASX Release
21 August 2025

EXCELLENT RARE EARTH EXTRACTION RATES ACHIEVED IN BIO-LEACHING SAMPLES FROM THE BYRO REE & LITHIUM PROJECT

Highlights

- **Excellent rare earth and lithium extraction rates from an initial bio-leaching program conducted by BiotaTec, a leading European Bio-mining specialist, including:**
  - **68% - 75% for Nd, Pr & Dy, key elements used in magnet production;**
  - **~40% for Li, V & Tb, key elements in battery technology**
- **The test program used BiotaTec proprietary microbial cultures to extract REE's, Li and other key metals from the Byro Project material.**
- **Close to maximum bioleaching capacity, or contact time, was reached during the first 1-2 days, indicating significant potential for a rapid heap leach operation.**
- **BiotaTec has advised that these results are highly significant for materials in an initial laboratory stage program for which they have been engaged and are developing industrial solutions.**
- **BiotaTec also believe that further optimisation will improve the metal recoveries and upscale the process.**
- **The Byro Project is situated in the Gascoyne Region of Western Australia, comprising two granted Exploration licences totalling 555km^2 and has the potential to be a large, low-cost supplier of critical minerals in Australia.**

Octava Minerals Ltd (ASX:OCT) ("Octava" or the "Company"), an Australian focused explorer of the new energy metals REE's, lithium, antimony and gold, is pleased to report outstanding results from initial bioleaching test work by European biomining experts, BiotaTec. REE, lithium and vanadium were successfully extracted at relatively high recoveries from sample material taken from the recent diamond drilling at the Byro Project in Western Australia.

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Initial metal recoveries for magnet rare earths (Nd, Pr, Dy, Tb), lithium and vanadium from the bioleaching program using 3 different microbial cultures include:

Table 1. Bioleach results highlights for Byro Shale samples

Element	Culture 1 Recovery	Culture 2 Recovery	Culture 3 Recovery
Nd	68%	30%	**75%**
Pr	61%	25%	**69%**
Dy	68%	48%	**70%**
Tb	39%	25%	**41%**
Li	38%	8%	**42%**
V	**41%**	15%	39%

These highly encouraging results have driven the team to examine the next steps forward for the project development.

Octava's Managing Director Bevan Wakelam stated**:**

These initial test results are extremely significant for the Byro Project.

BiotaTec has broad experience in the use of different cultures of microorganisms to extract metals from black shales and other materials. They are encouraged by what they have seen from their initial work with the Byro material, stating that with further refinements, there is good potential to further increase recoveries – and with the recent improvement in REE prices, the timing of these results could not have come at a better time.

The grades and type of material used in BiotaTec's testwork are typical of that seen in the wide-spaced historic diamond drilling within the Byro sub-basin over a strike length of ~30km. That's why we believe the Byro Project has the potential to be a key large-scale, low-cost supplier of critical minerals in Australia.

About the Byro Project

The Byro Project is a polymetallic project located on the Byro Plains of the Gascoyne Region, Western Australia, 220km south-east of Carnarvon and consists of two granted Exploration Licences – E 09/2673 and E 09/2674 – totalling 555 km^2. See Figure 1. The Byro Project has a Native Title agreement in place and nearby infrastructure includes accessibility to a commercial port (Geraldton) and power from the NW gas pipeline and future potential access to Western Australian government proposed green energy sites.

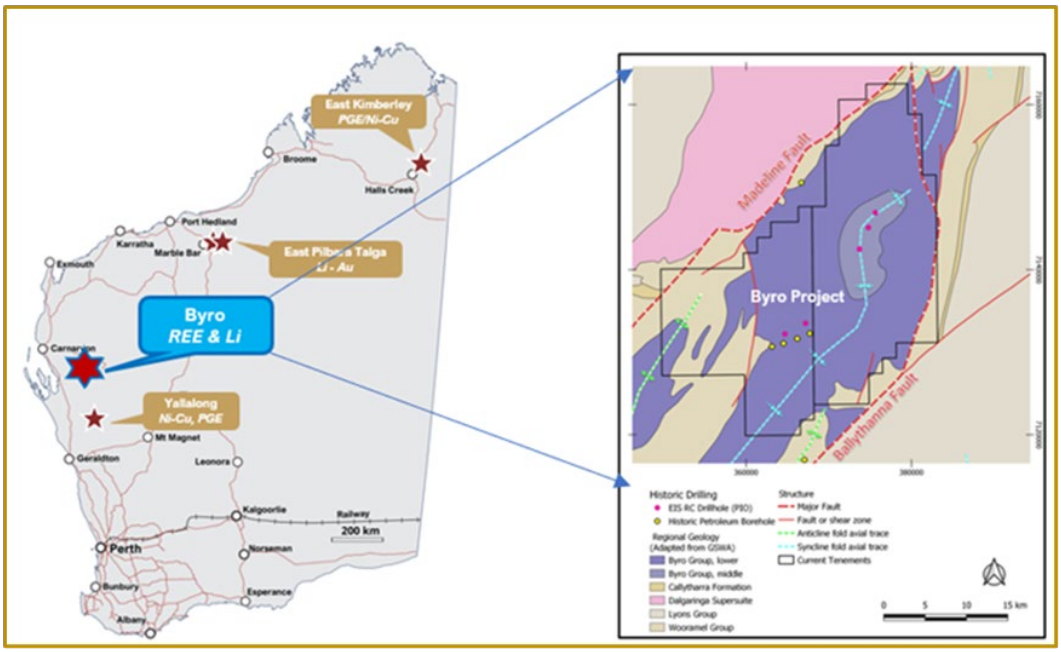

Figure 1. Byro Project Location Map

The target stratigraphy is the sedimentary Permian black shales and siltstones located within the Byro Sub-Basin of the Carnarvon Basin. The restricted basin is approximately 100km by 150km in size, and up to 3km in depth. The basin is bound to the east by the Precambrian Yilgarn Craton margin, and to the west by extensions of the Darling Fault.

The Permian-period is well known for extensive hydrothermal activity and anoxic black shale development which can accumulate metals, with SEDEX / sediment-hosted polymetallic deposits best known in Europe (Kupfershiefer, Poland and Germany).

Figure 2. Byro Core Tray (Drillhole 24BDD002 Depth 7.2 – 14.15m), showing Permian black Shale from shallow depth (refer ASX announcement 25 February 2025)

Biomining / Bioleaching of Black Shale - Potential application to the Byro Project

Biomining is the technique of extracting metals from ores and other solid materials typically using micro-organisms (i.e. bacteria, fungi or plants).

It was discovered in the mid-1900s that some microorganisms can use metals to support their energy needs. In addition, certain microbes excrete compounds that break down the metal-containing chemical complexes in ores. As a result, they are capable of separating metals from ores, providing a soluble form of metals, which can then be isolated. Black shales are a favourable host for biomining given their reduced nature and high sulphide content.

This includes stable metals such as iron, copper, zinc and gold, as well as unstable atoms such as uranium and thorium. Companies can now grow large-scale cultures to separate metals, which can then be converted into many marketable metal compounds. Using micro-organisms to isolate metals significantly decreases the volume of chemicals required and can operate at ambient temperatures, negating the need for large-scale consumption of fossil fuels. Compared to some other processing methods that use hazardous chemicals and have a large CO_2 footprint, biomining represents not only a more environmentally friendly, but also a much more cost-efficient alternative. Examples of biomining applications include numerous copper mines in Chile, gold processing (e.g. BIOX process developed by Gold Fields[1]) and the polymetallic black shale Talvivaara heap leach mine in Finland.

The black shales of the Byro sub-basin are a vast accumulation of critical metals, covering 10km's and up to 100m metres in thickness from near surface. Octava envisages a potential pathway to production for a-large-scale, low-grade deposit, which can utilise cost effective heap leaching using microbial bioleaching as the extractant.

Biomining / Bio-leaching Test Programs – Byro Project

Biomining is project specific and a specialised science and Octava is currently running two parallel work streams testing the extraction potential of the Byro Project black shale material, namely through CSIRO in Australia and BiotaTec in Europe. This work is to help ensure the best understandings and outcomes are achieved from the initial test programs, before moving forward with the project.

BiotaTec Test Program

BiotaTec undertook a program to test the effectiveness of bioleaching the Byro material using microorganisms from their proprietary bio-mining culture collection.

Octava provided four 1kg ore samples for bio-leaching experiments. The samples were from various depths of two drillholes, as shown in Figure 3. Full details in relation to the metallurgical bore holes were outlined in ASX announcement - 25 February 2025. For metal content measurement and subsequent bioleaching experiments, equal aliquots from each bag were mixed as a total composite.

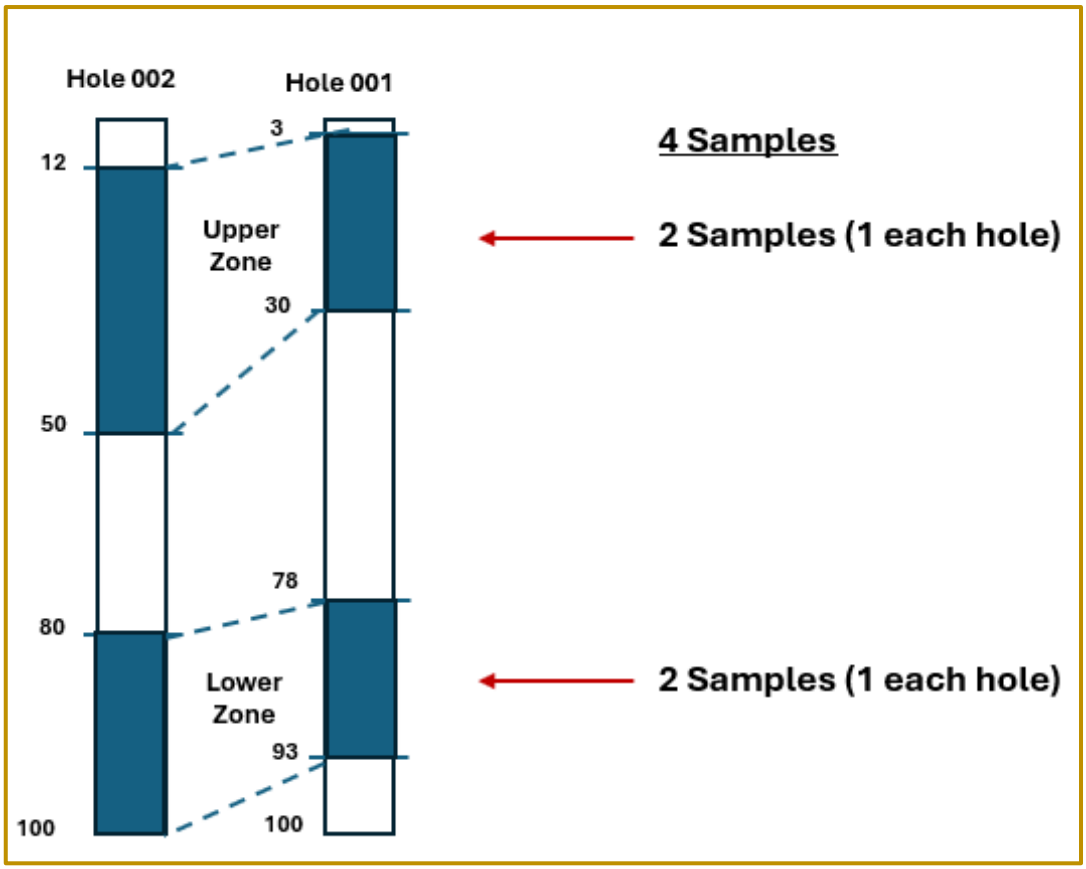

Figure 3. A schematic diagram of the sampling locations for each of the two bore holes.

For the determination of metal content in the Byro project black shale sample, the material was first heated in a porcelain crucible over a gas flame for 2-3 minutes until red-hot. The sample was cooled down, and heating treatment was repeated once more. A shed sample was treated with *aqua regia* for 60 minutes at 140°C in an oil bath.

After cooling, the mixture was filtered through a cellulose acetate filter. The insoluble fraction was treated with HF at 200°C for 60 minutes, after which the insoluble fraction made up <5% of the starting material. Metal content in liquid fractions was measured with ICP-MS, and the metal content in staring material was calculated (See Table 2).

Element oxide	Head Grade (ppm)	Culture 1 % Recovery	Culture 2 % Recovery	Culture 3 % Recovery
Sc_2O_3	232.2	9	4	8
V_2O_5	265.1	41	15	39
Li_2O	300.1	38	8	42
CeO_2	111.7	63	25	71
La_2O_3	49.1	57	20	65
Nd_2O_3	43.0	68	30	75
Y_2O_3	27.8	82	63	81
Pr_2O_3	12.6	61	25	69
Gd_2O_3	8.8	64	37	68
Sm_2O_3	8.7	63	35	70
Dy_2O_3	5.9	68	48	70
Er_2O_3	3.3	59	43	60
Yb_2O_3	2.7	51	38	52
Eu_2O_3	2.5	43	25	45
Tb_4O_7	2.0	39	25	41
Lu_2O_3	1.3	16	12	16

Table 2. Metal Content in Byro Project Black Shale and Recovery % by Culture.

Bioleaching Testing

Three different microorganism cultures were tested for bioleaching of the Byro black shale: Culture 1, Culture 2, and Culture 3 over approximately a two-week period. Initial tests were performed in batch style setup at laboratory scale.

Ground black shale was added to bacterial culture grown in Erlenmeyer flasks and incubated with shaking at 180 rpm in a bacterial incubator for two weeks. Solution samples were collected every day and analysed for solubilised metals by inductively coupled plasma mass spectrometry (ICP-MS).

Based on these results, the percentage of solubilised metals was calculated and plotted on graphs. (Refer Figures 4 to 10)

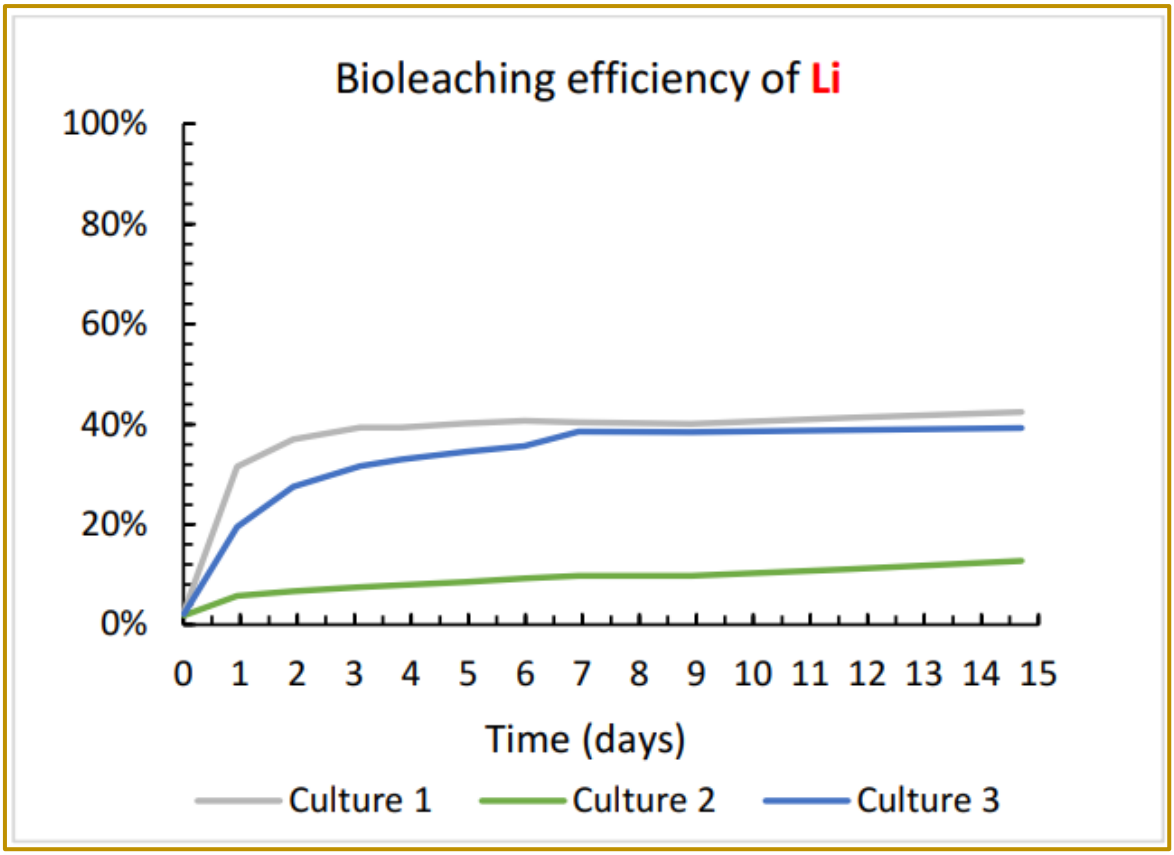

Figure 4. Bioleaching Efficiency of Li (Lithium) for all three cultures.

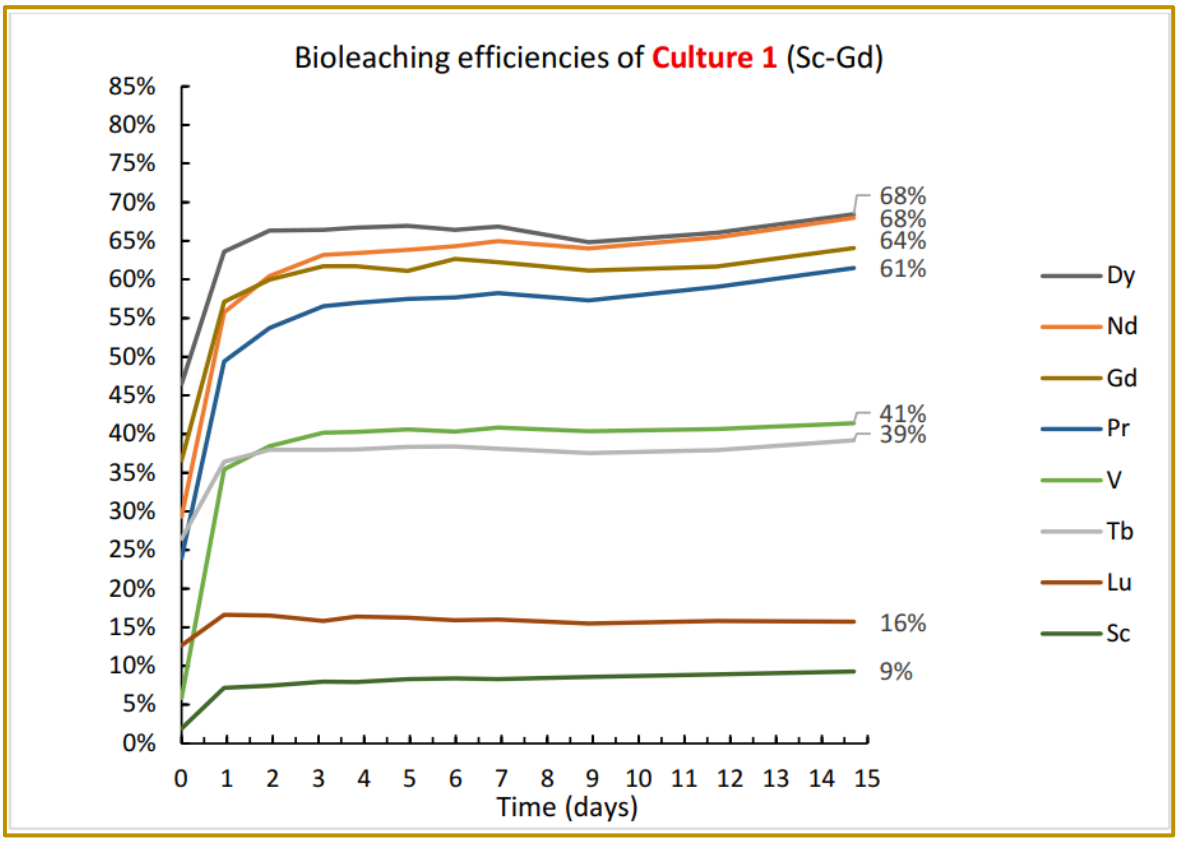

Figure 5. Bioleaching efficiency of Culture No. 1 (Sc-Gd)

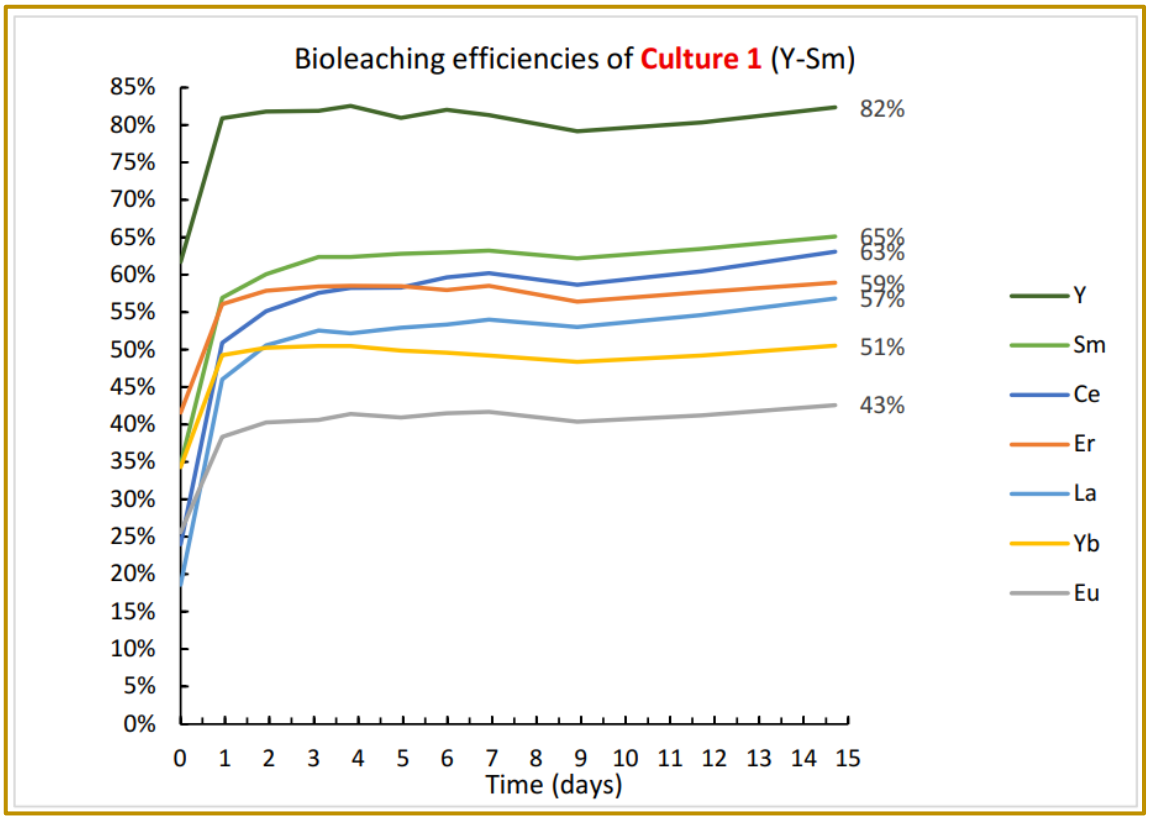

Figure 6. Bio-leaching Efficiency of Culture No. 1 (Y-Sm)

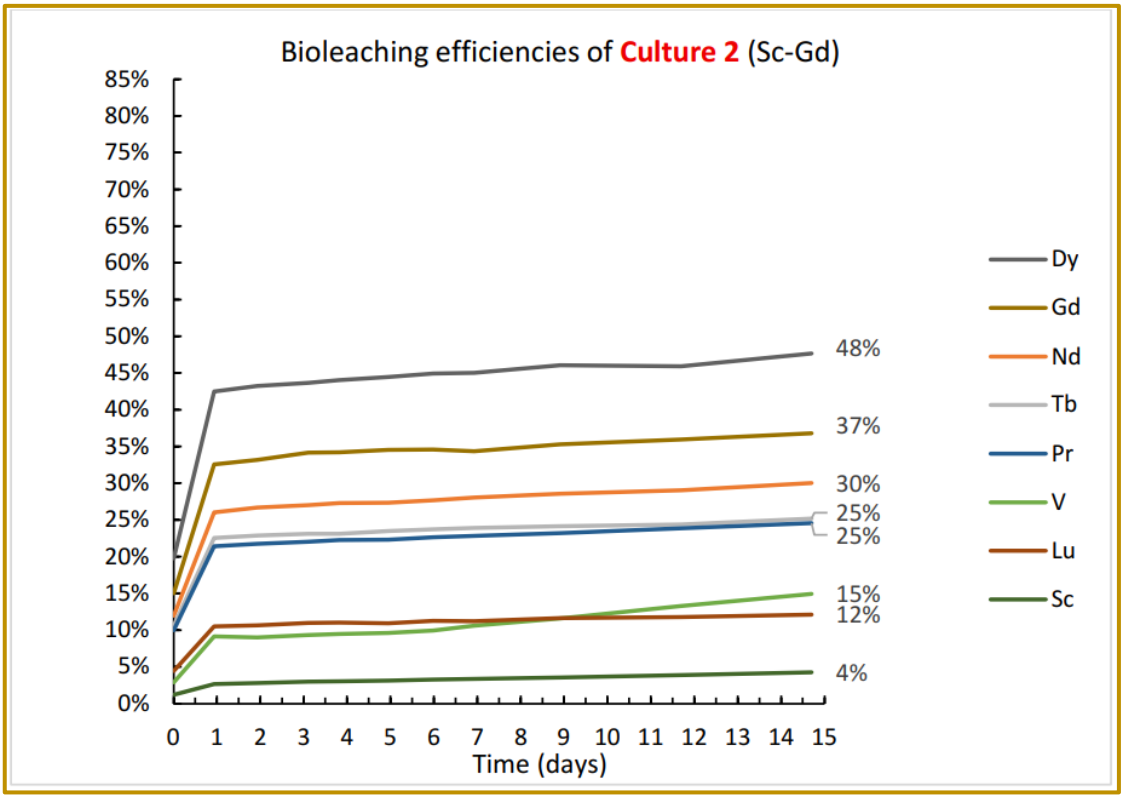

Figure 7. Bio-leaching efficiency of Culture No. 2 (Sc-Gd)

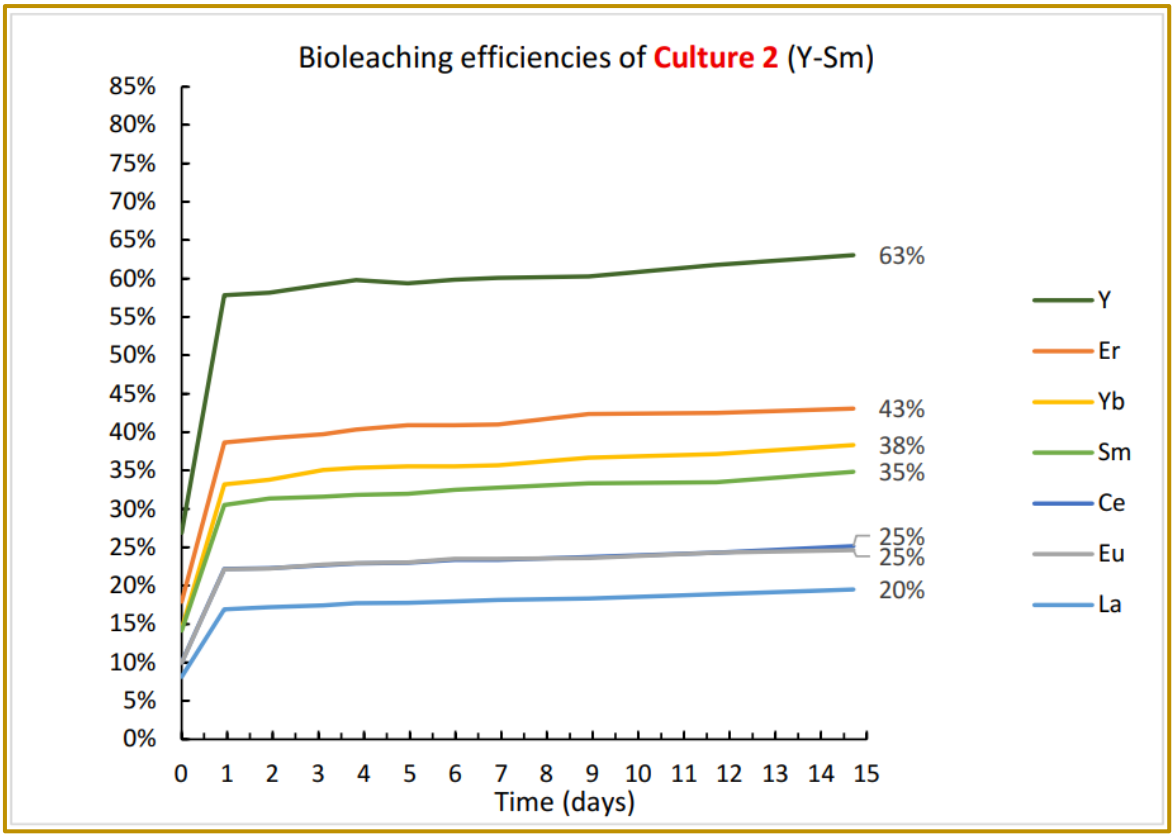

Figure 8. Bio-leaching efficiency of Culture No. 2 (Y-Sm)

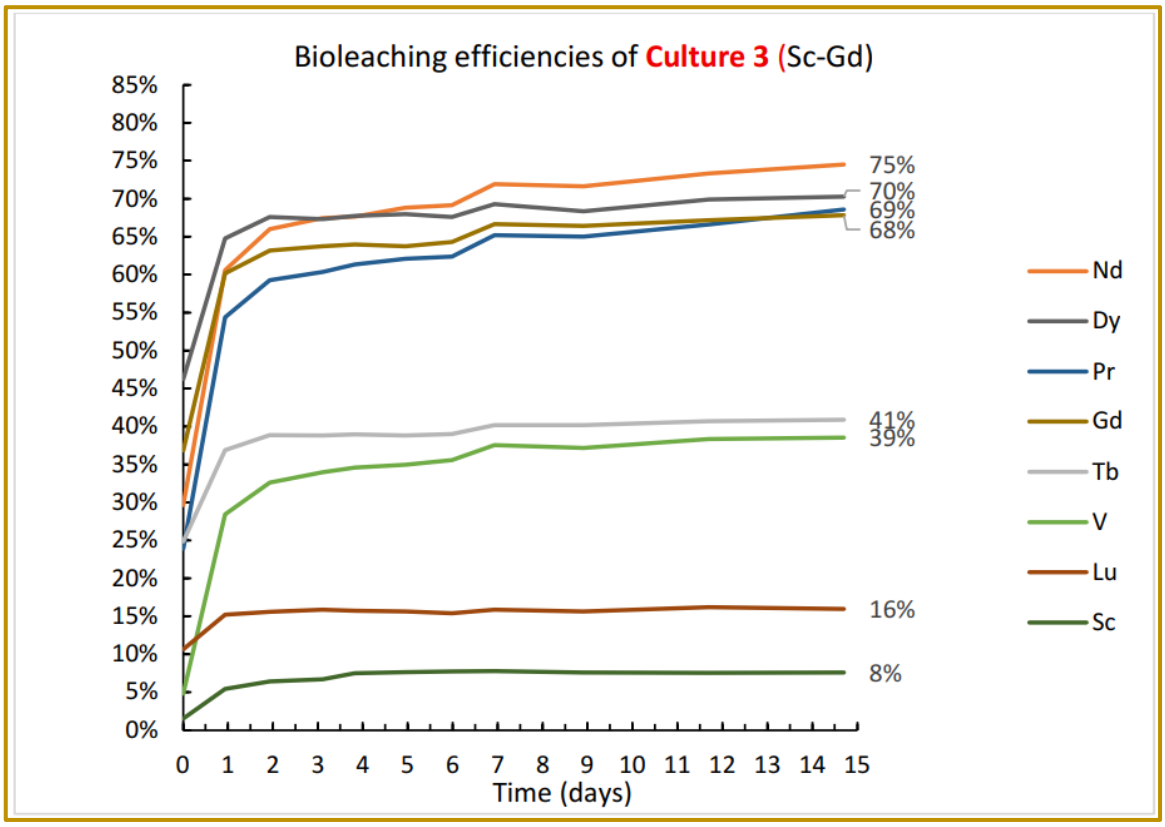

Figure 9. Bio-leaching efficiency of Culture No. 3 (Sc-Gd)

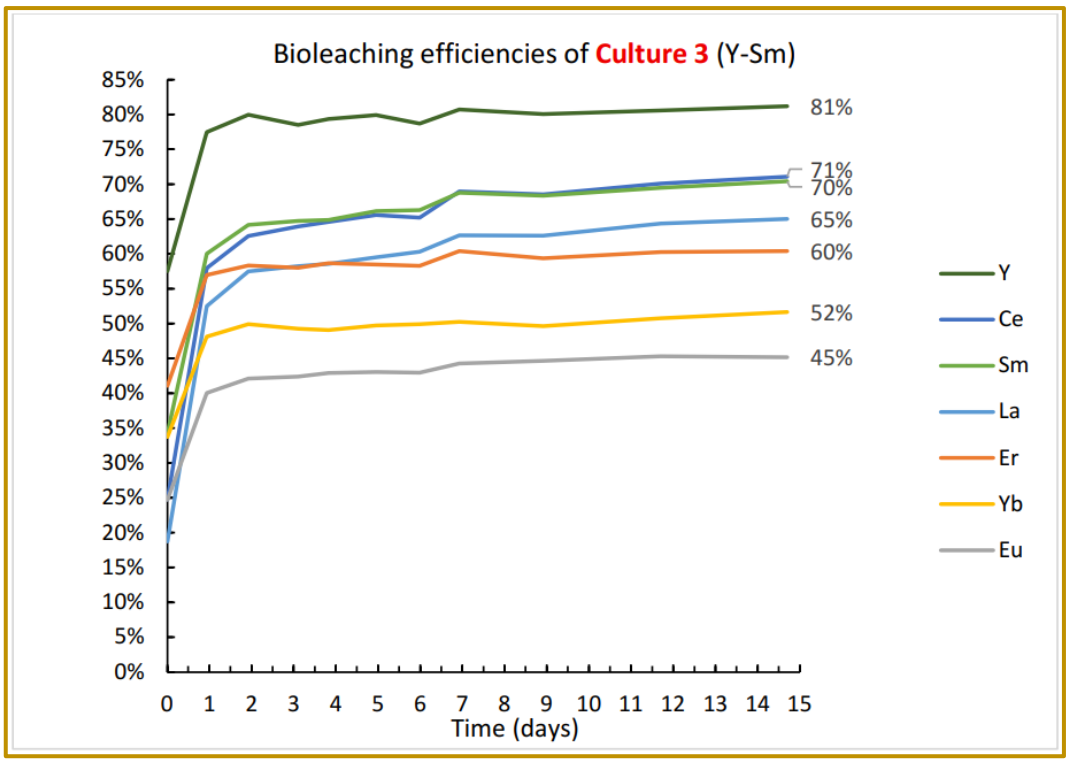

Figure 10. Bio-leaching efficiency of Culture No. 3 (Y-Sm)

Bioleaching Test Results – Byro Project

Cultures 1 and 3 resulted in more efficient leaching of REEs and Li from the Byro black shale, demonstrating efficiency >60% for the most important REEs (such as Nd, Pr, and Dy) and around 40% for Li, V & Tb.

BiotaTec has advised that these results are highly significant for materials in an initial laboratory stage program for which they are engaged and developing industrial solutions.

In all cases, the kinetics were largely the same – a rapid increase in leaching during the first 1-2 days, reaching close to maximum capacity, after which a more gradual rise occurred over the consecutive 1.5 weeks. This means that the necessary contact time for biolixiviant is around 24-48 hours, indicating excellent potential for a rapid heap-leaching operation on an industrial scale.

It was noted that the level of Sc leaching can be improved by testing microbial cultures that have demonstrated >85% Sc leaching efficiency with other Sc materials. In any potential future industrial setting, this step can be combined with REE-leaching procedures (e.g., with culture 3), as two-step technologies are quite common in the bioleaching industry, even for operations that process large amounts of ore annually, such as the one in Sotkamo, Finland (15-20 Mtpa).

Next Stage of Work

Based on the test program results, BiotaTec proposes a bioheap-leaching approach for processing the Byro ore in an industrial setting (Figure 11). Microbial-generated biolixiviant will be sprinkled on top of the crushed and agglomerated heaped material, where it will percolate through the stack, leaching metals in the process.

Pregnant liquid solution with metals will be collected at the bottom of the heap and channelled to the concentration step with ion-exchange columns. After that, metals will be precipitated as carbonates and isolated with a press filter.

To achieve this, suitable microorganism strains need to be adapted/optimised for the ore, resulting in increased leaching efficiency and the procedure upscaled to a pilot-sized industrial operation.

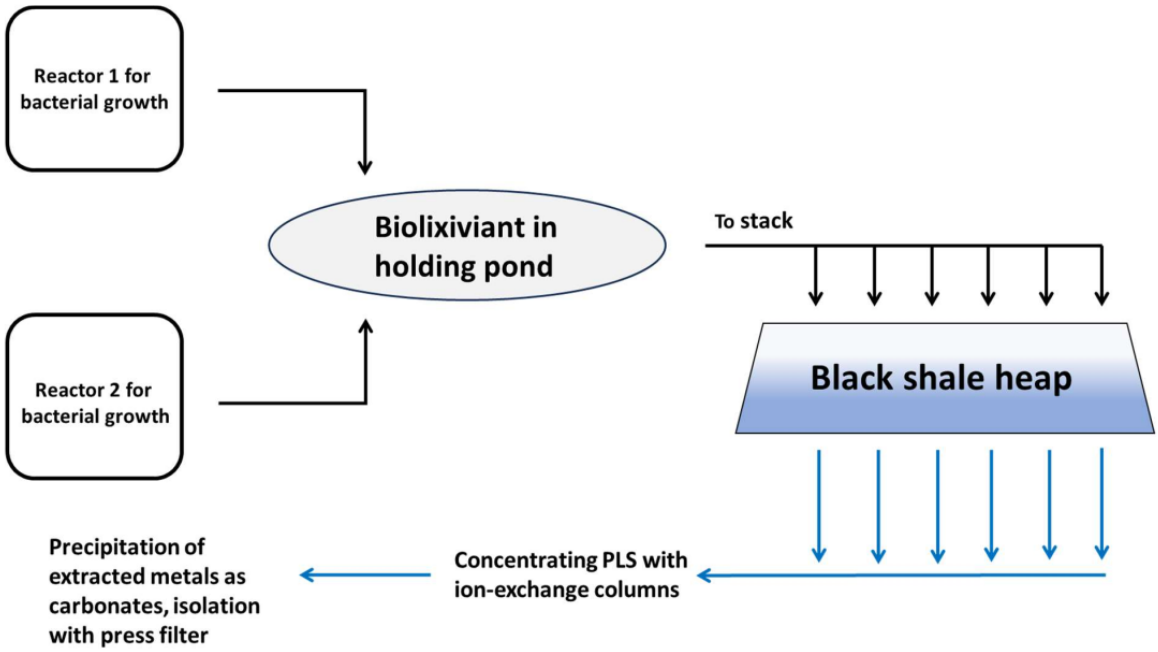

Figure 11. Potential scheme for processing Byro Project Black Shale

Following the excellent results of this test program, Octava is now working through what will be the next stage of development for the Byro Project and will provide updates shortly. This would include further testwork and drilling.

This announcement has been authorised for release by the Managing Director/CEO.

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About Octava Minerals Ltd

Octava Minerals Limited (ASX:OCT) is a Western Australian based exploration company. The Company has 4 strategically located projects in geographically proven discovery areas within Australia.

About BiotaTec

BiotaTec is a European Company established in 2007 with expertise in developing novel bio-leaching approaches for extracting different metals from low grade ores and industrial waste. They provide biomining technologies to help industry to move towards a low carbon future and to increase the availability of critical raw materials.

BiotaTec is developing and licensing next-generation rapid biomining solutions for critical raw materials (CRMs). They have developed technology BiotaMet (BM) which is a cost-efficient extraction method of critical metals from low grade ores and wastes. They have a biomining centre and operational pilot-scale units for testwork in Tartu, Estonia.

Critical raw materials are vital for the carbon-neutral future, as they are irreplaceable in solar panels, wind turbines, electric vehicles, and energy-efficient lighting. BiotaTec has undertaken projects in collaboration with the European Innovation Council (EIC) and other industry groups.

Forward looking Statements

This announcement includes certain "forward looking statements". All statements, other than statements of historical fact, are forward looking statements that involve risks and uncertainties. There can be no assurances that such statements will prove accurate, and actual results and future events could differ materially from those anticipated in such statements. Such information contained herein represents management's best judgement as of the date hereof based on information currently available. The Company does not assume any obligation to update forward looking statements.

Competent Person Statements

Exploration results

Where Octava references previously announced Exploration Results in this report and specifically the information noted in ASX announcements dated 25 February 2025 and 30 April 2025. Octava confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and that all material assumptions and technical parameters in those announcements continue to apply and have not materially changed.

BiotaTec Testwork

Dr Priit Jõers, PhD is Chief Scientific Officer, Biomining Centre, for BiotaTec and has sufficient experience to advise the Company on matters relating to bioleaching microorganisms and process development for extraction of metals from black shale. Dr Jõers is satisfied that the information provided in the announcement on biomining and the BiotaTec testwork has been presented accurately.

Previously Released ASX Material References

For further details relating to information in this announcement please refer to the following:

ASX announcements:

ASX:OCT 25 June 2025
ASX:OCT 25 February 2025
ASX:OCT 5 December 2024
ASX:OCT 24 January 2024

[1] See also - Goldfields Annual Report 2011 - Generating value and mitigating risk through BIOX® and ASTERTM process technologies Page 66