

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 29

**UNITED STATES PATENT AND TRADEMARK OFFICE**

---

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

---

Ex parte JOSE LUIS REVUELTA DOVAL,  
MARIA ANGELES SANTOS GARCIA,  
JOSE JAVIER GARCIA-RAMIREZ, and  
GLORIA ANGELICA GONZALEZ-HERNANDEZ

---

Appeal No. 2004-0601  
Application No. 08/989,140

---

ON BRIEF

---

Before WINTERS, MILLS, and GREEN, Administrative Patent Judges.

GREEN, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claim 10, the only pending claim. Claim 10 is reproduced below.

10. A process for the recombinant preparation of riboflavin which comprises cultivating a eukaryotic organism, which has been transformed by one or more DNA sequences or an expression vector comprising one or more DNA sequences selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 8 and SEQ ID NO: 12, thereby forming a fermentation medium; and isolating the riboflavin from the fermentation medium.

The examiner relies upon the following references:

Perkins et al. (Perkins)                      EP 0 405 370                      Jan. 2, 1991

Oltmanns et al. (Oltmanns), "Biochemical and Genetic classification of riboflavine Deficient Mutants of Saccharomyces cerevisiae," Molec. Gen. Genetics, Vol. 105, pp. 306-313 (1969)

Revuelta et al. (Revuelta), "Biosynthesis of Vitamin B2 in Yeast," In Organizing Committee of Biotech-90(Eds). From Genes to Bioproducts, DM PPU, Murcia, Spain, pp. 117-122 (1990)

Claim 10 stands rejected under 35 U.S.C. § 103(a) as being obvious over the combination of Revuelta and Perkins. After careful review of the record and consideration of the issues before us, we reverse.

#### DISCUSSION

According to the rejection, SEQ ID Nos: 2, 4, 8 and 12 correspond to rib1, rib2, rib4, and rib7, respectively, from Saccharomyces cerevisiae. See Appeal Brief, page 3. Revuelta is cited for teaching the RIB genes, rib1-rib6 and rib7 from Saccharomyces cerevisiae. See id. at 4. The rejection notes that "[w]hile Revuelta [ ] specifically describe[s] the characterization of only rib3 and rib5," but asserts that the reference has "cloned all six genes," thus those DNA sequences "are enabled since one of skill in the art could readily repeat the experiments for rib3/rib5 using a selection mechanism specific for rib1, rib2, rib4, or rib7." Id. While noting that "Revuelta [ ] also suggest[s] returning these genes to yeast by transformation of multicopy vectors and obtaining riboflavin for quantification," the rejection acknowledges that "Revuelta [ ] do[es] not

particularly teach the methods of riboflavin production using yeast transformed with RIB genes.” Id.

Perkins is cited for teaching “the production of riboflavin using the Bacillus RIB genes, specifically a single gene or the entire operon transformed into Bacillus host cells for the overproduction of riboflavin,” and for teaching “obtaining RIB genes from other sources, including yeast.” Id.

The rejection concludes:

It would have been obvious to one of ordinary skill in the art to combine the teachings of Revuelta [ ] and Perkins [ ] to practice methods of producing riboflavin using recombinantly expressed RIB genes in a eukaryotic microorganism because Revuelta [ ] specifically suggest[s] the invention and enable[s] the invention. One would have been motivated to combine the above teachings because as taught by Perkins [ ], riboflavin overproduction in organisms having RIB genes is effective and profitable. Both Revuelta [ ] and Perkins [ ] teach the profitability and usefulness of efficient riboflavin production in host cells. One would have had a reasonable expectation of success that the introduction of S. cerevisiae RIB genes into S. cerevisiae host cells would overproduce riboflavin because identical experiments are taught by Perkins [ ] using Bacillus.

Final Rejection at 5 (emphasis in original).

Appellants argue that while Revuelta discloses the molecular structure of two genes involved in riboflavin biosynthesis, rib 3 and rib 5, those genes were isolated through the production of mutants that were defective in the respective rib gene and complementation of these defective mutants by DNA of a yeast library. See Appeal Brief, page 3. Appellants assert that neither the way Revuelta produced the mutants nor how complementation was assessed is

disclosed by that reference either explicitly or through reference to another document. See id. at 3-4.

Appellants contend that neither Revuelta nor the combination enables the claimed invention “because the references do not show or suggest how to make such mutants and how to assay the complementation to these mutants to identify the rib1, rib2, rib4, and rib7 genes,” arguing that the statement in Revuelta that they have cloned all six genes does not amount to an enabling disclosure “for the isolation of said genes.” Id. at 4. Perkins does not remedy the deficiency of Revuelta, according to appellants, because Perkins pertains to the use of the rib genes from Bacillus, a prokaryotic organism, wherein the genes are organized in one operon, whereas the rib genes of S. cerevisiae are distributed over the whole genome of the organism.

We agree with appellants that the rejection fails to set forth a prima facie case of obviousness. “[T]he Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. ‘[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.’” In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citation omitted). An adequate showing of motivation to combine requires “evidence that ‘a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.’” Ecolochem, Inc. v.

Southern Calif. Edison Co., 227 F.3d 1361, 1375, 56 USPQ2d 1065, 1076 (Fed. Cir. 2000).

Moreover, whether a rejection is made under section 102 or section 103, the prior art must place the invention in the possession of the public, that is, enable one of ordinary skill to practice the invention. See In re Hoeksema, 399 F.2d 269, 274, 158 USPQ 596, 599 (CCPA 1968). With respect a nucleotide sequences, “the existence of a general method of isolating cDNA or DNA molecules is essentially irrelevant to the question whether the specific molecules themselves would have been obvious.” In re Deuel, 51 F.3d 1552, 1559, 34 USPQ2d 1210, 1216 (Fed. Cir. 1995), citing In re Bell, 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993).

In this case, the only reference to the rib 1, rib 2, rib 4 and rib 7 genes required by the process of claim 10 is the disclosure by Revuelta that that have “[r]ecently . . . cloned all the six genes encoding flavionegic enzymes.” There is no disclosure of the sequence of those genes, nor does the reference even teach isolation of those genes. As acknowledged by the rejection, Revuelta only describes the characterization of the rib3 and rib5 genes. The rejection asserts further that one of skill in the art could readily repeat the experiments for rib3/rib5 using a selection mechanism specific for rib1, rib2, rib4, or rib7, but as noted above, the existence of a method of preparing a DNA molecule does not render the DNA molecule obvious. As the method of claim 10 requires the DNA sequences of SEQ ID NO: 2 (rib 1), SEQ ID NO: 4 (rib 2), SEQ ID NO: 8 (rib 4) and SEQ ID NO: 12 (rib 7), and as neither Revuelta or Revuelta as combined

with Perkins places the claimed DNA sequences in the possession of the public, the rejection fails to set forth a prima facie case of obviousness, and the rejection is reversed.

CONCLUSION

Because the rejection fails to set forth a prima facie case of obviousness, it is reversed.

REVERSED

Sherman D. Winters	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
Demetra J. Mills	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
Lora M. Green	)	
Administrative Patent Judge	)	

LMG/jlb

Appeal No. 2004-0601  
Application No. 08/989,140

Page 7

Keil & Weinkauff  
1101 Connecticut Ave. NW  
Washington, DC 20036